Aspect, tense and modality:

Theory, typology, acquisition

Volume I

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Aspect, tense and modality:

Theory, typology, acquisition

Volume I

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Voor Jan

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Chapter 1

Introduction

1.1 INTRODUCTION

The majority of human beings take one of their most typical characteristics for granted: their ability to use language. However, this ability is one of the most extraordinary and sophisticated properties of human beings. Seemingly simple aspects of specific languages are practically impossible to describe correctly, yet human beings use them without any problems. Although it takes a few years, children learn to speak like their parents, including the most complex constructions, without any explicit instruction. There is large variation in language systems all over the world and all these different systems are adequate systems for human communication. What, then, is language exactly? What is it used for and how does it work? And what are the cognitive mechanisms that make language use possible?

Unfortunately, the above questions are in general studied independently. Theoretical linguists are concerned with the question what language systems look like and, possibly, how they function in communication. Psycholinguists on the other hand are concerned with the question how our brains work and how language is processed and acquired. The two groups of scholars do not often turn their attention to each other's field of research. However, there are probably strong relations between the two areas. On the one hand, cognitive processes may be of strong influence on possible language systems. What is easier to process and to acquire may be crosslinguistically more frequent. Language systems cannot be fully understood if it is unclear how the system develops in individual language users. On the other hand, the knowledge on variation in language systems may help in understanding the mental processes that play a part in language use and in language acquisition. Recurring linguistic properties may reveal important insights in cognitive processes. Although there is large variation in the acquisition of forms in different languages, from a more abstract viewpoint, there may be universals in the acquisition of the communicative and semantic functions that are expressed by language. Here, the study on linguistic variation might provide helpful insights. It is thus necessary to combine the knowledge of the two disciplines in order to establish

a deeper understanding of language and language users, their communicative needs and cognitive capacities.

In this thesis an attempt is made to examine the relation between universals in typological variation and in first language acquisition. This relation will be examined in the semantic domains of aspect, tense, and modality and the related domains of irrealis, evidentiality and quantification. These domains have been subject to a considerable number of studies on the theoretical side, on typological issues and acquisitional phenomena. This study focuses on the question to what extent the variation in grammatical systems of aspect, tense and modality is identical in languages of the world and in stages of language acquisition. This chapter discusses in more detail the significance of universals in adult language (1.2) and in child language (1.3) and the relation there might be between the two (1.4). Section 1.5 discusses how a functional grammatical theory might help to investigate and explain linguistic phenomena. Section 1.6 discusses the main research question and the structure of this thesis.

1.2 LINGUISTIC UNIVERSALS

At present there are about 6.000 different languages known, including extinct languages. These languages exhibit a rich diversity in every possible aspect of their linguistic systems: sounds, word and sentence structure, lexicon, social rules for appropriate language use, etcetera. Despite the fact that the variation is immense, there are limits on variation: only a subset of all logically possible combinations of linguistic properties is actually attested. Variation in language systems is not arbitrary. There are systematic similarities, presumably determined by essential universal human characteristics. One of the ultimate aims of linguistics is to discover uniformities between languages and the patterns in rule systems. If it is known what are possible and impossible languages, this will help to understand how the human mind works.

The quest for language similarities or linguistic universals is based on crosslinguistic comparisons (Comrie 1989; Croft 2003; Greenberg 1963). Linguistic universals are of different types. Firstly, there is a distinction between on the one hand **unconditional** or **unrestrictive** universals and on the other hand **implicational** universals. Unconditional universals state a constraint on possible language types on one specific parameter, independent of other linguistic properties, such as 'Indefinite articles never have more than two syllables' or 'No language has only VC or CVC syllables'[1]. More often however the presence or absence of a linguistic property is related to the presence or

[1] Both from the Universals Archive, http://ling.uni-konstanz.de/pages/proj/sprachbau.htm (Plank & Filiminova 2000).

absence of another property, so that the universal is implicational. An example of an implicational universal is the presence of reflexives: If there is a pronominal reflexive for first person, then there is also one for second person and third person (Faltz 1985). In other words, no language has first person reflexives without also having second and third person reflexives, whereas the opposite configuration does occur. Implicational universals reveal important information about languages as they connect linguistic properties that are logically independent. The general format of an implicational universal is: If Q, then also P, which implies that there are languages with both properties, without both properties or with only property P, but there are no languages with only property Q. This is presented in (1):

(1) ***IF Q, THEN P***

P	**Q**	
−	−	Attested
+	−	Attested
+	+	Attested
−	+	Unattested

A second distinction in types of universals is between **absolute** and **statistical** universals: Absolute universals are by definition exceptionless, as far as we know. Statistical universals, however, have counterexamples, but they do reveal interesting information about relations between different linguistic properties. Suppose there are two properties, R and S, then theoretically there are four possible linguistic systems: with both properties, without both properties or with one of the properties. If there is no relation between the properties, it may be expected that the distribution between all four types would be randomly distributed, for example as in (2):

(2)

	+ R	**− R**
− S	26 %	22 %
+ S	23 %	29 %

If, however, the distribution is not random and this deviation is statistically significant, it may be assumed that R and S are somehow related, even though this relation is not absolute. An example of such a relation is: If the dominant word order is VSO, the language is **probably** prepositional (Dryer 1992). A

possible non-random distribution of the two properties R and S is presented in (3):

(3)

	+ R	**− R**
− S	42 %	24 %
+ S	27 %	7 %

In (3), the presence of S seems to be dependent on the presence of R. There are hardly any languages (only 7%) in which S is present, but R is not. Such a strong tendency is remarkable and needs an explanation.

In short, if both distinctions are combined, there are four different types of universals:

1. Absolute unconditional universals (all languages have P).
2. Absolute implicational universals (if a language has Q, then it also has P).
3. Unconditional tendencies (nearly all languages have P).
4. Implicational tendencies (if a language has Q, then it will probably have P).

It appears that most linguistic universals are of the fourth type; implicational tendencies. In many cases, there may be dependencies between more than two properties and they can be ordered as a sequence of implications, such as presented in (4):

(4) $M \subset N \subset O$

in which '⊂' can be interpreted as: 'is implied by'. The presence of M is implied by the presence of N, and the presence of N is implied by the presence of O. These sequences are called **implicational hierarchies**. An example of such a (statistical) hierarchy in the domain of phonology is presented in (5) (Jakobson 1941/1968):

(5) /p/ ⊂ /t/ ⊂ /k/

The presence of the phoneme /p/ is implied by the presence of /t/ and the presence of /t/ is implied by the presence of /k/. In other words, a language with the phoneme /k/, also has the phonemes /t/ and /p/ and a language with the phoneme /t/, also has the phoneme /p/. The relation does not hold the other way around. An example within the domain of the lexicon is presented in (6) from Berlin & Kay (1969):

(6) dark / light ⊂ red ⊂ green ⊂ blue ⊂ brown ⊂ purple
black / white yellow pink
orange
grey

This hierarchy predicts that if a language has a color term more to the right, it also has the preceding color terms on the left.

There has been a recent debate about the usefulness and relevance of implicational hierarchies. Cysouw (2003) has warned against the practice to claim an implicational relationship on the basis of distributional frequency of different configurations of linguistic properties. He argues rightly that the distribution of configurational patterns is only relevant if it is significantly different form what can be expected on the basis of frequency of the individual linguistic properties alone. He concludes that there are only mutual statistically significant correlations between linguistic properties, but no true implications or one-way dependencies. In reaction to Cysouw, Maslova (2003), Dryer (2003) and Plank (2003) have objected to this latter stance and have convincingly shown that different types of unidirectional implicational relationships do exist and can be objectively established by statistical tests. They all, however, stress the importance of finding meaningful interpretations of relationships between linguistic properties after having established a statistically significant distribution of configurational patterns.

What is the information that implicational hierarchies provide? Firstly, they describe the possible or most likely configurations of linguistic properties in languages of the world within a specific domain. The hierarchy in (5) predicts that languages are likely to occur that have only /p/, or /p/ and /t/, or /p/, /t/ and /k/ are likely to occur, whereas languages with only /t/, only /k/ or with /t/ and /k/ but no /p/ are impossible or unlikely.

Secondly, implicational hierarchies describe the frequency of occurrence of certain items, both crosslinguistically and within a single language. The more to the left of the hierarchy an item is positioned, the more frequently the item will be found within languages of the world, but probably also within a single language. With respect to the phonological hierarchy this means that /t/ is more frequent than /k/ crosslinguistically, but also within one language.

Thirdly, implicational hierarchies provide ways to systematically describe differences between languages. From the hierarchy, the 'cut-off point' of a language may be determined: languages may have properties of the hierarchy up to a certain point. For example, if a language has property M and N of the hierarchy in (4) but not property O, then the cut-off point for that language lies between N and O. Since the hierarchy exhaustively defines the permitted configurations, no linguistic system will exist that does not conform to the

hierarchy. Consequently, it is only at the cut-off point that a language will change: it either loses property N or it acquires property O. This relation between typological and diachronic data was first hypothesized in Greenberg (1978) and later confirmed in many case studies. It is also at the cut-off point that there is regional variation and that language users are insecure about the grammaticality of the involved characteristics.

It is an ongoing debate how to explain linguistic universals in general and implicational hierarchies in particular. Within formal approaches to language, linguistic variation is presumably constrained by an innate universal grammar (UG) that contains possible values for different linguistic parameters. Within functional approaches on the other hand, the paradigm in which this thesis is embedded, universals are explained directly by general cognitive capacities of human beings, and properties of human communication (e.g. Comrie 1989: 24-29; Dik 1997a: 7). Implicational hierarchies are said to reflect scales of universal preferences (Haspelmath 2004; Vennemann 1983), also called scales of typological markedness (Croft 2003) and they are also referred to as markedness or preferential scales.

How do cognitive capacities and properties of communication influence linguistic systems? Human beings are dependent on their cognitive capacities in order to produce and interpret language: it may be assumed that linguistic structures that are easy to process are the most efficient and functional in communication and have the greatest chance to emerge and to survive in language use. Structures that cognitively tax our brains, on the other hand, disturb the fluency of communication. Such user-unfriendly structures have little chance to arise and will quickly change to structures that may be processed more efficiently (cf. Haspelmath 2004: 565). The way our brains process information will determine and restrict the possibilities for efficient linguistic rule systems. It is known for example that the processing of subordinate clauses is easier—all other things being equal—when they are at the beginning or end of the sentence (left- or right peripheral), than when they are in the middle of the main clause. It appears that there is a strong tendency for the order of noun and relative clause to correlate with the basic word in such a way that the preferred order arises, i.e., in SOV languages relative clauses tend to occur on the left, and in VSO languages on the right (Comrie 1989: 27).

Although it is not exactly known how the mind works, it is certain that different factors play a part in efficient processing, such as perceptual saliency, frequency, iconicity and economy. Perceptual saliency helps the hearer identify an element; frequent use of an element or structure facilitates storage and retrieval. The principle of iconicity is that 'the structure of language reflects in some way the structure of experience' (Croft 2003: 102). It is, for example, easier to process a sentence that iconically reflects the temporal ordering of

events—*he locked the door before he left*—than a sentence that does not—*before he left, he locked the door*. A one-to-one relation between form and function may also be considered a reflection of iconicity. The principle of iconicity competes with the principle of economy: 'the expression should be minimized where possible' (2003: 102). It is more economic, but less iconic, to express different meanings in one morpheme (more functions in one form), such as in homonymy or when person and number are expressed in one inflectional morpheme.

Another way in which human cognition plays a part in linguistic systems is through the influence of conceptual structures. A recent approach to linguistic universals is the semantic map model: these are universal structures of conceptual knowledge, represented by the semantic or conceptual space, that describe the universal relations between conceptual values (Croft 2001: 105). Languages differ in how they map linguistic constructions onto the conceptual space, and in what meanings are covered by a single linguistic element (e.g. Anderson 1982, 1986; Croft 2001, 2003; Van der Auwera & Plungian 1998). A linguistic element always maps onto one or more concepts that are related within a conceptual space (Croft 2001: 96; Van der Auwera & Plungian 1998: 112). An example of such a conceptual space or conceptual continuum is presented in Bowerman & Choi (2001) for static spatial relationships, consider Figure 1-1:

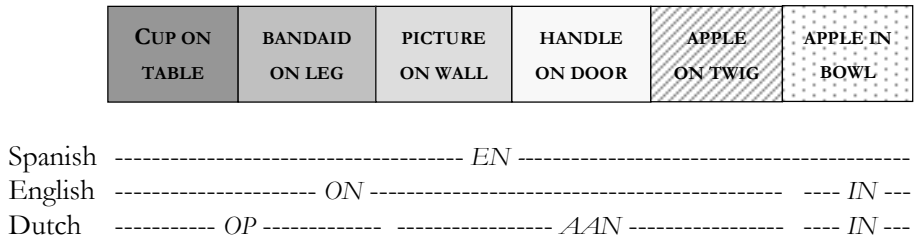

Figure 1-1. Simplified conceptual space for static spatial relationships and crosslinguistic variation in semantic mapping (adapted from Bowerman & Choi 2001: 485)

[2] Bowerman & Choi (2001) do not present a form for the expression of the four relations in the middle for Japanese.

It appears that languages do not

> categorize spatial situations in arbitrarily different ways. All of them appeared to be constrained by an underlying gradient—an implicational hierarchy—that orders spatial situations in the way shown in [Figure 1-1] (…) there was variation in how many spatial terms a language used to cover the situations, and in where the territory of one term left off and that of the next began, but if a term was used for more than one segment of the gradient, it covered *adjacent* segments. (Bowerman & Choi 2001: 485-86)

Besides cognitive skills of the language users, the function of language itself will be decisive in the development of linguistic systems. Language is an instrument for expressing communicative needs of human beings, such as asking questions; referring to entities, situations or ideas; making other people do, know or believe something; maintaining social relationships; describing events; expressing ones needs and wishes, etcetera. As the functions of language are assumed to be universal, the crosslinguistic variation in linguistic systems will be restricted: every language is an instrument for the same communicative functions. Although there are many different instruments, not every logically possible linguistic system could be an adequate instrument of human communication. For example, probably all languages have means to distinguish between interrogatives, declaratives and imperatives. A common expression form for this distinction is intonation and/or word order, whereas there is no language that expresses tense or number by a change in word order or intonation. It may be assumed that the former functions are very urgent or basic to communication and therefore need to be substantially different from each other: word order and intonation are perceptually very salient distinctions. A rather straightforward example of an assumed relation between form and communicative function is that a warning, for example for an approaching elephant, buffalo, or truck driver, is not efficient or functional if the part of the linguistic structure that signals the warning is at the end of a long construction. Finally, the fact that different linguistic rules have to collaborate and operate as a well-oiled machine probably blocks certain configurations of properties, as they would lead to ineffective systems, unsuitable for communication. Some universal linguistic phenomena thus 'serve to make language more functional, either as a communication system in general, or more particularly relative to the communicative needs of humans' (Comrie 1989: 26-27).

No sharp boundary can be drawn between the influence of cognition and of communicative needs, since they are interrelated. It may be assumed that the way human beings conceptualize the world influences what they want to talk about and how they structure their linguistic information. Concepts that are relevant to human beings (entities, activities or properties people naturally pay attention to) will in general also be relevant or basic aspects in communication. Thus, universal

cognitive bias and communicative needs are closely related to each other, and are expected to have influence on language systems.

In sum, universal cognitive capacities and properties of communication determine the boundaries for linguistic variation; they are the restraining framework in which languages are shaped and continuously reshaped. Since language users all around the world have comparable cognitive capacities for processing information and constructing concepts, linguistic rule systems will look alike. And since language users all around the world try to reach similar communicative goals, the instruments they use, i.e. their languages, will show similarities. This influence could be schematically represented as in Figure 1-2.

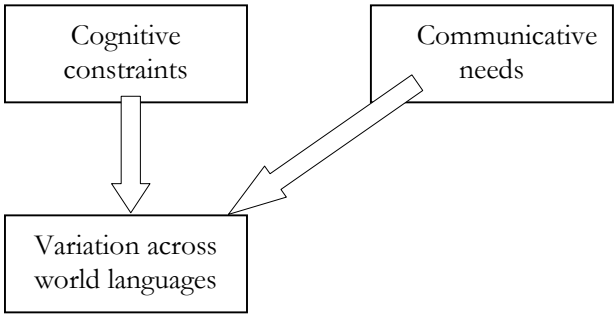

Figure 1-2. Constraints on typological variation

There are different explanations for different universals. Every linguistic universal needs an explanation in cognitive or communicative terms, rather than in terms of an innate universal grammar (UG) (cf. Slobin 1985). In this view implicational hierarchies reflect extra-linguistic sequences going from least to most abstract in meaning, from most to least relevant to communication, most to least efficient in processing or perceptually most to least salient. None of these sequences is by itself a sufficient explanation for all possible restrictions: they complement each other. Future research may reveal further general social-cognitive characteristics in human beings that constrain possible language types.

1.3 UNIVERSALS IN FIRST LANGUAGE ACQUISITION

Linguistic universals are not only of importance to the description of linguistic systems of adults. In the study of first language acquisition there is an ongoing debate about what is universal in the process of language acquisition and what is language-specific (see Berman 1986; Bowerman & Levinson 2001b; Lieven 1997; Slobin 1985, 1997). Children start at the same, universal point, but end up

speaking different languages. On the one hand there is evidence that children follow similar developmental paths crosslinguistically, for example, active constructions are acquired before passive constructions and main clauses before subordinate clauses, but on the other hand there is evidence that children immediately pay attention to language-specific characteristics, for example, the acquisition of spatial expressions in English, Mayan languages and Korean follows language-specific patterns from the start (Bowerman & Choi 2001; P. Brown 2001; de León 2001; Levinson 2001).

What is universal in child language and what is language-specific? Similar to what was assumed for adult human beings, cognitive capacities of children are in principle universal (although there is individual variation in age and speed of development) and the same holds for their communicative needs. It thus may be assumed that cognitive capacities and communicative needs form a universal constraining framework in which language is acquired. The fact that children learn to speak different languages is obviously the consequence of a difference in language input.

One hotly debated issue is what the cognitive capacities are that children bring to the job. The debate has largely concentrated on the question of how children acquire the meaning of words. This may at first sight seem a rather uncomplicated aspect of language acquisition, but when one considers all the logically possible referents of a word, the problem of assigning meaning to words turns out to be virtually unsolvable. This can be illustrated by the famous example of Quine (1960: 29), who described this 'problem of referential indeterminacy' in the context of a native speaker who says *gavagai* to a field linguist at the moment a rabbit runs by. The linguist immediately assumes that *gavagai* means 'rabbit', but how can he be sure that the word does not refer to this specific rabbit only, to animals in general, to a specific part or property of the rabbit such as his head, furriness or color, to the activity of scurrying, etcetera? Besides, as Bloom (2000: 4) noticed, *gavagai* could equally well mean 'Look!' or 'I'm bored', or it could be the case that the chain of sounds consists of two or more words.

Children continuously need to assign meaning to words. But how do they succeed if there are simply too many possible referents? Apparently, children do not come up with all the logical options: there must be some restrictions on what they consider potential referents. One way to think of these restrictions is to suppose that there are very specific constraints on word learning (see Landau, Smith, & Jones 1988; L. B. Smith 2001; Waxman 1990, 1994). Children could for example assume that words only refer to whole objects or entities (the entire rabbit) and not to parts or properties of it (the ears, the softness) (see Golinkoff, Mervis, & Hirsh-Pasek 1994; Macnamara 1982; Markman 1989, 1994), or that words only refer to a whole category of objects (rabbits), rather than to a

subgroup of it (running rabbits, eating rabbits) (Markman & Hutchinson 1984). There is disagreement whether constraints or word learning principles are innate or learned, generally cognitive or specifically linguistic, universal or language-specific and at what age they play a role in children's word learning.

A different way to face the problem of word learning is the recent social-pragmatic, usage-based account of first language acquisition, in which the idea of a priori constraints on word learning is weakened or even rejected (see P. Bloom 2000, 2001; Clark 2003; Slobin 2001; Tomasello 1999, 2001, 2003). On the contrary, this approach assumes that general social-cognitive abilities guide the child in language acquisition. In this view, Quine's description of the problem of referential indeterminacy is mistaken, in that it ignores the influence of a shared context in communication. Children acquire language in social interaction and they make use of the shared context between parent and child for establishing possible referents for a word. Bloom (2000) states that:

> words are learned through abilities that exist for other purposes. These include an ability to infer the intentions of others, an ability to acquire concepts, an appreciation of syntactic structure, and certain general learning and memory abilities. These are both necessary and sufficient for word learning. (p.10)

Tomasello (1999; 2001; 2003) poses that understanding of intentional and mental states of other persons is the crucial property that enables human beings to use language and to communicate. He argues that from around nine months, the ability emerges in human infants to understand others as intentional agents like themselves (Tomasello 2003: 3, 21-28). This means that children understand goal-directed behavior and attention of others as manifest in their behavior[3]. This ability becomes manifest by some important changes in the behavior of children around this age, which do not take place in non-human primates. Firstly, children become able to check the attention of others by following gaze: they begin to share attention with others to an object or event of mutual interest (joint attentional frame). Such situations of joint attention create a domain 'of current relevance' for the child, a common contextual frame for interpreting the communicative intentions of the other. Secondly, children start monitoring emotional reactions of adults: they begin to understand that the communicative intention of the other is to change their own intentional states, for example, the other intends for the child to change his or her attention towards an object. Tomasello (2001: 133) states that 'the understanding of intentions—specifically, the understanding that other persons have intentions towards my intentional states—is the very foundation on which

[3] It is only around age four that children understand the other as a **mental agent**: a person with plans, beliefs, and desires that are not necessarily visible in behavior (cf. Tomasello 1999: 179).

language acquisition is built'. The third change that Tomasello mentions is that, because children now understand the other as an intentional agent, they become able of imitative learning, also called social or cultural learning. The crucial point about imitative learning is that the child not just mimics the adult's action: the child identifies with the adult, and understands the underlying goal or intention of the adult's action. The child thus intentionally reproduces the adult's intentional act and imitatively learns the use of tools and instruments. In this approach, the use of language as an instrument to communicate intentions is one of the domains in which social learning takes place. Children start to imitatively use language. The imitation of this intentional linguistic behavior leads to the acquisition of linguistic symbols, as a by-product of social interaction.

Tomasello further states that the process of assigning meaning to sounds takes place in contexts of joint attention and that children's interpretations of adult speech are based on the assumption that this speech will be relevant to the ongoing social interaction. The 'social contexts serve to "constrain" the interpretive possibilities' (Tomasello 2001: 135): children simply do not come up with all the possible hypotheses for linguistic symbols, since they would not make sense in the context. In addition, Tomasello (2001: 135-36) assumes that, when children begin acquiring language, they have 'an adult-like understanding of at least some aspects of the social activities in which they participate'. They have a growing ability to conceptualize the world similarly to adults, which also restricts them from certain hypotheses about word meanings. These conceptualizations, however, are not a priori tied to language in specific ways.

> The process of word learning depends fundamentally on the child being biased to conceptualize the world in certain ways (similar to adults' conceptualizations), it is just that the connection of conceptualizations to language must be learned in communicative interactions with others. (Tomasello 2001: 153)

In a similar vein, Slobin (2001) argues that the acquisition of grammatical elements is restricted by the communicative context in which these elements are used because this context simply restrains children from postulating certain notions as meanings for these forms. As opposed to his earlier work (1985), he now claims that there are no prelinguistic (grammaticizable) notions in the individual child's mind that operate as constraints on interpreting linguistic elements. Language variation is limited not because of a universal restricted set of semantic entities that can be expressed grammatically, but because of 'conditions on the processing, social use and learning of form-function relations' (Slobin 2001: 438). It is the social-historical development of language that creates forms to express what is relevant, important or salient to human experience and communication.

Finally, Clark (1987; 1993; 2003) proposes that from an early age children are sensitive to the pragmatic principles of conventionality and contrast, which

encompass the assumptions that there is a conventional form for expressing a certain meaning, and that a difference in form signals a difference in meaning. Now if a speaker does not use the conventional form in an appropriate context, then the addressee infers that he must mean something different from what the conventional form would have signified. This pragmatic understanding also helps in assigning meaning to words.

Contrary to Bloom (2001: 178), both Slobin (2001: 439) and Tomasello (2001: 155) argue that the same learning mechanisms apply across the lexicon, including both content words, purely lexical items, and functors, purely grammatical items. I subscribe to the position that the acquisition of grammatical elements as well as whole linguistic constructions are embedded in a social-pragmatic context and is guided by their communicative functions.

What is universal in language acquisition is the capacity of children to interpret communicative intentions and to imitate these intentions in addition to general learning abilities, such as various kinds of pattern finding or categorization.[4] A further domain that probably is of influence to language acquisition is the general conceptual development of children. The conceptualizations that children make are to a large extent universal and independent of their native language, although recent attention to the Sapir-Whorf hypothesis (Whorf 1956), stating that language-specific characteristics cause their speakers to have different conceptualizations of the world, suggests that 'some very moderate form of "Whorfianism" may be unavoidable' (Bowerman & Levinson 2001a: 13). Nevertheless, children learning different languages have to discover which concepts are denoted by which linguistic elements in their native language. These relations are not pre-determined or constrained. In the words of Levinson (2001):

> Many linguistic categories are simply not natural in any straightforward sense at all: they have to be learnt from instances of usage. Sure, they may be built out of underlying "natural" concepts, and moreover the range of variation may be limited. But the point is that languages *construct* concepts that otherwise might not have been. And that is precisely the added cognitive value of language: it provides "un-natural concepts," complex conceptual wholes which connect across natural capacities (…), and which can be processed as units in working memory, thus vastly increasing the power of our mental computations. (…) This picture is radically opposed to the standard line in child languages research, which assumes that language rests directly on the fundaments of preexisting categories. (p.584)

The linguistic input to children in social interaction is the primary source for children that reveals form-function relations and that helps children to construct linguistic categories. The input to children is not universal: it varies in many respects, both structurally and in social-interactional ways, both crosslinguistically

[4] Cf. Tomasello (2003: 4) for a summary.

and cross-individually (see e.g. Lieven 1994; Pine 1994). However, the possible variation in input languages, as argued in section 1.2, is limited: the communicative intentions for which language is used are similar in all different input languages and the possible structural and semantic properties are also restricted. Furthermore, the communicative needs of children themselves are in all probability universal. Children all over the world develop similar communicative needs: they want to describe what they see, express desires and intentions, ask questions and give orders, etcetera.

To conclude, there are several important universal factors involved in the process of first language acquisition: general processing and learning capacities, conceptualizations, functional and structural universals in language input, and communicative intentions of the children. These factors are expected to restrict the possible linguistic systems that may arise. During every stage of language acquisition, the child's linguistic system, however primitive, is evidently controlled by the cognitive capacities of the child and it functions as an instrument for expressing communicative intentions of the child. As was argued in the previous section for adult languages, this will restrict the possible variation in child language.

Language acquisition is thus dependent on cognitive as well as communicative factors, just as similarities between adult languages of the world are dependent on cognitive as well as communicative factors. See Figure 1-3 for a schematic representation.

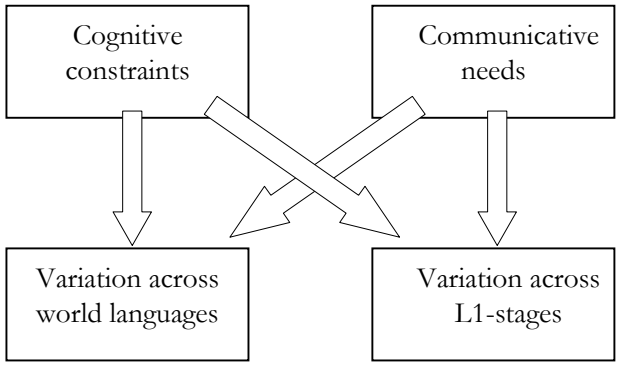

Figure 1-3. Constraints on language variation

The limits on variation may be described using words of Tomasello:

> There are (…) universals in the way symbols are created, learned, and used across languages, of course, reflecting universals both in the way human beings experience the world and in the ways they interact and communicate with one another socially. (Tomasello 2001: 135)

1.4 RELATIONS BETWEEN UNIVERSALS IN ADULT AND CHILD LANGUAGE

If human cognition and communicative intentions are the restraining factors in linguistic variation, both in typology and in acquisition, it may be assumed that there is a connection between typological phenomena and language acquisition: universals will identically be reflected in the typological domain and in stages of language acquisition. What is cognitively more efficient, conceptually more salient or communicatively more basic or relevant will be more frequent within languages of the world as well as within different stages of language acquisition.

In section 1.1 it was explained that variation in adult languages is often described by implicational hierarchies, which reflect scales of cognitive and communicative factors, such as perceptual saliency, communicative relevance, processing efficiency, etcetera. Consider once more the general format of a hierarchy:

(7) $P \subset Q \subset R$

in which '$\subset$' should be interpreted as: 'is implied by'. The presence of property P is implied by the presence of property Q. Another approach is to call P a less marked property than Q. Here, I use 'less marked' to refer to conceptually less difficult and communicatively more motivated.[5] Less marked properties have higher frequency of use[6] and occur more often crosslinguistically. It has often been demonstrated that implicational hierarchies are reflected in languages of the world. For example, Bybee (1985) has shown that the ordering of morphemes is motivated by the iconic principle of Behaghel (1932: 4) 'what belongs together mentally is placed close together syntactically': morphemes are ordered in such a way that they reflect their relevance to the meaning of the stem they modify.

If the same types of language-external constraints hold for child and adult language, then the assumption is justified that implicational hierarchies or

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[5] See Haspelmath (t.a.) for a critical discussion of the use of the term markedness.

[6] Contrary to Haspelmath (t.a.), I assume that conceptual difficulty is primarily the cause for low frequency of use in adult languages, and not the effect of it.

markedness scales also describe the variation within child language systems. Analogous to the prediction for adult linguistic systems, it may be predicted that within the process of language acquisition every stage will consist of a linguistic system that is in accordance with the implicational hierarchy. The hierarchy in (7) predicts that there should be no stage in which element Q is present, but P is not, or in which element R is present, but P and Q are not. If variation in child language is actually restricted by similar factors as variation in adult language, then the hierarchies exactly predict in what order elements are acquired. Only if children acquire first the least marked element P, then the more marked element Q and finally the most marked element R, their linguistic system is at every stage in accordance with the hierarchy, i.e. with cognitive or communicative constraints that hold for every human being. Another possibility is that children acquire the different properties simultaneously: for example, children could start out with property P and Q simultaneously and only later acquire property R. The acquisition order will thus follow the direction of the hierarchy: what is more to the left, will be acquired earlier than what is more to the right. If this is not the case, then a system arises in which for example the more marked property Q is present but the less marked property P is. This system would cross the limits of variation.

Implicational hierarchies or markedness scales established for describing adult language variation are thus hypothesized to be reliable predictors of universals in language acquisition. The relation between possible language variation and first language acquisition may even be so strong that the explanation for (some) implicational hierarchies is to be found in the learning capacities of children: the absence or infrequency of certain structures in adult languages might not be caused by the fact that adults would not be capable of using them, but by the fact that children have much difficulty learning them.

Whether the variation in adult and child languages is limited in identical ways will be the main subject of this thesis. The predictive power of implicational hierarchies for phenomena in languages of the world and for acquisition order will be investigated in the domain of aspect, tense, and modality.

1.5 FUNCTIONAL LINGUISTIC THEORY

Before turning to the actual study, the role of linguistic theory will be discussed. This thesis is embedded in the framework of Functional Grammar (Dik 1997a), a grammatical model of language, based on semantics and pragmatics. Within a functional framework, language is considered an instrument for social interaction, meant to establish communicative relations between human beings. This instrument, however, is structured by rules: a rule system of semantic, syntactic, morphological and phonological rules governs the constitution of

linguistic expressions while communicative rules or principles account for the patterns of verbal interaction, in which the linguistic expressions are used. Within this linguistic rule system, phonology is viewed as instrumental with respect to morphosyntax; morphosyntax is viewed as instrumental with respect to semantics and semantics is viewed as instrumental with respect to communicative functions.

The aim of Functional Grammar is to describe the rule systems of languages, from the starting point of communicative intentions or functions and semantics. The model should be general enough to describe every possible language, and specific enough not to describe impossible language systems. Furthermore, it should not only account for sentences but also for connected discourse. These requirements are defined as the descriptive adequacy of a theory (cf. Chomsky 1965). As different grammars could be constructed with the same descriptive adequacy, an even more important criterion for a linguistic model is its 'explanatory adequacy' (Dik 1997a: 13). In order to arrive at explanatory adequacy, the grammatical model may not clash with the restrictions on linguistic variation. Therefore the model should be compatible both with cognitive and communicative factors.

Following up on Dik (1997a: 12-15), Boland (1999) defined the criteria to which the model of Functional Grammar should comply as two standards of explanatory adequacy, namely the standard of cognitive adequacy and the standard of communicative adequacy, and as two domains of application, namely the domain of typological variation and the domain of acquisitional variation. The standards of explanatory adequacy serve as the constraining framework within which a theory can be developed. The standard of cognitive adequacy captures general cognitive features of human beings that might play a part in language function and form. A linguistic model should be compatible with cognitive models of linguistic behavior, processing capacities and conceptualizations of human beings. Givón (1988) provides a good example of relating cognition to language use. He explains the fact that in most languages the first position of the clause has a special function by a psychological feature of humans: it attracts more attention from the addressee. Givón states that 'the string-initial position invites the hearer to **pay more attention**, and thus to store and retrieve the information more efficiently' (1988: 276). This kind of relation is precisely what should be understood by the standard of cognitive adequacy. Human cognitive capacities have an impact on language and this relation should be made clear in a grammatical model.

The standard of communicative adequacy requires that a grammatical model should fit in a broader pragmatic theory of verbal interaction. Within a functional approach verbal interaction is described as follows: a speaker wants to communicate a certain intention to an addressee for which he uses a verbal

expression. In the production as well as the interpretation of verbal expressions speaker and addressee make use of pragmatic information: this is the knowledge of the preceding context, the current speech situation and general knowledge of the world. The speaker anticipates the interpretation of the addressee of his utterance by estimating the pragmatic information of the addressee, and shapes his intention in such a way that the addressee will be capable of reconstructing the intention of the speaker. In interpreting the speaker's utterance, the addressee uses his own pragmatic information but he also makes an estimation of the pragmatic information of the speaker. The utterance in itself does not establish but rather mediates the relation between the intention of the speaker and the interpretation of the addressee. A linguistic model ultimately describes what the communicative intentions and functions of language are, and provides explanations on how different linguistic elements may function as a clue for encoding and decoding communicative intentions.

The two standards thus set the boundaries within which a linguistic model has to fit: a functional grammatical model may not be in conflict with what is known about communicative and cognitive factors, and should preferably reflect universal cognitive and communicative principles. The goal of the grammatical model is then to provide adequate descriptions of languages and systematic explanations for differences and similarities between natural languages. There are two domains of application of a theory: the theory should account for possible linguistic variation in languages of the world and in stages of language acquisition.

The first domain of application is typological variation. In Dik's words:

> A typologically adequate theory reveals the most fundamental recurrent properties of natural languages, properties which have sedimented into the systems of languages through centuries of intensive use in verbal interaction. It is a reasonable working hypothesis, then, that those principles which are most generally characteristic of natural languages are at the same time the principles which have the most fundamental psychological and pragmatic significance. (Dik 1997: 15)

I propose to define the domain of typological variation as including both crosslinguistic and diachronic variation.[7] As Dik remarks, it is not only the case that a grammatical model should account for descriptions and predictions for specific languages and typological variation, but crosslinguistic comparison can also point to underlying cognitive or communicative factors. Universals may produce 'hypotheses of cognitive structure that can be tested and confirmed or rejected by cognitive psychological research' (Croft 2003: 203).

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[7] Bakker (1998) proposed a separate standard of diachronic adequacy. In my view, however, diachronic variation may be covered by the notion typological variation.

But the typological domain is not the only descriptive challenge. The assumption is justified that language acquisition is dependent on cognitive as well as communicative factors, just as similarities between adult languages are dependent on cognitive as well as communicative factors. The cognitive and communicative universals that restrict typological variation will also restrict the possible linguistic systems in every stage of first language acquisition. If the grammatical model is in accordance with the standards of communication and cognition, it should not only supply correct descriptions of languages of the world but also of the different stages within the process of language acquisition. In particular, the domain of acquisition includes normal first language acquisition. I assume that in the process of language acquisition of disordered children and in language attrition, there may arise atypical linguistic structures as there are atypical factors involved, such as possible deficits in the cognitive capacities of the language users. The process of second language acquisition will also have specific peculiarities: there may for example be interference of the first language.

From a functional perspective, it is fruitless to describe linguistic rule systems in isolation from the question why language is organized the way it is. The organization of verbal interaction is influenced by several human qualities and skills, such as biological properties, social capacities, cognitive development, information processing mechanisms, knowledge of the world, etcetera. One of the most intriguing questions is how all these different mechanisms co-operate in such a way that newborn human beings eventually become capable of verbal communication and speak like adults. In order to answer this question, it is crucial to examine how language is learned and what language is. The ultimate theory of language should answer both questions. A language theory that correctly describes the communicative purposes and linguistic rules of adult language, but cannot account for the developmental aspects of language is inadequate. A grammar of adult speech should be rejected if it is incompatible with the developmental stages and psychological processes of language acquisition. On the other hand, a theory of language acquisition is not complete if it does not explain why children eventually use the same rule system as adults to encode communicative intentions and decode linguistic expressions.

Why do we need a linguistic theory in the quest for universals? According to Dryer (t.a.) a theory-neutral "metalanguage" would do. Haspelmath (2004: 569) also argues that a phenomenological description of linguistic systems is enough for discovering linguistic universals: a grammatical model does not need to reflect the real underlying mental patterns of language users. His main objection to functional theoretical models is that they often claim to be cognitively real, whereas there are many subjective decisions in the construction of such models. He does, however, recognize that descriptive models may be more or less

adequate and that external evidence can determine which of two observationally adequate descriptions should be chosen (2004: 574).

Theoretical models that comply with explanatory adequacy may provide helpful information in understanding the limits on possible linguistic systems. This is exactly what the theory of Functional Grammar aims at: describing relations between different semantic and pragmatic functions of language in such a way that they are in accordance with general cognitive characteristics and communicative principles. Whether Functional Grammar represents real mental structures is not the most relevant question: to date, it is unknown what the real mental structures look like and we are far from understanding how neurological processes lead to conceptualizations, attention, memory, etcetera. Only provisional models of the human brain are available. The function of a linguistic model is to relate these mental models to linguistic structure and to account for the relation between communicative needs and their semantic and formal structuring. Descriptions of these relations and structures are helpful or even necessary for crosslinguistic research since the definition of a category for crosslinguistic comparison must be based on semantics, pragmatics, discourse function etcetera, and not on morphosyntactic criteria (see for example Croft 2003: 13-14). A further goal of functional linguistic models is to account for the relations between different aspects of the language system. A phenomenological description of grammar lacks an explanation for the relations between different linguistic aspects: establishing an ever-growing list of linguistic universals without being able to unify them and understand relations between them does not seem to be a fruitful enterprise. A functional linguistic model does not only try to account for variation within a restricted domain, but also for relations between linguistic phenomena as they occur within an entire linguistic system. If the relation between cognitive and communicative functions and language is modeled, it becomes possible to investigate if these functions are reflected in languages of the world. And if linguistic universals in languages of the world can be interpreted in terms of cognition and communication, new hypotheses can be formulated about human cognition and communication.

To recapitulate, a functional model of language serves as an interface between the standards of adequacy and the domains of application. On the one hand a theoretical modal has to fit in the framework of communicative and cognitive properties and on the other hand it has to provide correct descriptions of actual adult and child language data. Whereas the cognitive and communicative standards operate as restrictions on the possible grammatical models, the typological and acquisitional domains operate as tests of the theory. On the one hand, typological research and research of language acquisition may point to cognitive and communicative factors through the intermediate of a

linguistic theory: on the other hand, the modeling of cognitive and communicative factors is a helpful tool in describing and accounting for phenomena in typology and acquisition. This is represented in Figure 1-4. In this thesis I will show how the semantic representations in Functional Grammar are necessary tools for the crosslinguistic and cross-stage comparison of categories.

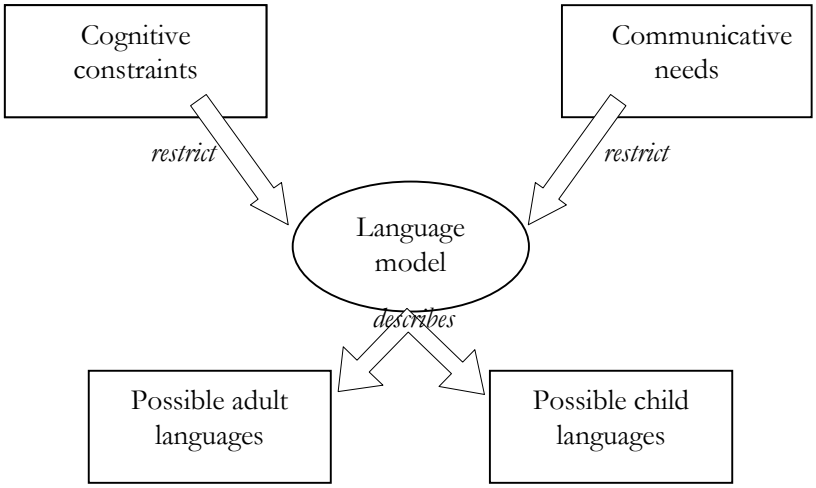

Figure 1-4. Demands on a functional model of language

1.6 STRUCTURE OF THIS THESIS

The main research question in this thesis is:

> Are the limits on variation across adult languages of the world identical to the limits on variation across stages of language acquisition?

The underlying assumption is that universal cognitive and communicative aspects constrain possible language systems, both in adult language and in child language. Since implicational hierarchies or markedness scales can often describe these restrictions within a linguistic domain, I predict that such hierarchies or scales are not only reflected in the typological domain but that they are also predictive with respect to the order of language acquisition. As mentioned before, this hypothesis will be tested in the semantic domains of aspect, tense, and modality, and the closely related domains of quantification,

irrealis and evidentiality. Functional Grammar provides an analysis of grammatical expressions of these notions that relates cognitive constraints and communicative needs to linguistic structure. On the basis of this analysis it is possible to predict limits on variation in adult and child language.

This thesis is divided in four parts. Part I is dedicated to theoretical approaches to aspect, tense and modality. In Chapter 2 a broad outline is given of the theory of Functional Grammar and in particular the analysis of grammatical expressions of aspect, tense and modality is explained. This analysis leads to the formulation of an implicational hierarchy. Chapter 3 defines the semantics of the domains of aspect and tense and the related domains of quantification and situation types. Chapter 4 presents a classification of different types of modality and the related domains of irrealis, future tense and evidentiality. Finally, in Chapter 5, the specific research questions for this study are formulated and motivated, using the implicational hierarchy of Chapter 2. Part II investigates the limits on variation for languages of the world. Chapter 6 discusses quantitative and qualitative properties of morphemes that express notions of aspect, tense and modality in English. Chapter 7 investigates universals in the systems of aspect, tense and modality in a sample of 76 languages. Part III is dedicated to first language acquisition. In Chapter 8, a detailed examination is presented of the acquisition of aspect, tense and modality in English. Chapter 9 examines the contexts of use of expressions of aspect and tense in English child language. Chapter 10 investigates the acquisition of aspect, tense and modality in a crosslinguistic perspective, using a survey of existing studies. Finally, Part IV consists of a discussion of the findings and the implications for further research.

Part I ***Theory***

INTRODUCTION TO PART I

Part I discusses theoretical issues concerning the expression of tense, modality and aspect by grammatical means. The semantic domains of tense, modality and aspect (hereafter, TMA) have been studied extensively in theoretical linguistics, from many different angles. Notwithstanding this enormous effort, the domains remain notoriously complex and hard to grasp. I will not discuss all different approaches to TMA. In this thesis, the description of TMA is embedded in the framework of Functional Grammar (Dik 1997a). This theoretical model of language provides an analysis of TMA that generalizes across different semantic functions within the domains, which leads to clear predictions about possible universals within the domain of TMA. The approach to TMA in Functional Grammar will be the subject of Chapter 2.

Although TMA is described rather precisely in the theory of Functional Grammar, the current state of the art within this model does not suffice in all respects for this thesis. Therefore, Chapters 3 and 4 are dedicated to a more precise description of the domain of TMA. Insights from Functional Grammar and other approaches are used to (re)define the functions of the broad TMA domains and of specific semantic functions within these domains and to classify TMA categories according to their scope. The proposed definitions and classifications of TMA are assumed to have universal value.

Finally, in Chapter 5, the relation between the domain of TMA and grammaticalization processes will be discussed. This discussion leads to the formulation of specific hypotheses concerning the limits on variation that may be expected to exist in TMA systems in languages of the world and in stages of first language acquisition.

Chapter 2

An Outline of Functional Grammar

2.1 INTRODUCTION

In Chapter 1 it was hypothesized that universals in general and implicational hierarchies in particular are reflected in languages of the world as well as in stages of first language acquisition. Is this hypothesis tenable within the domain of TMA? The semantics and pragmatics of these domains have to be established before TMA systems can be compared across languages in the world and across stages of language acquisition. In this thesis, the semantic description of TMA is embedded in the Theory of Functional Grammar, adopting the concept of **scope**. A TMA expression has scope over the maximal part of the utterance that is modified by that expression. Before the discussion of the domains of TMA in Chapters 3 and 4, the basic principles of Functional Grammar will be discussed in order to understand the concept of scope.

2.2 LEVELS OF ANALYSIS

The Theory of Functional Grammar (from now on FG) has as its aim to describe and explain the grammatical organization of natural languages. It is assumed that the grammatical organization of language is determined by its communicative functions. Accordingly, the basis for the model is constituted by the semantic and pragmatic functions that are universally relevant to languages, even though not every language makes use of the same functions. The model strives to account for the relations between pragmatics, semantics and morphosyntax and therefore tries to describe and define interpersonal communicative functions, semantic representations and expression forms.

In the research on FG, the exposition of the model by Simon C. Dik (1997a; 1997b) has long been the standard. However, in the course of the last decade, many adaptations to the model have been proposed culminating in the introduction of Functional Discourse Grammar (FDG) (Hengeveld 2004a). In FDG the relation between cognitive and communicative factors and linguistic structure is more fully developed. The FDG model starts from communicative intentions and describes linguistic structure at the level of discourse acts. Here,

those aspects of FG/FDG relevant for the present study will be discussed.[1] For the sake of convenience, the term 'FG' will be used and not 'FG/FDG'.

One of the basic principles of FG is that a linguistic expression conveys what the speaker talks about and why the speaker talks about it. An utterance is analyzed at four different levels: an interpersonal, a representational, a morphosyntactic and a phonological level. The interpersonal level accounts for the communicative intentions of the speaker, such as the distinctions between orders and requests, or the communicative acts of reference and ascription. The representational level accounts for the semantics of the communicated content of the utterance that is transferred from speaker to addressee. The structure of this level will be explained in more detail below. Expression rules relate the interpersonal and the representational layer to the morphosyntactic level that contains the language-specific formal elements and templates used to express the semantics and pragmatics. Finally, the phonological level is the interface between the formal structure and the actual articulation.

For this thesis, the representational or semantic level is the essential part of the FG model. The semantic structure of an utterance is subdivided into three hierarchically ordered layers that all serve different communicative functions. Firstly, by producing an utterance, the speaker describes a certain property or relation pertaining to one or more individuals, in other words, an event; the first layer of the semantic structure serves to **describe** a set of possible events. Secondly, the speaker relates the description of the set of possible events to the specific event the speaker has in mind; the second layer of the semantic structure serves to **situate** the event in a real or hypothesized world. Thirdly, the speaker transfers propositional content to the addressee; the third layer of the utterance serves to **present** the content of the speech act (Hengeveld 1989: 130). Expressions of TMA are described as operators that modify the different layers. Different TMA categories apply to different layers, they have different scopes, and consequently, they contribute to different communicative functions. In Chapters 3 and 4 specific TMA categories will be discussed. Here, the different layers at the representational level will be described in more detail.

2.3 THE REPRESENTATIONAL LEVEL

2.3.1 The predicate and arguments

The most basic communicative function that the semantic structure of an utterance fulfils is properly describing a state of affairs (also: event, situation).

[1] See Anstey & Mackenzie (2005) for a thorough background in the development of FG, and Hengeveld & Mackenzie (in prep.) for a full account of the present state of the art.

This is done by the first layer of an utterance that primarily contains two semantic units: predicates and arguments. The predicate designates a property or relation and arguments designate entities involved in the property or relation expressed by the predicate. The description of an event is thus compositional.

Although languages universally have predicate-argument structures, it is language-specific how the predicate and argument slots may be filled to describe a certain real world event. All linguistic elements or lexemes are listed in the lexicon: the language user not only stores the form of the lexeme in question, but also information about the meaning or use and the communicative function for which it may be used. For each lexeme, it is specified how many arguments are involved, i.e., the entities that obligatorily participate in the property or relation designated by the lexeme. This is the **quantitative valency** of a lexeme.[2] Each argument is labeled with a semantic function, specifying the part that the participant plays in the state of affairs. This is the **qualitative valency** of the lexeme. The representations of the lexemes *read*, *man* and *old* can illustrate this. See (1):

(1) a. (read) $(x_1)_{\text{Agent}}$ $(x_2)_{\text{Patient}}$
b. (man) $(x_1)_{\emptyset}$
c. (old) $(x_1)_{\emptyset}$

The verbal lexeme *read* describes the relation between two arguments; one argument (x_1) has the semantic function Agent—the participant that reads—and the other (x_2) has the semantic function Patient—the participant that is read. Both the nominal lexeme *man* and the adjectival lexeme *old* describe properties of only one argument (x_1). This argument has the semantic function Zero, which means that the participant is primarily involved in a state. In 1b the participant has the property 'man' and in 1c it has the property 'old'.

Second, the categorical status, verb, noun, adjective or adverb, is stored for each lexeme, which serves as information about the possible communicative functions for which the lexeme may be used. For example, different lexemes can be used predicatively. In the sentence *The man reads a book*, the verbal lexeme *read* is used as the predicate; in *he is president* the nominal lexeme *president* is used as the predicate; in *the man is old* the adjectival lexeme *old* is used as the predicate; and in *she is here* the adverbial lexeme *here* is used as the predicate. In addition to the predicative use, different lexemes or parts of speech have specific, distinguishing communicative functions. Without any modification, the function of a verbal lexeme is only predicative: it always designates a property

[2] There is some variability in the valency of lexemes: for example, *write* in English may be used as a one-place predicate *I'm writing* or a two place predicate *I'm writing a letter* and there may also be a third participant, *I'm writing a letter for John*.

or relation that is ascribed to one or more arguments[3]. Besides the predicative function, only a noun can be used with a referential function, to refer to an individual or a more abstract entity, such as *the man is old*. Adjectives and adverbs may be used for modifying, in addition to their potential predicative function: an adjective can be used to modify a nominal head and an adverb to modify a non-nominal head (Hengeveld 1992).

Depending on the event he tries to describe, the speaker chooses lexemes from the language-specific lexicon to serve as the predicate, designating the central relation or property in the event that is ascribed to a specific number and type of arguments. The speaker also chooses lexemes (or more complex constructions) that designate the entities that participate in the relation or property. In FG, the description of the event is formalized as in (2):

(2) $(f_1\text{: Lexeme}_{ß})\ (x_1\text{: Lexeme}_{ß})^n$

in which f_1 is the variable used as a symbol for the main predicate; the colon can be read as 'such that'; ß stands for the categorical status of the lexeme, verb, noun, adjective or adverb; $(x_1)^n$ represents the required number and type of arguments. Arguments can be concrete individuals, such as *John*, *the dog*, or *the book*, but also abstract entities, such as *the meeting*, *the idea* or *the question*. In fact, the first layer of the semantic structure does not describe a specific event, but it describes a set of possible events. The description of the event at the first layer is not related to the real world; it is not specified which concrete event in the real world the speaker has in mind.

Speakers thus use different semantic units to construe a proper description of a set of possible events. In addition to the predicate (f) and the arguments (x), there may be units designating non-obligatory participants (adjuncts), for example with the role beneficiary, company or instrument, or properties of the event, such as the direction or path of an event. See (3):

(3) a. Diana_{x1} is buying_f a present_{x2} for $\text{Margaret}_{\text{BENEFICIARY}}$
b. I went_f to Paris_{x2} with $\text{John}_{\text{COMPANY}}$
c. I_{x1} want to write_f a letter_{x2} with a $\text{feather}_{\text{INSTRUMENT}}$
d. Peter and Angie_{x1} will cycle_f to $\text{France}_{\text{DIRECTION}}$
e. He_{x1} drove_f through the $\text{tunnel}_{\text{PATH}}$

[3] Verbs need to be made a noun (nominalization) before they can be used to refer, such as in English by adding *–ing*; *fishing* or *eating* as the name of the activities.

2.3.2 The predication

The speaker not only describes a set of possible events in an utterance. He also relates the description of this set of events to the concrete event he has in mind. The second communicative function of an utterance is thus situating the event. The semantic unit in an utterance that accounts for the function of situating the event is the second layer, that contains the **predication**. The predication designates an event and is symbolized by the variable 'e'. This event e can be located in space, time or actuality. An illustration of the underlying structure of the predication is presented in (4) for 'The old man reads a book':

(4) e_1: [(f_1:read$_V$) (x_1:man$_N$: old$_A$)$_{Agent}$ (x_2:book$_N$)$_{Patient}$]
'The old man reads a book'

The predicate *read* provides two argument slots. The argument slot (x_1) $_{Agent}$ is filled with *the old man*, that itself is built up by the nominal lexeme *man* and the adjectival lexeme *old*. The argument slot (x_2)$_{Patient}$ is filled with *a book* that itself is construed on the basis of the nominal lexeme *book*. The predication, the semantic unit at the second layer, is thus construed by the semantic units of the first layer, the predicate, arguments and, potentially, adjuncts.

2.3.3 The proposition

Besides describing and situating, a speaker also transmits content to the addressee. In FG, the third layer of the underlying representation of an utterance serves to express the transferred content of the utterance. The semantic unit at this layer is the **proposition** that designates a potential fact or propositional content. A propositional content exists only in the mind of the speaker contrary to an event, which is part of the external world and exists independently of the speech act and speaker. A propositional content can be evaluated in terms of truth and the speaker may denote his personal attitude towards the propositional content. The proposition is represented by the variable 'p', which is restricted by a predication. Consider (5):

(5) p_1: [e_1: [(f_1: Pred$_ß$) (x_1)^n]]

Each layer of the underlying representation is provided with a specific variable that symbolizes the entity designated at that layer: at layer 1 the variable f is used for the description of a property or relation and x for arguments, at layer 2 the variable e is used for the event and at layer 3 the variable p is used for the propositional content. The variables thus represent semantic units designating a certain type of entity. A simplified representation of the layers is presented in

Table 2-1. It is important to note that semantic units at lower layers form part of the semantic units at higher layers: the predicate and arguments form part of the predication and the predication forms part of the proposition. As a result the designated entities are more abstract and the semantic units are more complex at each next higher level.

Table 2-1. Underlying structure of the layers

Linguistic unit	Structure	Function	Designation
Predicate + arguments	$(f_1{:}Pred_\beta)\ (x_1)^n$	Describing	Relation / property + participants
Predication	$[e_1{:}[(f_1{:}Pred_\beta)\ (x_1)^n]\ ]$	Situating	Event
Proposition	$[p_1{:}[e_1{:}\ [(f_1{:}\ Pred_\beta)\ (x_1)^n]\ ]\ ]$	Presenting content	Propositional content

The underlying semantic representation of an utterance in FG is thus based on the communicative functions that the utterance fulfils and its semantic designations. The semantic units are universal, that is, the predicate, the predication and the proposition can be expressed in any language, but each language has its own set of lexical and grammatical elements that may be used to build up the units.

2.4 MODIFIERS

The representational level of an utterance thus consist of layers that serve the functions of describing a set of possible events, situating the event and presenting the content of the utterance. Semantic units that designate different entities fulfil these functions: at the first layer, the predicate (f) designates a property or relation and arguments (x) designate the individuals that participate in the property or relations; at the second layer, the predication (e) designates a state of affairs; at the third layer, the proposition (p) designates the content of the utterance. Layers should be considered as semantic rather than syntactic units.

The designated entities at each layer of the semantic structure can be further modified by lexical or grammatical elements such as adverbial constructions, periphrases, inflection, particles or auxiliaries. The distinction between grammatical and lexical elements will be discussed in more detail in 5.2 and 6.2.1. For now, it suffices to say that the boundary between lexical and grammatical elements is not absolute, but rather a continuum ranging from purely lexical to purely grammatical elements. Grammatical modifiers have a general, often abstract, meaning and lexical modifiers a specific, often concrete,

meaning. For example, the grammatical expression of past tense in English, *–ed*, indicates that the event is temporally located before the moment of speech, whereas lexical expressions of past time, such as *yesterday*, *two days ago* or *in 1907*, indicate much more specifically when the event actually took place. Grammatical modifiers are called **operators** in FG and are represented by the symbol π in the semantic representation; lexical modifiers are called **satellites** and represented by the symbol σ. Grammatical expressions of TMA, the subject of this thesis, are thus grammatical modifiers, formalized as operators.

Modifiers contribute to the communicative functions of description, situating and presenting content, by modifying the semantic units and therefore specifying the designated entity of a semantic unit. The classification of modifiers in FG is primarily based on the scope of their modification, with which is meant the maximal semantic unit that is modified by the operator or satellite. The target of modifiers can be the property or relation designated by the predicate, the event designated by the predication or the propositional content designated by the proposition. Arguments can also be modified, but that is not relevant to this thesis and will not be discussed further. Modifiers are labeled with the number of the layer to which they apply: $\pi1$ and $\sigma1$ for grammatical and lexical modifiers of the predicate at the first layer, $\pi2$ and $\sigma2$ for modifiers of the predication at the second layer and $\pi3$ and $\sigma3$ for modifiers of the proposition at the third layer. A complete semantic representation of an utterance with its modifiers is presented in Figure 2-1.

Predicate and arguments: $(f: Pred_{\beta})\ (x_1)...(x_n)$

Modification of predicate: $(\boldsymbol{\pi 1}\ (f: Pred_{\beta})\ \boldsymbol{\sigma 1})\ (x_1)...(x_n)$

Predication: $\mathbf{e:}\ [(\pi1\ (f: Pred_{\beta})\ \sigma1)\ (x_1)...(x_n)]$

Modification of predication: $\boldsymbol{\pi 2}\ (e: [(\pi1\ (f: Pred_{\beta})\ \sigma1)\ (x_1)...(x_n)])\ \boldsymbol{\sigma 2}$

Proposition: $\mathbf{p:}\ [\pi2\ (e: [(\pi1\ (f: Pred_{\beta})\ \sigma1)\ (x_1)...(x_n)])\ \sigma2]$

Modification of proposition: $\boldsymbol{\pi 3}\ (p: [\pi2\ (e: [(\pi1\ (f: Pred_{\beta})\ \sigma1)\ (x_1)...(x_n)])\ \sigma2])\ \boldsymbol{\sigma 3}$

Figure 2-1. Semantic representation of the clause in FG

Each language has its own set of expression rules that translate the underlying semantic representation into an actual linguistic expression. At the

point of translation morphosyntax comes into play. From a functional perspective morphosyntax is primarily a means to express semantics and pragmatics. Every detail of the syntactic organization of a language should thus have an underlying semantic or pragmatic explanation in the model of the utterance that accounts for these syntactic features or there should be general cognitive factors that explain the syntax.

This thesis is restricted to grammatical modification by π1-, π2-, and π3-operators. They will be referred to as predicate or π1-operators, predication or π2-operators and proposition or π3-operators. Notice in Figure 2-1 that (modified) semantic units of lower layers fall within the scope of semantic units at higher layers. Consequently, operators at lower layers fall within the scope of operators at higher layers. Note furthermore that several modifications may apply at the same time to the same semantic unit, so that operators at the same layer may have scope over each other. Scope relations between operators are thus not an a priori argument for locating those operators in different layers. The location of specific categories at a certain layer is entirely determined by its semantic contribution to the utterance.

How is the function of predicate operators defined? In Hengeveld's definition (1989: 133) predicate operators (π1) contribute to 'building up a proper description of the situation the speaker wishes to refer to.' This is correct, but it is only a specific part of the event description that is influenced by predicate operators, that is, the designated property or relation. Predicate operators do not influence the designated participants or additional participants. The description of the participants can be modified but this does not influence the description of the predicate. The proper description of a state of affairs is thus established compositionally by the elements at the first layer: a (modified) predicate, (modified) arguments, and possibly, (modified) additional participants. I adhere to Hengeveld's approach (1989) that this description of the event cannot be further modified as a whole, contrary to the position of Dik (1997a) and Cuvalay-Haak (1997). A predicate operator (π1) is thus a grammatical expression that changes the description of the property or relation that is ascribed to the argument(s), without modifying the description of the arguments itself. A π1-operator interacts with the semantics of the lexeme that designates the property or relation. The resulting complex property of relation is then applied to the arguments. Chapters 3 and 4 will show that the categories aspect, property quantification, and certain modal categories, such as ability and volition, are to be classified as π1-operators.

Predication operators (π2) contribute to the situating function of the predication, they 'relate the description of a [state of affairs] to the occurrence of that [state of affairs] in a real or imaginary world.' (Hengeveld 1989: 134). In Dik's formulation (1997a: 218) π2-operators 'leave the internal constitution of

the [state of affairs] intact, but either quantify it or locate it with respect to spatial, temporal and "objective" cognitive dimensions.' In the next two chapters the semantic categories tense, irrealis, event quantification and certain modal categories are shown to be π2-operators.

Proposition operators (π3) contribute to the presentation of content, by evaluating this content. They specify how much responsibility the speaker takes for the propositional content or how reliable the speaker estimates that the proposition is, by indicating his personal attitude towards the proposition, his commitment to the truth of the proposition or the source of evidence he has for the proposition. In Chapter 4, it is shown that the categories of evidentiality and certain modal categories function as π3-operators.

This thesis is restricted to operators at the representational level in FG. There are also modifiers that operate at the interpersonal level (2.2), and that express, among other things, the basic illocution of an utterance (declarative, interrogative), politeness strategies or discourse structure (*finally*, *in short*). These modifiers fall outside the scope of this thesis.

2.5 THE SCOPE HIERARCHY

As discussed above, FG analyzes an utterance as serving different communicative functions at the same time. The first layer fulfils the function of describing a set of possible events. The semantic units at this layer are the predicate and the arguments and possibly adjuncts. The predicate designates a property or relation and the arguments designate entities that participate in the property or relation. **Predicate operators** (π1) have scope over the predicate only. They contribute to the description of a state of affairs by specifying additional features of the property or relation. The second layer fulfils the function of situating the event. It relates the description of the set of possible events to a concrete event in a real or imaginary world. The semantic unit at this layer is the predication that designates the event. **Predication operators** (π2) have scope over the predication. They specify the setting and occurrence of the event, by situating the event in time or actuality or expressing the frequency of occurrence of the event. The third layer fulfils the function of presenting the propositional content. The semantic unit at this layer is the proposition that designates a propositional content. **Proposition operators** (π3) have scope over the proposition. They are concerned with expressing the speaker's personal attitude or commitment towards the propositional content (Hengeveld 1992: 130-32).

According to the model of FG, lower layers in the semantic representation form part of higher layers, which makes the relation between the layers hierarchical. Each higher layer contains a more complex semantic unit that

designates a more abstract entity. Operators like TMA expressions apply to different layers and also stand in a hierarchical relation to each other, since operators at higher layers have scope over all lower layers, including their operators. As a consequence, operators at each higher layer modify a more complex semantic unit ranging from a predicate to a predication to a proposition, that specify increasingly abstract entities, from properties or relations (π1) to events (π2) to propositional contents (π3). The function of operators at each higher layer thus seems to be cognitively more complex.

Furthermore, the function of operators at each higher layer seems to be communicatively less motivated, that is, they present more redundant information. The function of π1-operators is most basic or motivated. In most utterances, the property or relation ascribed to the arguments is important new information and the modification of this property or relation by π1-operators is crucial to an adequate description of the event. π1-Operators contain information that is so specific that it cannot be predicted or inferred from context and it needs to be expressed linguistically. The function of π2-operators, modifying the relation of the event to the real or imagined world, is also a basic communicative function, but here, the context often helps the addressee to infer the temporal or spatial location, the actuality, or the frequency. This means that π2-operators more often than π1-operators present redundant information. Finally, the function of π3-operators, modification of the propositional content, seems to be communicatively least motivated: π3-operators provide the speaker's evaluation of the content, but in many utterances, the expression of the speaker's evaluation is not relevant. It is a conversational maxim that the speaker is committed to the propositional content: only when this is not the case or when the commitment of the speaker is somehow special, the speaker's evaluation has to be encoded linguistically.

It is thus assumed that if their scope is wider, operators are cognitively more complex and communicatively less needed. In other words, operators with wider scope have more marked functions than operators with narrower scope, according to the Scope Hierarchy in (6):

(6) π1-operator $\subset$ π2-operator $\subset$ π3-operator,

in which '$\subset$' stands for: 'is less marked than'.

It is expected that the Scope Hierarchy is reflected in TMA systems of the languages of the world and in stages of first language acquisition. In Chapters 3 and 4 it will be investigated how specific TMA domains should be understood in terms of scope. In Chapter 5 hypotheses will be formulated on how the Scope Hierarchy will be reflected in the variation of TMA domains in adult languages and child languages.

Chapter 3

Tense, Aspect and Quantification[1]

3.1 INTRODUCTION

In FG, TMA expressions are defined with respect to their scope, the part of the utterance that they modify. As the scope of an operator gets wider, the operator modifies a more complex semantic unit that designates a more abstract entity and it contributes to a less basic communicative function. See Table 3-1:

Table 3-1. Functions of operators

Operator	Scope over	Modifies	Contributes to
π1	Predicate	Property / relation	Describing
π2	Predication	Event	Situating
π3	Proposition	Propositional content	Presenting content

Operators with wider scope are more marked than operators with narrower scope, in that they are cognitively more complex and communicatively less relevant. The hierarchical relation between operators can be conceived of as a markedness scale or implicational hierarchy.

To determine the scope of specific TMA expressions, i.e. to which class of operators they belong, their semantics have to be described adequately: it has to be clear what the expression adds to the semantic structure in order to know as what type of operator it functions. As described in Chapter 2, predicate operators (π1) change the description of the property or relation that is ascribed to the argument(s) without modifying the description of the arguments or of additional participants. They specify additional features of the property or relation in such a way that it is applicable to the argument(s). Predication operators (π2) contribute to the situating function of the predication, they 'relate the description of a [state of affairs] to the occurrence of that [state of affairs] in a real or imaginary world.' (Hengeveld 1989: 134). Finally, proposition operators (π3) contribute to the function of presenting the content.

[1] An earlier version of this chapter appeared in Boland (2005).

They specify how much responsibility the speaker takes for the propositional content or how reliable the speaker estimates the proposition to be.

In this chapter the semantics of the related domains tense, aspect and quantification are discussed together with the scope of specific categories in these domains. Section 3.3 is dedicated to the domain of aspect; the domains of tense and quantification will be discussed in sections 3.4 and 3.5, respectively. Quantification covers notions such as habitual, frequentative, repetitive, distributive and iterative, sometimes labeled as quantificational aspect. Although the discussion will be organized according to general TMA domains, note that I agree with the statement in Dahl (2000):

> The basic units of description are not "the category of tense" and "the category of aspect" but rather what we call grams, i.e., things like Progressive in English, the Passé simple in French etc. Notions like tense, aspect, and mood are seen as ways of characterizing the semantic content of grams, or domains from which their meanings are chosen, but do not, in the typical case, represent structurally significant entities in grammatical systems. (p.7)

Before the semantics of TMA can be discussed, however, it is necessary to take a closer look at situation types or inherent temporal constituencies of events because aspect, tense and quantification are often interrelated with this component.

3.2 SITUATION TYPES

In the previous chapter it was explained that one of the major functions of an utterance is to describe an event, but it was not yet discussed what events actually are. In FG an event is defined as 'the conception of something that can be the case in some world' (Dik 1997a: 51). Events can be classified with respect to their inherent temporal structure. Vendler (1967), elaborating on Aristotle, was one of the first who recognized that verbs have different 'time schemata' and he proposed a classification of verbs. It is now, however, widely accepted that it is not the inherent temporal structures of a verb that should be taken into account but rather the inherent temporal structure of an event. This event is compositionally constructed by the (modified) predicate (often, but not necessarily, expressed by a verb), the (modified) arguments, and possibly (modified) additional participants.[2] In the literature, different terms are used to refer to different temporal structures: *lexical aspect*, *situation type* or *event structure*[3].

---

[2] Cf. Verkuyl (1972) for a systematic analysis of the compositional nature of event structure.

[3] The term Aktionsart is also used to refer to event structure, but in my view it covers a related, though slightly different phenomenon, namely systematic marking of the type of relation or property designated by the **verb**, such as German *brennen* 'burn', *an-brennen* 'start burning' (of food), *ver-brennen* 'burn up'.

In this thesis I will use the terms situation type and event structure interchangeably. I will not use the term lexical aspect in order to avoid confusion with (grammatical) aspect.

Different situation types are generally described by the universal features dynamicity, telicity and durativity (e.g., Chung & Timberlake 1985; Comrie 1976; Mourelatos 1978; C. S. Smith 1991). The first broad distinction is made between situations that are [–dynamic] and situations that are [+dynamic]. Consider (1)-(3):

(1) Mary is searching for an envelope.
(2) She also needs a stamp.
(3) She has written a letter.

The difference between (2) on the one hand and (1) and (3) on the other is a matter of dynamicity. The situation type described in (2), 'need a stamp', is non-dynamic or static. It differs from the dynamic situation types *search for an envelope* and *write a letter* in that *need something* can continue forever, without any input of energy, 'unless something happens to change that state' whereas *search for an envelope* and *write a letter* are actions started deliberately whereby the action 'will only continue if it is continually subject to a new input of energy' (Comrie 1976: 49). Non-dynamic or static events are called states. Entities involved in a state are presented 'as being or remaining the same at all points of the time interval during which the [state of affairs] obtains' (Dik 1997a: 107), whereas there is always some change involved in dynamic events.

A test that helps to distinguish dynamic and static events is to add an adverb of manner that expresses a sense of control, such as *deliberately* or *carefully*. Dynamic events (with animate agents) allow this combination, as shown in (4) and (6), whereas the combination with a state leads to a semantic anomaly, as shown in (5):

(4) Mary is searching for an envelope on purpose. / Mary is carefully searching for an envelope.
(5) *She needs a stamp on purpose. / *She carefully needs a stamp.
(6) She has written a letter on purpose. / She has carefully written a letter

Other examples of states are *know the Russian alphabet*, *want a new car, be a linguist*, *have three sisters*, *be blond*, *love John*, *see the eclipse*, etcetera.

Dynamic events can be further divided with respect to telicity. The above examples (1) and (3) differ in this respect. The event *search for an envelope* could in principle last forever: it is atelic. The event *write a letter* on the contrary has an inherent endpoint, the moment at which the letter is finished: it is telic.

> Atelic events are internally homogeneous; any subpart of them has the same properties as the event as a whole. In contrast, telic events involve change through time: any subpart of the event ideally has properties different from those of any other subpart and different from those of the event as a whole. (Bohnemeyer 1998: 59-60)

In other words, a telic event involves a certain change of state, from a 'source state' to a 'target state' (Klein 1994). It describes 'a process that leads up to a well-defined terminal point, beyond which the process cannot continue' (Comrie 1976: 45), whereas atelic events have an arbitrary endpoint. Atelic events are referred to as *activities* or *processes* and telic events as *events* or *state changes*. I will use the term *event* or *state of affairs* as a neutral term and refer to static, dynamic, atelic and telic events or states of affairs. More examples of atelic events are *dance*, *listen to the radio*, *hunt sharks*, *buy clothes*. Some examples of telic events are *climb the mountain*, *cross the river*, *kill the dragon* and *free the lady*.

There are several criteria to determine the telicity of an event (Dik 1997a: 109). A first test is to combine it with a specification of duration. If an event is telic, it is possible to add a specification of the duration until the reaching of the endpoint, such as *(with)in an hour*, whereas this is not possible with atelic events. Compare (7) and (8):

(7) Mary wrote the letter in an hour.
(8) *She searched for an envelope in an hour.

A second related test is illustrated in (9) and (10). A telic event can be combined with an expression like 'it took X three hours to ...', whereas this is impossible with an atelic event.

(9) It took her three hours to write a letter.
(10) *It took her three hours to search for an envelope.

A third criterion is the *almost*-test. If one adds *almost* to an atelic event, it implies that the event has never started, whereas with a telic event, it implies either that the event never started or that it was started but not finished. Compare (11) and (12):

(11) Mary almost wrote a letter (but she didn't start/but she didn't finish it).
(12) Mary almost searched for an envelope (but she didn't start/*but she didn't finish it).

Smith (1996) and Bohnemeyer (1998: 66) have noted that the above tests do not yield the same results in every language, as for example in Navajo and in

Yukatek Maya. The exact semantics of constructions like *almost* or *within an hour* are not identical in every language, which affect possible combinations. Bohnemeyer (1998: 60-61) suggests that the strongest test crosslinguistically is to use the question: *If X is interrupted in the course of VERB-ing, has she then VERB-ed?* With telic events, the answer is *no*, whereas with atelic events the answer is *yes*. Consider (13) and (14):

(13) If Mary is interrupted in the course of writing a letter, has she then written a letter? Answer: No.

(14) If Mary is interrupted in the course of searching for an envelope, has she then searched for an envelope? Answer: Yes.

Whether the event structure is telic or atelic depends for a large set of verbs on the presence of an object, whether the object refers to a specified or an unspecified quantity, or on the presence and type of an additional participant. See (15) and (16):

(15) a. *Bob painted within an hour. > atelic
b. ?Bob painted landscapes within an hour. > atelic
c. Bob painted five landscapes within an hour. > telic

(16) a. *Bill walked in Santiago within three hours. > atelic
b. Bill walked to Santiago within three months. > telic

These examples illustrate that the event structure is not a property of the verb but rather the resultant semantics of the predicate and its arguments.

A third feature that distinguishes event structures is punctuality, i.e. whether events have duration in time or not. This feature is mainly relevant to telic events.

> [punctual events] are conceived as having no duration: their beginning coincides with their terminal point: they occupy only one point in time. [non-punctual events] on the other hand, occupy a certain stretch of time, and have a distinct beginning and terminal point. (Dik 1997a: 111)

Telic punctual events are, for example, *reach the summit*, *break the egg*, *sit down*, etcetera. Punctual events do not combine very well with specifications of duration, such as *for an hour*. Telic non-punctual events are for example *draw a still life*, *run a mile*, *bake a pie*, etcetera. Their combination with duration is unproblematic.

By using the three parameters of dynamicity, telicity and punctuality, the different situation types can be described schematically as in Figure 3-1:

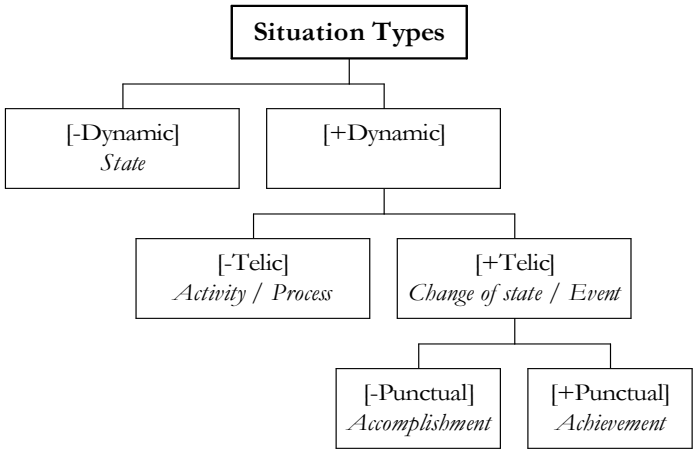

Figure 3-1. Classification of situation types (adapted from Dik 1997: 112)

Smith (1991) demonstrated that there is a fifth situation type, which she called semelfactives.[4] Examples are *jump*, *drip*, *knock, bounce* or *sneeze*. These verbs are often used to describe a repeated (iterative) event: for example, *jumping* in *I was jumping for an hour* involves a series of jumps that could be conceived of as an atelic event. Semelfactives describe one punctual event or a series of punctual events, but they do not involve a change of state: they are therefore atelic. They can be regarded as a special type of activity [+dynamic, -telic].

The above distinctions in event structures are commonly recognized and they seem to be universally applicable. However, in what way a specific real world event is semantically structured is a language-specific characteristic. For example, a specific real world event may in one language be described as a state (*know*), while another language describes it as a change of state (*come to know*, *realize*; one language may describe a specific event as a state (*be seated*) whereas another describes it as an activity (*sit*).

3.3 ASPECT

3.3.1 Introduction

To determine the scope of aspectual expressions, their semantics have to be defined. What do speakers do when they mark aspect? What do they add to the meaning of the utterance? The examples in (17)-(22) from Bohnemeyer (1998:

[4] They are called 'points' in Moens (1987).

73) illustrate aspectual distinctions with respect to the description of an event of Mary writing a letter, which started at 6.30 and ended at 7 o'clock:

(17) Mary was going to write a letter.
(18) At 6.30, Mary started writing a letter.
(19) At 6.45, Mary was writing a letter.
(20) At 7, Mary finished writing a letter.
(21) At 7.15, Mary had written a letter / At 7.15, a letter was written.
(22) Mary wrote a letter from 6.30 to 7.

A common definition of aspect is that it marks the viewpoint or the perspective from which a speaker looks at an event. In the seminal work by Comrie, aspect is defined as 'different ways of viewing the internal temporal constituency of a situation' (1976: 3). One of the major aspectual distinctions is between perfective and imperfective aspect. When speakers use perfective aspect, as in the above example (22), they look 'at a situation from outside, without necessarily distinguishing any of the internal structure of the situation', 'the whole of the situation is presented as a single unanalysable whole, with beginning, middle, and end rolled into one'. When speakers use imperfective aspect, as in (19), they look 'at the situation from inside' and make explicit reference to the internal temporal constituency of the situation, to 'the various individual phases that make up the action' (1976: 3-4).

The standard approach to aspect in FG is to distinguish different areas of aspectuality (Dik 1997a: 221-22): the first type of aspectuality concerns the distinction between perfective and imperfective aspect, similar to Comrie's view. The second area is phasal aspectuality, which specifies the phase of development of the event in terms of beginning, continuation or end of an event (see (18)-(20)). The third area concerns perspectival aspectuality that relates the occurrence of the event to an outside temporal reference point. This includes the categories prospective (17) and perfect (21). Finally, Dik speaks of quantificational aspect that gives information about the frequency of an event. This last category is not considered aspect in this thesis, but it is treated under the notion of quantification in section 3.5.

In my view, the definition of aspect in FG is not entirely adequate. This results in considerable disagreement on the scope of different aspectual areas (Anstey 2002: 3).[5] In order to arrive at a more decisive analysis, it is important to reconsider the semantics of different aspectual categories. Therefore, in the next section, other approaches to aspect will be discussed.

[5] The relevant works in Anstey's survey are Dik (1997a), Mackenzie (1998), Vet (2001), Keizer (1992), Hengeveld (1989) and Cuvalay-Haak (1997).

3.3.2 Defining aspect

In the early nineties, Smith (1991) proposed an analysis of aspect that is compatible with Comrie's view, but nonetheless crucially different in formulation:

> The aspectual viewpoint of a sentence functions as an independent lens on the situation talked about. Viewpoint makes visible all or part of a situation, without obscuring the conceptual properties of the situation types. (C. S. Smith 1991: 171).

Smith considers aspect as **selecting** a part of the event or the whole event, whereas Comrie uses the metaphor of **looking at** the internal temporal structure in a different way. In a similar vein as Smith, though logically better underpinned, Bohnemeyer (1998) proposes to treat different aspectual categories as one unified category of 'boundary operators' that select a specific part of the temporal structure of an event that is relevant to the conversation.[6] What this means, is illustrated in Figure 3-2. The lower line in Figure 3-2 represents a time line with times related to examples (17)-(22). The upper figure represents the maximal referential projection of an event. This includes all parts of the temporal structure that can potentially be referred to by a linguistic expression, including a potential pre- and post-state. The dotted ovals indicate which part of the temporal structure is selected, representing the examples in (17)-(22). Bohnemeyer distinguishes six notional boundary operators: language-specific categories do not necessarily match these selections, but may select larger or smaller parts.

In each sentence, the speaker concentrates on a different part of the temporal structure. In (17), the speaker focuses on the 'pre-state' of the process of writing a letter: this is prospective aspect. In (18), the starting point of the process of letter-writing is focused on, while in (20) the endpoint is highlighted. These are ingressive and egressive aspect, respectively. In (19) the speaker selects a time interval in the middle of the temporal structure, without taking the initial or terminal boundary into consideration. This is both imperfective and progressive aspect. In (21) the speaker concentrates on the post-state of the

[6] This idea is inspired among others by Chung & Timberlake (1985), Klein (1994), Moens (1987) and Smith (1991).

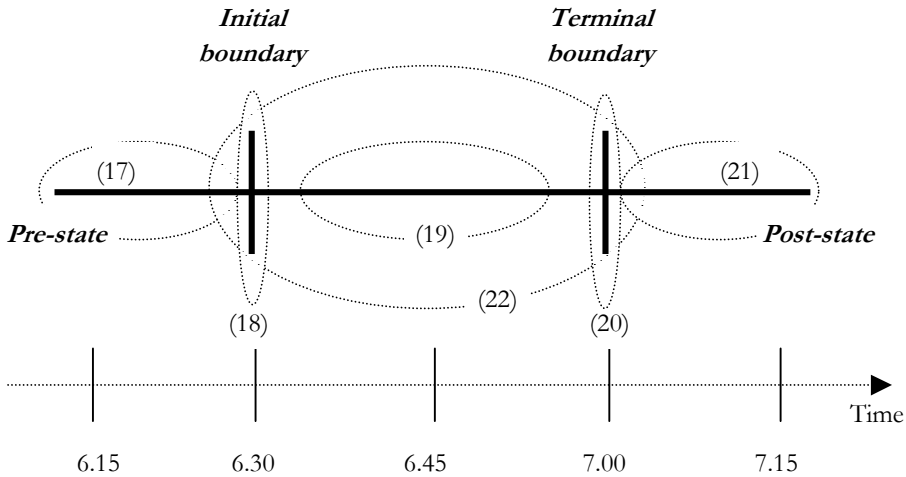

Figure 3-2. Possible selections of parts of the temporal structure of an event by aspectual expressions (adapted from Bohnemeyer 1998: 73)

letter-writing, which is the counterpart of (17). This is perfect (*had written*) or resultative (*was written*) aspect. Finally, in (22) the speaker describes the complete event, including the beginning and endpoint, which is perfective aspect.

What Bohnemeyer means by pre- and post-*states* is different from pre-and post-*times*:

> Pre-and post-times are time intervals that precede and follow the event, respectively. By contrast, pre- and post-states are related to the event in some non-temporal way in addition to temporal sequentiality. (...) Post-states reflect some kind of trace that the occurrence of the target event leaves behind in the world. (...) the target event may be the consequence or purpose of the pre-state, or an agent may be said to be in an intentional pre-state with respect to the target event. (...) I assume that pre- and post-states of an event E are events which do not form part of E, but encompass E in a natural 'causal chain'. (1998: 76-77)

Causality is thus the essential distinction between prospective and perfect aspect on the one hand, and future and past tense on the other. Dik (1997a: 239) explains the difference of a prospective compared to a future tense as 'a prediction about what is going to happen in the future on the basis of what information the speaker has now, whereas a future is a simple statement about what will happen in the future.'

Now what exactly are the semantic distinctions between (17)-(22)? All utterances concern the same relation, designated by the predicate *write*, with the same participants, designated by the arguments *Mary* and *a letter*. What is

variable is that different parts of the temporal structure of 'write' are ascribed to Mary. For example, in (17) Mary is not writing, she is *going to write*, in (20) she is not going to write, she *stops writing*. In other words, the speaker selects exactly the part of the temporal structure of the property or relation that is relevant, and it is only this specific part that is predicated of the arguments.

Bohnemeyer's analysis unites different types of aspect that are distinguished in FG: in his account there is no distinction between the function of perspectival aspect (prospective, perfect), phasal aspect (progressive, egressive, ingressive) or (im)perfective aspect: in principle, all aspectual expressions serve the same function, which is selecting the part of the temporal structure of the property or relation that is ascribed to the arguments. In this thesis, Bohnemeyer's proposal is adopted and aspect is defined as follows:

D1. **Aspect** markers select the relevant parts of the temporal structure of a property or relation, including the pre- or post-state. It is only this selected part of the temporal structure that is the predicated property or relation of the argument(s).

Aspect markers modify the property of relation that is ascribed to the argument(s) and contribute to a proper description of the event; at the same time, they leave the description of the argument(s) intact. This implies that aspect markers have scope over the predicate only and that they should be classified as π1-operators in FG.

3.3.3 Categories in detail

Now that the semantics of aspect are broadly defined, a closer look is taken at the specific semantic functions within the domain of aspect, at their relation with the temporal structure of properties and at relations and possible combinations of aspect markers. The specific functions will be described starting from the maximal temporal structure of a property or relation. Notice that the extension of a property or relation in time does not mean that it also has location in time. As shown above, it is not always the maximal temporal structure that is predicated of the argument(s); it is often only part of the temporal structure that the speaker wants to assert. The selection of part of the temporal structure neither modifies the meaning of the arguments nor of the additional participants; it only modifies what is predicated of the argument(s). As a consequence, this has repercussions on the description of the set of possible events, since only the selected part of the temporal structure of the property or relation, only the modified predicate helps to build up the event description.

Although different properties or relations behave differently a general temporal structure is presented in Figure 3-3:

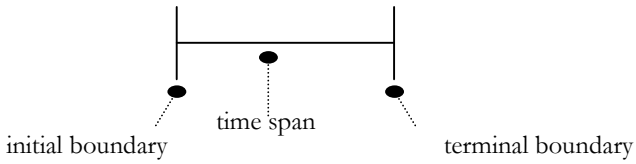

Figure 3-3. Representation of maximal temporal structure of an unmodified relation or property: PRED $(x_i)^n$

The time span represented by the horizontal line represents a homogeneous or a heterogeneous interval, with or without a state change within the boundaries. The length of the time span is not exactly specified in the temporal structure of the unmodified property or relation. The initial and terminal boundaries, represented by the left and right vertical lines can represent an arbitrary begin- and endpoint but they can also represent the point of beginning and completion in case the predicate is used in the description of a telic event. However, whether the temporal boundaries are points of ending or of completion is determined by the combination of the predicate, the arguments and the additional participants. In case of states, there are no boundaries if the state is permanent, but there are boundaries if the state is temporary. When aspectual expressions are used, the temporal structure is modified: part of the temporal structure is selected or part of the structure is added and then selected as in the case of pre- and post-states. Only this selected part of the temporal structure is ascribed to the argument(s), and nothing more.

Common aspectual distinctions will be illustrated below, in Figure 3-4 to Figure 3-10[7]: in these representations, the maximal temporal structure is represented by the dotted line. The dotted oval indicates the part of the temporal structure that is selected and ascribed to the argument(s). In addition to the selected part, some other parts of the temporal structure may be implied. Contrary to what I claimed in Boland (2005), the implied part is the interval earlier in the temporal structure. This can be inferred by general knowledge of temporal structures. For example, if an event is going on, it must have begun. However, it is not necessarily the case that anything earlier in time is *ascribed* to the participants: the initial boundary is not made explicit by the progressive (Figure 3-6), whereas it is made explicit by the continuative (Figure 3-7). The

[7] The representations are inspired by Figures 4 and 34-38 in Bohnemeyer (1998).

complete part of the temporal structure that is implied is represented through the solid line, which is thus not necessarily equal to the part of the structure that is selected and ascribed to the argument(s), indicated by the dotted oval.

I will discuss aspectual categories in two sets: those categories that do not and those categories that do imply the complete temporal structure. Categories that do not imply the complete temporal structure are the prospective, the ingressive (inchoative), the progressive, the continuative and the imperfective. First, the prospective will be discussed. If a speaker uses a prospective, he adds a pre-state to the temporal structure.[8] Only this pre-state of the event is predicated of the argument(s). So, the argument is not in the state of, for example, reading, but only in the state of **going to** read. See Figure 3-4:

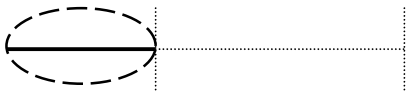

Figure 3-4. Representation of prospective: 'going to PRED'

When a participant is in the pre-state of an event, it is probable, but not necessary that the event will in fact also take place. A prospective may thus lead to the inference of the occurrence of the event, but this inference may be denied: *I was going to read, but I couldn't find my book and I ended up watching television.*

The ingressive focuses on the initial boundary. In English, it can only be expressed lexically by *start* or *begin*, but in other languages there may be specific markers for ingressive. The ingressive is represented in Figure 3-5:

Figure 3-5. Representation of ingressive: 'start PRED'

When an ingressive is combined with a state, it means that the state has begun and it may imply that the state still continues. In several languages, such as

[8] The idea that the speaker *adds* a pre-state or a post-state to the temporal structure is based on Klein (subm.) even though Klein speaks of pre- and post-times. Bohnemeyer (1998) on the contrary supposes that the pre- and post-state are always part of the maximal temporal structure of a property or relation.

Russian, Ancient Greek, Mandarin Chinese and Spanish (Comrie 1976: 19), a perfective may be combined with a stative state of affairs, which yields the interpretation that the state begins, or, as an inference, that the state holds. When the initial boundary is selected, it implies in general that the event takes place for an unspecified duration. *Jim started to read* implies that Jim read and if the starting point is just before speech time, it probably also implies that Jim is now in the process of reading. Note that when an ingressive is combined with a telic event, it does not imply that the event reaches its point of completion: *Jim started to draw a circle* does not imply that Jim drew a circle.

By using a progressive the speaker selects a subinterval in between the boundaries to ascribe to the argument(s), without taking the initial or terminal boundary into account. Consider Figure 3-6:

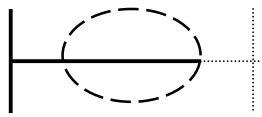

Figure 3-6. Representation of progressive: 'PRED-ing'

The starting point of the event is implied, but not ascribed to the participants. A progressive is most frequently used with dynamic and non-punctual events. However, depending on the particular language, there may be exceptions that raise specific interpretations. First, a progressive may be used with predicates that by default describe a permanent state, *naughty*, or *a teacher*. In those cases, the state is described as if it were a temporary, deliberate activity, with boundaries in the temporal structure, such as *being naughty* or *being a teacher* (behaving naughtily or behaving like a teacher, rather than being a teacher by profession). Furthermore, a progressive may be combined with a predicate that in general describes properties or relations of very short duration, raising the interpretation that the property or relation has a longer duration, either because it is repeated (*jumping*, *firing a gun*) or because the stage leading up to the state change is stretched (as in *reaching the top*).

Closely related to the progressive is the continuative. It was argued that a progressive implies, but does not ascribe the initial boundary to the participants. When the initial boundary does form part of what is ascribed to the participants, we speak of continuative aspect. In English, this is expressed by the construction *keep –ing*. Consider Figure 3-7:

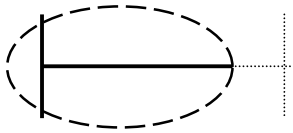

Figure 3-7. Representation of continuative: 'keep PRED-ing'

A continuative indicates that the argument(s) have started and still continue their activity.

Finally, imperfective aspect may cover the same meanings as progressive and continuative markers (see Figure 3-6 and 3-7). Imperfective aspect thus functions in the same way as phasal aspect, but makes less fine-grained selections. Speakers have to infer more about the intended focus.

The aspectual categories that target the complete temporal structure are the egressive, completive, perfect and perfective. The egressive and completive focus on the terminal boundary. They both select the terminal boundary, but a completive can only combine with telic events. It not only indicates that the event stopped, but also that it is completed. In English, egressive and completive aspect can only be expressed lexically by *stop*, *end*, or *finish*. Egressive and completive aspect are represented in Figure 3-8:

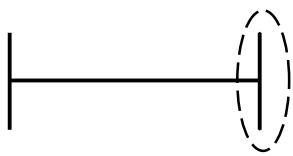

Figure 3-8. Representation of egressive and completive: 'stop PRED' or 'finish PRED'

If a speaker uses a perfect, then a post-state is added to the temporal structure. It is exactly this post-state that is predicated of the argument(s). This view is compatible with Smith (1991: 148) who also claims that the post-state, selected by the perfect, should be considered the modified property ascribed to the argument:

> Present perfect sentences *ascribe to their subjects a property* that results from their participation in the prior situation. If at some time Henry has laughed, danced, built a sandcastle, *the property of having done these things is asserted of Henry*.' (italics mine).

The perfect is the counterpart of the prospective and can be depicted as in Figure 3-9:

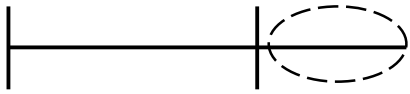

Figure 3-9. Representation of perfect: 'have PRED-ed'

The post-state of an event starts immediately after the terminal boundary of an event, but it may stretch in time for an indeterminate period. The post-state may also be selected by a resultative ('was PRED-ed') in which the agentive argument has little or no relevance. Note that a perfect makes the complete temporal structure explicit. It is therefore possible to get the so-called continuative perfect reading as in *He has lived here for ten years* or *I have already run five miles*. Although the preceding event is implied, the focus is on the post-state, since the 'having lived somewhere **for ten years**' is only true in the post-state of this event (see Klein 1994: 113 for a similar analysis). In Bohnemeyer's words:

> Pre-and post-state operators select semantic components of the causal chain in which the event is embedded, in the same manner in which the other boundary operators select parts of the event itself. (1998: 77)

Although there is a temporal relation between the pre- or post-state and the event (the event took place before the post-state or the event will take place after the pre-state), this temporal relation is only an implication and not part of the meaning. Only when this implication becomes an increasingly essential part of the meaning, as has happened to different extents in German and Dutch (cf. Boogaart 1999: 156), then it may grammaticalize into a tense marker.

Like imperfective, perfective aspect makes a less fine-grained selection than phasal aspect. A perfective expression selects the entire temporal structure including the initial and terminal boundary. This is depicted in Figure 3-10:

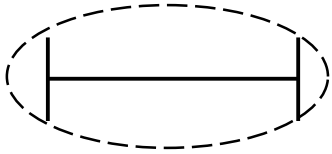

Figure 3-10. Representation of perfective: 'PRED-ed'[9]

[9] There is no real perfective marker in English, but the simple past is often interpreted as perfective past.

A perfective often covers the post-state too, but not necessarily. Moreover, it is important to note that perfective is not the same as **completed**, an assumption often incorrectly made, as argued by Comrie:

> The perfective does indeed denote a complete situation, with beginning, middle, and end. The use of 'completed', however, puts too much emphasis on the termination of the situation, whereas the use of the perfective puts no more emphasis, necessarily, on the end of a situation than on any other part of the situation, rather all parts of the situation are presented as a single whole (Comrie 1976: 18).

Some of the aspectual categories may be combined. This is again a language-specific quality. In English, a perfect or prospective can have scope over a progressive. This is however no argument for positioning them at a different layer. The combination of a perfect with a progressive leads to a more refined selection of what is predicated of the argument, that is the argument is in a post-state of being engaged in an event, without the implication that this activity has ended. Consider Figure 3-11:

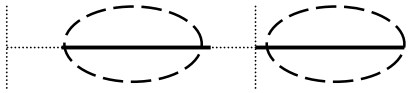

Figure 3-11. Representation of perfect progressive: 'have been PRED-ing'

Observe that a perfect progressive does not necessarily imply the terminal boundary. In contrast to *John has written a letter*, which implies that the letter is finished, in *John has been writing a letter* there is no implication that John has finished writing the letter. Therefore, the terminal boundary is not bold in Figure 3-11.

The opposite of the perfect progressive can also be expressed: *John is going to be writing a letter*. In this case, the pre-state of the activity of writing is ascribed to the argument(s), without making the boundaries of the temporal structure explicit. Consider Figure 3-12:

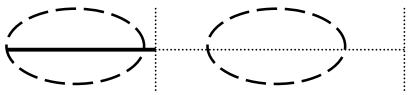

Figure 3-12. Representation of prospective progressive: 'going to be PRED-ing'

As with a 'simple' prospective, the actual occurrence of the property or relation is not implied, only expected. The distinction between both categories is that

the expectation of the prospective progressive is confined to the interval in between the boundaries, whereas a normal prospective concerns the complete temporal structure. Finally, it is possible to combine a perfect or prospective with an ingressive or an egressive. Consider Figure 3-13 for the representation of prospective ingressive:

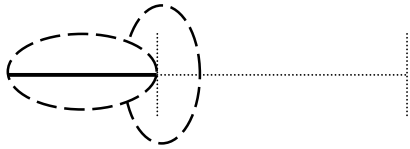

Figure 3-13. Representation of prospective ingressive: 'going to start PRED'

Perfect and prospective aspect can have other aspectual expressions in their scope, but this is not considered an argument for regarding these expressions as different types of operators. The communicative function of the complex aspectual expressions is equal to 'simple' aspectual expressions, that is, they select the part of the temporal structure that is ascribed to the argument(s). The combination of aspectual expressions results in a more complex selection of the temporal structure, with different parts of the structure taken into account. However, like with simple aspect, complex aspect does not change anything about the description of the arguments nor does it situate the event in the real world; the combination of expressions functions as a π1-operator.

3.3.4 Summary

Aspect was defined as a grammatical means to select a specific part of the temporal structure of a property or relation to be ascribed to the argument(s). This definition differs from the standard approach to aspect in FG in that it assumes a similar function for all possible aspect markers. Selecting the pre-state or post-state of a property or relation in principle does not differ from selecting one of the boundaries, a subinterval or the complete temporal structure. All categories of aspect have the same communicative function: they select part of the temporal structure of the property or relation that is designated by the predicate. Therefore, they all function as π1-operators. An aspect marker modifies what is predicated of the participants. It restricts or defines the part of the temporal extension that is ascribed to the argument(s). The fact that certain aspectual expressions may have scope over each other is no reason for locating them at different layers of the semantic representation. The combinations of aspect markers still function as a selection of the temporal structure, albeit a more complex selection.

It must be stressed that it is language-specific which aspectual categories are marked by **grammatical** means. In English for instance lexical verbs such as *start* or *finish* are needed to describe an initial or terminal boundary of an event; in fact, in English these verbs describe a state of affairs by themselves, the state of affairs of starting or finishing something. Note that simple tenses may imply, but do not encode a perfective or imperfective viewpoint. I will elaborate on this matter in the next section.

3.4 TENSE

3.4.1 Introduction

The second semantic domain to be discussed is the domain of tense. The most common temporal distinction is between past and non-past, where non-past may be split up into present and future. A less common distinction is between future and non-future. For the discussion of tense, consider the situation in which Mary is writing. Depending on when this situation takes place, the speaker could describe the situation in different ways. If the speaker does not make a clear selection of the event, the situation could be described as in (23)-(25). If the speaker wishes to focus for example on the post-state of the event, the situation could be described as in (26)-(28):

(23) Mary wrote a letter.
(24) Mary is writing a letter.
(25) Mary will write a letter.

(26) Mary had written a letter.
(27) Mary has written a letter.
(28) Mary will have written a letter.

In the classical analysis of tense by Reichenbach (1947), tense denotes a three-way relation between the time of speech (ST)[10], the time of the event (ET) and the time of a reference point (RT). The time of speech is the time at which the utterance is spoken; the time of the event is the temporal location of the event and the point of reference is indicated either by an adverb or contextually. In Reichenbach's analysis, past, present and future tense (23)-(25) indicate that ET is at RT and RT is located relative to ST, before, at or after ST, respectively. Thus, for the past tense the relation would be ET = RT and RT < ST; for the

[10] Comrie and Reichenbach use S, R and E, but here ST, RT and ET are used.

present tense ST = RT = ET; and for the future tense ST < RT and RT = ET. In the case of a perfect, ET is located before RT. In the pluperfect RT precedes ST (26), that is; ET < RT and RT < ST. In the present perfect (27), RT overlaps ST, that is; ET < RT and RT = ST. In the future perfect (28), ST < RT and ET < RT, but there are three possible resultant interpretations: ET < ST < RT; ST < ET < RT, or; ST = ET and ET < RT.

Reichenbach's approach was later modified by Comrie (1981; 1985). He criticized the idea that every tense marker involves a reference point by making a strict distinction between absolute and relative tense marking. Comrie argued that absolute tense, such as the simple past, present and future in English, marks the temporal relation between ET and ST directly; there is no RT involved. The past, present and future are thus analyzed as ET before ST, ET simultaneous to ST, and ET after ST, respectively. Relative tense, on the contrary, marks the relation between ET and a reference point RT: ET can be before, simultaneous to or after RT. The reference point (RT) is somehow given in the (linguistic) context, 'the range of potential reference points being in principle all those compatible with the given context' (Comrie 1985: 58). The pluperfect and the future perfect combine absolute and relative tense marking. In contrast to Reichenbach's analysis, Comrie assumes that in those cases, there are two binary relations, between ET and RT and between RT and ST, rather than one three-way relation between ET, RT and ST. The future perfect for example is composed of ET before RT and of RT after ST. The relation between ST and ET is not established and therefore, different readings are allowed: ET may take place before, at or after ST. Comrie makes a distinction between the basic meaning of a tense category and its implicatures. The basic meaning of the past is 'location in time prior to the present moment' (1985: 41). There is often a conversational implicature that the situation does not continue up to or beyond the present, but that is not part of the basic meaning.

A further difference between Comrie and Reichenbach is that the former considers present perfect as essentially an aspectual category rather than a (relative) tense category, expressing 'current relevance' (Comrie 1976, 1981), as opposed to the pluperfect and future perfect, that are combinations of absolute and relative tense. It is a language-specific characteristic which temporal distinctions a language marks grammatically. The most commonly marked opposition is between past and non-past. Some languages divide the non-past into present and future.

The standard account of tense in the FG model closely resembles Comrie's point of view: 'Tense operators serve to locate the SoA [state of affairs] on the time axis in relation to some t_r.' (Dik 1997a: 237). The moment t_r can represent the moment of speech (absolute tense) or another moment in time (relative

tense). This view needs some modification, however, as it is not completely satisfactory. This will be discussed in the next section.

3.4.2 Topic time

Although Comrie's view on tense is widely used, Klein (1994: 22-23) has shown that it does not account for some common phenomena. The first problem with Comrie's view is that a past tense marker is used for a state that still holds at the moment of speech; in *It was a beautiful book, but it was in Japanese*, there are two states marked for past tense, whereas the real world states (being a beautiful book and being in Japanese) are still true for the present time. Why then is it correct to use a past tense in these contexts? The opposite phenomenon also occurs: a future marker is used for a state that already holds at the moment of speech. It is perfectly fine to ask *will you be here at eight?* and to answer *yes, I will be here*, whereas in both cases, the state of being here already holds in the present. It can, therefore, not be maintained that tense markers locate the event in time, since the events in the above examples also hold in the present, whereas they are not encoded for present tense. Klein solves this problem by the notion of **topic time**, that is 'the time span to which the speaker's claim on this occasion is confined' (1994: 4). In his view, tense does not locate the **event** on the time line, but rather the topic time. The topic time interval is located on the temporal axis by tense markers. In Klein's view 'tense does not directly specify the "time of the situation"; rather, it imposes a temporal constraint on the time for which the assertion is made.' (1994: xii). This implies that the speaker does not mark the temporal location of the complete situation or event (ET in Comrie's approach); he merely asserts the time location for a selected part of the situation, the part he has focused on. In the earlier examples (26)-(28), only the post-state of the event of Mary's writing a letter is located in time. Klein calls the time of the interval for which the assertion is made the topic time (from now on, TT), and the time of the real event the Situation Time (TSit). In his view absolute tense marks the relation between TT and the time of the utterance (TU) or speech time. The past tense indicates that TT < TU, which means that the speaker asserts something for a period of time (TT), which is located prior to TU. Accordingly, the present can be represented by TT overlapping TU; and the future by TT after TU.

Topic time also explains why aspectual expressions are used to select part of the temporal structure. In Klein's view aspect serves to link the time of the event to the topic time interval (1994: 99). This is compatible with the definition of aspect presented in D1. The relevant part of the temporal structure that aspect selects is exactly the part of the structure that holds at topic time. An overview of Klein's approach to relevant categories of tense and aspect is presented in Table 3-2.

Table 3-2. Temporal and aspectual relations according to Klein (1994)

Tense categories		Aspect categories	
past	TT before TU	imperfective	TSit overlaps TT
present	TT overlaps TU	perfective	TT overlaps TSit
future	TT after TU	perfect	TT after TSit
		prospective	TT before TSit

Notes. TT = topic time ; TU = Time of utterance ; TSit = Time of situation or event

Klein argues that relative tenses should be analyzed as prospective or perfect aspect in combination with tense. The pluperfect, then, is the combination of the selection of the post-state of a situation (TT), which is situated prior to TU, while the present perfect situates the post-state of a situation (TT) as overlapping TU.

3.4.3 Defining tense

I agree with Klein that tense does not necessarily locate the entire state of affairs in time. I also agree with Klein that there is a topic time, a time span about which the speaker is asserting something. I do, however, not agree with his view that tense locates the topic time interval on the temporal axis. In my view, topic time is not systematically marked linguistically. However, there are several cues that the language users can rely on to infer the topic time, such as tense markers, temporal adverbial phrases, world knowledge about the sequence of events, etcetera. This stance resembles the statement that Partee (1984) makes about reference times:

> Reference times are not directly *denoted* by any part of the sentence; they are more like a part of the necessary context for interpreting tensed sentences (…), akin to the kind of locative frame of reference needed to interpret *left* and *right* and other locative expressions. And like the locative case, they are not bound to the actual context of the utterance but can be 'constructed' and shifted in the course of interpretation. (pp. 264-65)

The relation between the topic time interval and the temporal structure of a property or relation is crucial. Tense does locate the event in time, but only the part that is relevant to topic time.[11] Speaker and addressee mutually understand what is the relevant time span about which the speaker asserts something. It is

[11] This view is compatible with Dik's remark (1997a: 50) that 'the *qualified* [state of affairs] expressed in the core predication can be located in space and time by predication operators' (emphasis mine).

because of the Conversational maxim of Quantity (Grice 1975)[12] that tense marking only concerns the part of the event that is relevant to topic time and not the complete event.

If a speaker selects a part of the temporal structure by aspectual operators, then this indicates that only that specific part of the temporal structure is relevant at topic time and ascribed to the argument(s). If no selection is made of the temporal structure, then the temporal structure of the property or relation determines what is the relevant part to topic time. In cases of a temporal structure with boundaries, it can be assumed that the complete state of affairs is relevant at topic time; in such cases the speaker wants to ascribe the entire temporal structure to the argument(s). In cases of a temporal structure without boundaries (properties conceived of as permanent states) only the part of the state that overlaps topic time is located in time. No explicit selection of the temporal structure is made but it is pragmatic inference that only a partial interval of the permanent state is located in time: locating the entire state of affairs is virtually impossible (or at least pragmatically very inconvenient) since it holds anterior to, simultaneous to and posterior to the topic time. Language users know that once a permanent state holds for a certain topic time, it will also hold for other topic times. So, only the part of the state that is relevant to the topic time needs to be located in time. In this view, the examples of Klein in which tense markers do not comply with the temporal location of the entire event (see 3.4.2), can still be accounted for. With respect to states, for example, this view explains why it is possible to use a past tense for a state that still holds at the moment of speaking. Consider (29):

(29) He didn't come to the party. He was ill.

In the light of his not coming to the party in the past, it is only relevant to talk about the interval of the state of his being ill that held at the same time interval of his not coming to the party, even though he might still be ill.

So, Comrie's view on tense can with slight modifications readily account for the problems that Klein has pointed out. I therefore propose to define the function of tense markers as follows:

D2. **Tense** markers locate the part of the event that is relevant to the discourse on the time axis in relation to a reference time interval, in general the speech time interval.

[12] Make your contribution [to the conversation] as informative as required and do not make your contribution more informative than is required.

In cases of absolute tense marking, the use of a present tense indicates that the relevant part of the event overlaps ST. Whenever the past tense is used, the relevant part of the event is anterior to ST. Whenever the future tense is used, the relevant part of the event is posterior to ST. 'Relative' tense marking can in many cases be explained by the interference of perspectival aspect and tense, like Klein claims (section 3.4.2). However, there are languages that encode real anterior or posterior tenses, such as Japanese (Bohnemeyer, personal communication). In those cases the relevant part of the event is not located with respect to the speech time interval, but with respect to another reference time interval. This other reference time interval is comparable to Comrie's RT.

In addition to the location of the relevant part of the event in time, some languages specify the length of the period between the location of the event and the reference time interval. These languages have different encodings for events that are situated relatively close to or relatively far away from RT or ST. This leads to categories like remote past, recent past, immediate future or remote future. Some languages have a different encoding of what happened today (hodiernal) or before today (prehodiernal), or they distinguish between past events that took place today, past events that took place yesterday (hesternal) and past events that took place before yesterday (prehesternal) (Comrie 1985: 83-101).

3.4.4 Scope of tense

Where should grammatical tense expressions be located in the model of FG? Although I have modified the semantic definition of tense compared to the traditional FG view, its communicative function has remained the same. Tense contributes to the situating function of the utterance, that is, it situates the state of affairs in time. Tense expressions do not change the description of the event, such as aspect expressions do. They therefore belong to the class of predication-operators ($\pi 2$), located at the second layer of the semantic representation.

FG thus assumes expressions of aspect and tense to modify different parts of a clause. This has already been noted by Jakobson (1971), Foley & Van Valin (1984, and subsequent work on RRG), and Bybee (1985). These authors all recognize that aspect is only concerned with the temporal structure of the action or property designated by the predicate, 'without involving its participants and without reference to the speech act.' (Jakobson 1971: 134). The participants are unaffected by a marker of aspect. Tense on the contrary is concerned with locating the relevant part of the event in time **in its entirety**, i.e., including the participants that are involved in that event.

Although RRG and FG agree that the clause can be divided into layers and that TMA expressions should be considered operators that modify a layer, the

exact layered structure is not identical in both theories. In RRG (Foley & Van Valin 1984: 208) no distinction is made between predication and proposition. A main point of difference with FG is that tense in RRG is considered a peripheral operator that modifies the whole clause (similar to the proposition in FG), whereas in FG it only modifies the predication.

3.4.5 Tense and aspect

What are the implications of the definition of tense for the relation between tense and aspect markers? Aspect markers select the part of the temporal structure of a property or relation that is relevant to topic time. Only this part helps building up the proper state of affairs description. Tense markers on the other hand locate the part of the state of affairs that is relevant to the conversation on the time axis in relation to the speech time interval. In the figures below, the relevant part of the event is indicated by a dotted oval, the topic time interval by 'TT' and speech time by 'ST'. For example, in *Mary has written a letter* in Figure 3-14, the relevant part of the event is the post-state, selected by the perfect. The present tense *has* indicates that this post-state is overlapping the speech time interval (indicated by ST). Consider Figure 3-14:

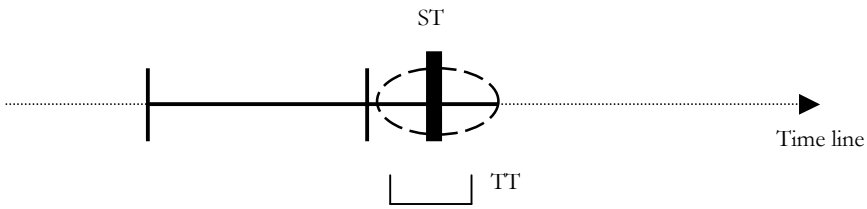

Figure 3-14. Representation of present tense and perfect: *Mary has written a letter*

A past tense marker indicates that the relevant part of the event, the post-state in case of perfect aspect, is located anterior to speech time. See Figure 3-15:

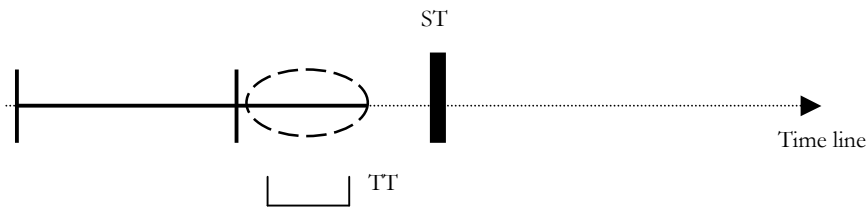

Figure 3-15. Representation of past tense and perfect: *Mary had written a letter*

A future tense marker indicates that the relevant part of the state of affairs, the post-state in this case, is located posterior to speech time. There are three possible temporal interpretations for an utterance like *Mary will have written a letter*:[13] Consider Figure 3-16 for the representations of these interpretations:

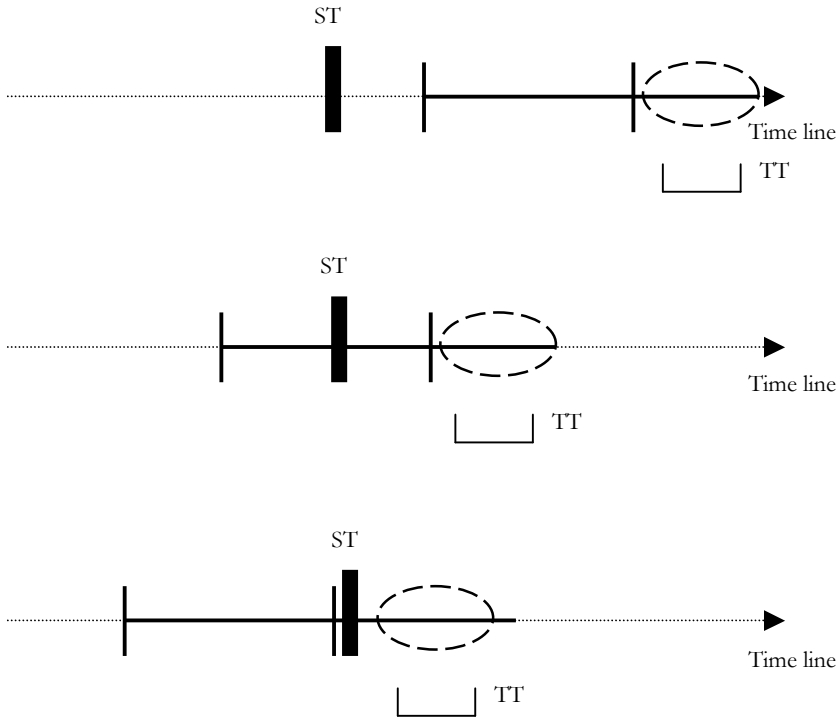

Figure 3-16. Representations of future tense and perfect: *Mary will have written a letter*

When a prospective, instead of a perfect is used, it is the pre-state that is located on the time line with respect to ST, when an ingressive is used, it is the initial boundary that is located on the time line with respect to ST, etcetera.

There are close relationships between certain aspects, tenses and situation types, mainly due to the implicatures of aspectual expressions. First, when the pre-state of an event is selected (prospective aspect) or the initial boundary (ingressive), it may be inferred that the event will indeed take place (although

[13] There is a fourth and even a fifth possible interpretation, in which *will* is not interpreted as a future tense marker, but as a prediction marker, in which case the post-state may overlap the moment of speech or even precede it. This will be discussed in Chapter 4.

this implicature may be denied). There is thus a close relationship between prospective or ingressive and with future tense. Second, when TT is in the present, and the predicate refers to a dynamic event, it is quite "natural" to select the middle part of the temporal structure, by using a progressive, continuative or imperfective aspect marker, as it happens very rarely that a complete event occurs exactly at the speech time interval. Cases where this might occur in English will be discussed in section 6.2.3.2. When the speaker wants to refer to a stative event at the present time, it will in most cases overlap S; when it is a permanent state, an imperfective marker might be used to select the relevant interval of the state for the conversation, and when it is a resultant state, following from a telic event, the speaker may use a perfect or resultative marker to select the post-state of the event. There are thus close relations between states, present tense and imperfective aspect, between dynamic events, present tense and imperfective or progressive aspect and between telic events, present tense and perfect or resultative aspect. Finally, the selection of the final boundary or the post-state by an egressive, perfective, perfect or resultative aspect may often imply that the event has taken place, or in other words, that it is located in the past tense. Telic events seem to be prime candidates for 'perfective' aspects and past tense: these operators imply that the inherent endpoint of such an event type is reached, which is a rather crucial piece of information. Similar claims are made by Chung and Timberlake (1985):

> The different temporal locations of an event—past, present, and future—are inherently correlated with differences in mood and aspect. An event that will occur after the speech moment is non-actual and potential. Hence there is a correlation between future tense and non-actual potential mood and, by implication, between non-future tense and actual mood. An event that is ongoing at the speech moment has not been completed. Hence there is a correlation between present tense and incompletive (imperfective or progressive) aspect and, by implication, between past tense and completive (perfective or non-progressive) aspect. (p.206)

The relation between aspect, tense and situation type will be a returning topic in later chapters, especially Chapter 9.

3.4.6 Summary

Tense expressions contribute to relating the set of possible events to the concrete event the speaker has in mind. They locate the part of the event that is relevant to the discourse on the temporal axis in relation to some t_r. Tense expressions leave the description of the state of affairs intact and do not change the internal dynamics of the state of affairs nor any of the other elements that build up the description of the state of affairs (the arguments, the property or relation, the additional participants). They therefore function as $\pi 2$-operators in

the second layer of the semantic representation, which is the standard approach in FG.

3.5 QUANTIFICATION

3.5.1 Defining quantification

The third domain to be discussed is quantification. In FG, it is traditionally referred to as a specific category of aspectuality, but since quantification has a different function than aspect, I will refer to it as a separate domain.

There are two types of quantification. Both Klein (1994) and Anstey (2002) distinguish between expressions that indicate the frequency of a property or relation and expressions that indicate the frequency of an entire event. Anstey shows that some languages have expressions that mark the iteration or intensity of the predicate. For example, Biblical Hebrew employs phonological modifications of the verbal stem to indicate that a relation or property is intense or iterated. For example, *ʃavar* 'break' may be modified to *ʃibbar*, meaning 'break into pieces' (Anstey 2002: 6). I will refer to these types of functions as property quantification. This domain is defined in D3:

D3. **Property quantification** modifies the internal structure of the property or relation, ascribed to the arguments, by adding a sense of iteration or intensity.

Expressions of property quantification modify the temporal structure of the property or relation designated by the predicate. They thus function as π1-operators, with scope over the predicate only.

The second type of quantification is event quantification (Anstey 2002: 6) that indicates the frequency of an entire event, for example a habitual or frequentative. Only this type of quantification was recognized in the standard approach of FG. The definition presented here is a slight adaptation of Dik's definition (1997a: 236):

D4. **Event quantification** situates the event (in different ways) with respect to its frequency, without entering into the definition of the event itself.

Markers of event quantification function as π2-operators. They do not change the description of the event and contribute to the situating function of the utterance: there are several instances of an event that are relevant to the discourse. The speaker does not refer to one specific event in the real or

imaginary world, but to a sequence or group of events. In section 3.5.2 and 3.5.3 the different operators within the domain of quantification will be discussed in more detail.

3.5.2 Property quantification

Possible categories of property quantification (π1) are:

- Iterative: the property or relation ascribed to the arguments denotes a repeated action (on one occasion),
- Intensity: the property or relation ascribed to the arguments denotes an intense action.
- Semelfactive: the property or relation ascribed to the arguments denotes a single action.

In English, these categories are not expressed by grammatical means. Lexical equivalents for the iterative meaning in English would be *jump (one jump)* vs. *jump repeatedly*; *hit* vs. *hit several times*. For the intense meaning, one may think of the distinction between *look around* and *look around thoroughly* or *read* and *read through and through*. For the semelfactive aspect, it is explicitly specified that some action is performed only once instead of the default iterative interpretation, such as *He bounced the ball (repeatedly)* vs. *He bounced the ball once*. Modifications of iterative and intensity markers on the structure of the property or relation may be represented as in Figure 3-17:

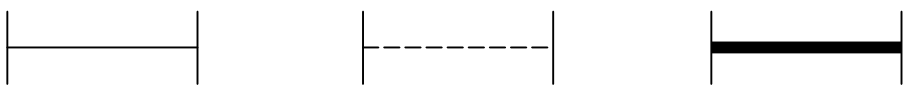

Figure 3-17. Representations of an unmodified (left), an iterative (middle) and an intense (right) property or relation: *jump*, *jump up and down*, *make big jumps*

Property quantification falls within the scope of aspect: the former modifies the property or relation and the latter selects the part of this modified property or relation that is relevant to topic time. They both specify what is predicated of the arguments, therefore, they both function as π1-operators.

3.5.3 Event quantification

Possible operators of event quantification (π2) are:

- Habitual: the same state of affairs recurs on different occasions, potentially due to a habitual propensity of the participants involved, (adapted from Dik 1997: 236)
- Repetitive: the same state of affairs occurs again on a different occasion,
- Frequentative: the same state of affairs occurs several times on different occasions,
- Distributive: the same state of affairs occurs several times, with different participants.

What is most crucial to this thesis is first, that the internal structure of the event is not changed by expressions of event quantification and second, that event quantification relates the description of the set of possible events to several concrete events the speaker has in mind. Consider Figure 3-18 for a general representation of event quantification:

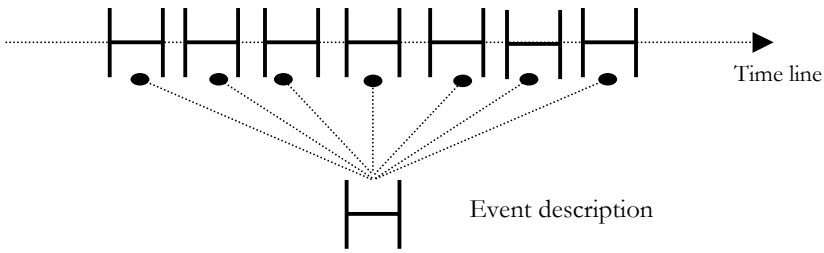

Figure 3-18. General representation of event quantification

The scope relation between aspect and event quantification is opposite to the relation between aspect and property quantification: aspect falls within the scope of event quantification; the complete event may be described as occurring frequently, but also the initial or terminal boundary, the pre- or post-state or the interval in the middle: *He frequently draws a still life*, *He frequently started to draw a still life*, *He was frequently drawing a still life*, *He has drawn a still life frequently*, etcetera. Furthermore, event quantification falls within the scope of tense, 'since for an event to occur at all, it must occur at some time' (Anstey 2002: 20).

What is the relation between the set of events and topic time for a habitual? There are different proposals. In Klein's analysis (1994: 47) a speaker chooses to speak about a series of topic times, and for all of these topic times, the event

holds. The representation of a habitual is presented in Figure 3-19, for an event with boundaries. The event is repeated. Note that the topic time may overlap the entire event, as in this representation, but it may also overlap only part of the event, which is the case when aspect is also expressed.

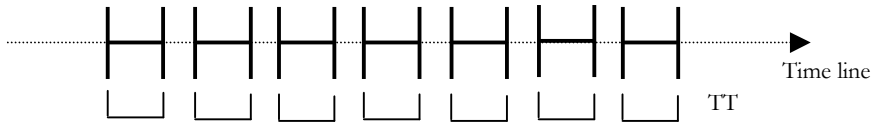

Figure 3-19. Representation of a habitual following Klein's analysis

An alternative way to represent a habitual is provided by Bohnemeyer (1998: 338). He assumes that the topic time is an extended interval, which is included in the interval of a sequence of the target event. Consider Figure 3-20:

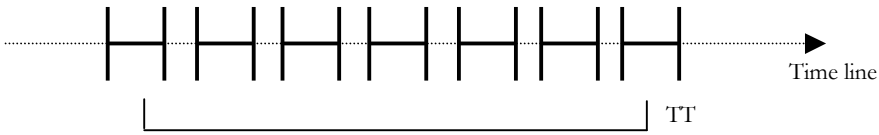

Figure 3-20. Representation of a habitual following Bohnemeyer's analysis

In my view, Bohnemeyer's account is the best way to represent a habitual. The topic time interval is mutually understood by the interlocutors and a habitual expression indicates that the event referred to consists of a repeated sequence of events. I assume that the same kind of representation could be used for a frequentative. In the representation of a distributive, the events should occur simultaneously or overlap partly, as they may occur at the same time, whereas in the representation of a repetitive, there are only two events involved, that occur sequentially. The second event overlaps topic time.

3.5.4 Summary

I made a distinction between property quantification ($\pi 1$) and event quantification ($\pi 2$). Expressions of property quantification specify that the property or relation ascribed to the argument(s) is constituted of a repeated or intense action. They function as $\pi 1$-operators. Expressions of event quantification specify that the speaker does not have one concrete event in

mind, but a set of concrete events. They thus contribute to situating the state of affairs and they function as π2-operators.

Finally, the scope-relations between the different domains were discussed. Operators may have scope over another operator at the same layer since several operators may contribute to the different communicative functions of an utterance at the same time. Event quantification has scope over aspect and falls itself within the scope of tense. Property quantification falls within the scope of aspect. The outcome of this discussion is presented in (30):

(30) [π2 tense [π2 event quantification [π1 perspectival aspect [π1 (im)perfective / phasal aspect [π1 property quantification [Pred]]]]]]

The scope relations between operators of the same type are not further relevant to this thesis.

3.6 CONCLUSION

In this chapter, I considered the semantics of grammatical expressions of aspect, tense and quantification. The semantics are crucial in deciding where the grammatical categories should be located in the underlying representation of the clause. They determine the communicative function of the expressions, whether they contribute to the description of the property or relation (π1) or to situating the event (π2). I proposed alternative definitions for aspect, tense and quantification for those presented in the standard FG-approach (Dik 1997a). Therefore, the notion of topic time was introduced; 'the time span to which the speaker's claim on this occasion is confined' (Klein 1994: 4).

Firstly, the definition of aspect used in this thesis is: **aspect** selects the relevant part of the temporal structure of a property or relation, including the pre- or post-state (D1). The relevant part is the part that holds at topic time. The speaker only ascribes this selected part of the temporal structure of the property or relation is to the argument(s). Aspect markers modify what is ascribed to the argument(s) and thus function as π1- or predicate operators. It was also shown that there is no difference in the communicative function of perspectival aspect, phasal aspect and (im)perfective aspect. Although perspectival aspect may have scope over other aspectual markers, the resulting interpretation is still a selection of the temporal structure of the property or relation designated by the predicate. There is furthermore no difference between the communicative function of phasal aspect operators and (im)perfective operators: the latter express a less fine-grained binary opposition (either the temporal structure with or without the boundaries is selected) whereas the former can make more specific selections.

Secondly, the definition of tense was refined: **tense** locates the part of the event relevant to topic time on the time axis in relation to the speech time interval (D2). It does not change the internal structure of the event: tense does not modify the descriptions of the designated entities nor of the designated property or relation. It relates the description of the set of possible events temporally to the concrete event the speaker has in mind. Tense expressions thus contribute to situating the event and they function as π2-operators.

Thirdly, a distinction was made between expressions of quantification that specify the frequency or intensity of a property or relation (property quantification) and operators that specify the frequency of the state of affairs (event quantification). **Property quantification** modifies the internal structure of the property or relation that is ascribed to the arguments, by making it iterated or intense (D3). Property quantification helps to build up a proper description of the event and belongs to the category of π1-operators. **Event quantification** relates the description of the set of possible events to a set of concrete events in the real or imaginary world (D4). Operators of event quantification contribute to the situating function within an utterance and are predication operators (π2): they do not change the description of the event, but situate the event in terms of frequency of occurrence. The resulting categorization is presented in Table 3-3.

The TMA domains in this table all belong to the representational level in FG. There is, however, a significant difference between the domains that function as π1-operators and those that function as π2-operators, because π2-operators have scope over π1-operators. In general, π1-operators can be interpreted independently of contextual information, whereas π2-operators can only be interpreted by pragmatic inferences about topic time, based on context, speech situation and world knowledge.

Table 3-3. Classification of aspect, tense and quantification according to scope

TMA Domain	**Scope over**
Aspect *prospective, ingressive, continuative, progressive, egressive / completive, (im)perfective, perfect* Property quantification *iterative, intensity, semelfactive*	Predicate (π1)
Tense *past, present, future, non-past, non-future, ± specification of temporal distance* Event quantification *habitual, frequentative, repetitive, distributive*	Predication (π2)

Chapter 4

Modality, Evidentiality and Irrealis

4.1 INTRODUCTION

In Chapter 3 the domains of tense, aspect and quantification were discussed. The topic of this chapter will be the domains of modality, evidentiality and irrealis. There is a crucial distinction between the former and the latter domains. Chafe (1995) states that there are:

> various paths by which ideas enter consciousness, among them the direct perception of current states and events, the remembering of previously experienced states and events, and the imagining of states and events that are judged not to accord with current objective reality. (p. 349)

Grammatical expressions of tense, aspect and quantification are mainly used for communication about perceptible and remembered events, whereas grammatical expressions of modality mainly concern the communication about imagined states and events. In section 4.2, I will discuss the major subcategories within the domain of modality. I will argue that three parameters are needed, sense, scope and source, to define different categories of modality and I will show that this leads to a sound classification. In section 4.2.5 the areas related to modality, future tense, prospective aspect, irrealis and evidentiality, will be discussed.

4.2 MODALITY

Distinctions in the domain of modality are illustrated in (1)-(4), again concerning the event of Mary writing a letter:

(1) Mary has to write a letter.
(2) Mary could write a letter.
(3) Mary might write a letter.
(4) Mary will be writing a letter.

In (1), it is stated that Mary is somehow obliged to write a letter and in (2), that Mary is able or has the opportunity to write a letter; in (3) the speaker supposes

that there is a possibility that Mary will write a letter; finally, one of the interpretations of (4) is that the speaker predicts that Mary is writing a letter. The examples in (1)-(4) illustrate that the nature of modality can hardly be covered by one general definition; the meanings within the domain are very diverse. There is much controversy about how to define the domain of modality. A rather successful attempt to formulate the general semantics of modality is made by Perkins. He states that 'human beings often think and behave as though things might be, or might have been, other than they actually are, or were.' By marking modality, a speaker speaks 'in terms of 'things being otherwise" and conceives of something 'being true or real in some non-actual world, or true or real in some state of the actual world at a point in time other than the present moment' (Perkins 1983: 6-7).

Another debate concerns the question which meanings should be included in the domain of modality and which ones should not. In this thesis I follow the standard approach in FG that sentence types or basic illocutions (such as declarative, interrogative and imperative) and different moods, such as subjunctive or indicative, are excluded from the domain of modality, since they do not belong to the representational level, but to the interpersonal level (see 2.2). On the other hand, modal expressions that concern characteristics of participants, such as ability or volition, are included in the domain of modality.

Although there is no general agreement on the boundaries of the domain of modality, some modal distinctions are generally acknowledged. First, it is often claimed that modality expresses notions of either necessity or possibility: this opposition will be further elaborated as the parameter **sense**. Second, a general division in the domain of modality is between epistemic, deontic and dynamic or root meanings: general definitions are that epistemic meanings have to do with the knowledge of the speaker about the truth of the propositional content, as in (3) and (4), deontic meanings have to do with notions of permission and obligation, as in (1) and dynamic meanings with internal characteristics of the participants, as in (2). These distinctions will be refined as the parameter **source**. Finally, I will add a third parameter, **scope**, which was defined in 2.1. This notion is much less commonly recognized, although notions like objective, subjective and agent-oriented modality are related to scope. I will show that together with sense and source, scope may account for the specific modal meanings and the close relationships that exist between them.

4.2.1 Sense: potentiality, disposition, weak necessity and necessity

Modal expressions are often used with different meanings. A particular phenomenon is that in very diverse languages, such as Indo-European, Semitic, Philippine, Dravidian, Mayan, and Finno-Ugric, single modal expressions cover

the same meanings (cf. Steele et al. 1981; Sweetser 1990: 49). For example, many languages use a single form for expressing obligation (5) and certainty of the speaker (6), like in English:

(5) You must go now.
(6) You must be joking.

In (5) the participant *you* is obliged to go, whereas in (6) the speaker is certain that the addressee is joking. The fact that in both cases *must* is used indicates that there is probably a close semantic relationship between the notions of obligation (or requirement) and certainty. A similar relation seems to exist between permission and possibility. Palmer (2001) rightly asks why both connections exists.

> There is no immediately obvious reason why the same forms should be used for expressing the speaker's degree of commitment to truth and for getting other people to do things. It is by no means obvious that permission is a 'related notion' to possibility, or requirement to certainty. (p.98)

A plausible view is that there is one general meaning that is involved in the specific meanings of possibility and permission and that there is one general meaning that is involved in the meanings of obligation and certainty. Most often it is assumed that permission has something to do with possibility—which I will refer to as potentiality—and that obligation and certainty both have to do with necessity. The opposition between potentiality and necessity derives from modal logic (Lyons 1977: 787; Von Wright 1951), but it would be mistaken to speak of a binary opposition between the two. In language there is rather a gradient scale between potentiality and necessity. Perkins (1983) adds a third distinction of disposition, which means 'with a tendency to …'. Bybee, Perkins & Pagliuca (1994) make a further distinction between necessity and weak necessity. This leads to a gradual scale of senses from potentiality to necessity, which is represented in Figure 4-1:

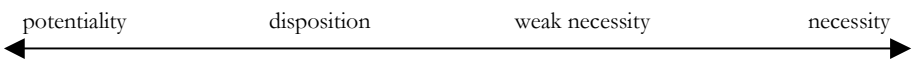

Figure 4-1. Scale of senses

The degree of modal strength[1] can run from potentiality on the one extreme via disposition and weak necessity to necessity on the other extreme. I assume that the scale of senses represents a universal conceptual continuum: in how many

[1] A term borrowed from Harder (1998).

parts the scale is divided is a language-specific characteristic. There may be less or there may be more than four distinctions. English uses different expressions for the four general senses given in Figure 4-1. Potentiality is expressed by *can, could, may* and *might*; and the meaning of these expressions can be paraphrased as 'not precluding'. Disposition is expressed by *will, would* and *wanna* and the meaning of these expressions can be paraphrased as 'disposed towards'. Weak necessity is expressed in English by *shall*, *should, ought to* and *be supposed to*, which can be paraphrased by 'expected to'. Finally, necessity is expressed by *need to, have (got) to, got to* and *must*. The general sense of expressions that belong to this domain could be paraphrased as 'forced to' or 'entailing'.[2] The expressions for one basic sense differ in formality, politeness, and possible contexts of use. As a matter of fact, the basic sense of a modal expression is only part of the resultant meaning. The basic sense of a modal marker in combination with the two other parameters, source and scope, leads to more specific meanings. First, the source of modality will be addressed.

4.2.2 Source: internal, external and epistemic

The second parameter that is needed to describe the semantics of modality is the source of the modality. This is a refinement of the distinction between epistemic, deontic and root or dynamic[3] modality (Bybee 1985; Bybee et al. 1994; Coates 1983; Lyons 1977; Palmer 1986; Perkins 1983; Sweetser 1982). Epistemic modality is 'concerned with matters of knowledge, belief' (Lyons 1977: 793), with 'opinion rather than fact' (p.681-82), whereas deontic modality 'is concerned with the necessity or possibility of acts performed by morally responsible agents' (p.823). Obligation (*must*, *have to*) and permission (*may*, *can*) form the major types of deontic modality. The term 'root modality' is used by Hofmann (1976), Sweetser (1990) and Coates (1983) to refer to all types of non-epistemic modality, but I will reserve this term for modality which has its source in participant-external, but non-deontic circumstances (see later this section) like in Bybee et al. (1994: 320) and Van der Auwera & Plungian (2001: 84). Another term that is sometimes used for non-deontic and non-epistemic modality is dynamic modality. This term will not be further used in this thesis.

Several authors, among whom Sweetser (1990) and Perkins (1983), have already connected sense and source, although they used different labels for it. Sweetser has formulated the senses of specific modal expressions in English and assumes that they apply to different 'worlds', a sociophysical and a world of

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[2] The paraphrases for potentiality, disposition and necessity (*entailed to*) are adopted from Perkins (1983), who used them for specific modal expressions. The paraphrase *forced to* is adopted from Sweetser (1990).

[3] A term of Von Wright (1951: 28).

reasoning. Sweetser formulates the basic senses for each modal auxiliary in terms of Talmy's force dynamics (1988a)[4]: *May* for example indicates the force of an absent potential barrier. This absent potential barrier may apply to the concrete, external sociophysical world, in which case it is interpreted deontically or dynamically: the participant x is not barred from doing something. By metaphorical extension, it may apply to the internal, mental world of reasoning, in which case it is interpreted epistemically: 'the speaker is not barred by the available premises from the conclusion that …' (Sweetser 1990: 61). Similarly, the deontic use of *must* is paraphrased as follows: 'the direct force of y's authority compels x to do something', or in its epistemic use: 'the available (direct) evidence compels S to the conclusion that …' (1990: 61).

Perkins (1983) too describes the semantics of the English modals by a basic meaning such as 'entailing X' for *must*, 'not precluding X' for *can* and *may* and 'disposed towards X' for *will* and *shall*. Again, these basic meanings may apply to different worlds, that Perkins describes in terms of different sets of laws or principles to which the truth or actuality of propositions or events is relativized. He distinguishes three types of modality: the first type, epistemic modality is concerned with rational laws of inference and deduction. It relates to the 'interpretation of the world via the laws of human reason' (p.10). The second type, deontic modality, is defined in terms of social or institutional laws. These laws can be either installed by a legal authority or institution or they can relate to the less formal rules of social status, to the authority one person has over another. The third type, dynamic modality, relates to the set of natural laws. This type of modality is concerned with the relationship between empirical circumstances or states of affairs and non-actualized events, which are the result from natural laws of e.g. physics, chemistry, biology, etcetera (p.11).

> The (…) rational laws (or the laws of reason), social laws (or the laws of society), and natural laws (or the laws of nature) define three different types of possible worlds in which the truth/actuality of propositions/events may be assessed (…). (Perkins 1983: 12)

Although the metaphorical descriptions of epistemic, deontic and root modality as different worlds or different sets of laws are appealing, a more lucid, less symbolic approach is presented by Van der Auwera & Plungian (1998: 80-81), who state that modality is ascribed to different sources, namely, participant-internal characteristics, participant-external circumstances, either deontic or non-deontic, and knowledge. This approach links the semantic distinctions in a consistent and plausible way to one another and it will serve as the basis for the

[4] Talmy systematically describes meanings in terms of entities that exert forces on each other towards rest or towards action. Modal auxiliaries in Sweetser's terms can be understood as expressing forces.

parameter of source in this thesis. With some slight adaptations, the different sources are defined as follows:

- **Participant-internal** modality ascribes the source of the modality to characteristics internal to the participant.
- **Participant-external** modality ascribes the source of the modality to circumstances external to the participant.
    - **Deontic** modality identifies the external circumstances as a deontic source.
    - **Non-deontic** modality identifies the external circumstances as something other than a deontic source.
- **Epistemic** modality ascribes the source of the modality to knowledge.

The combinations of basic senses with source lead to different meanings. This is illustrated for English, for the domain of potentiality expressed by *can*. Each example ascribes the potentiality to a different source. The reference of the example is given between brackets, C for Coates (1983) and P for Palmer (1986), followed by the page number.

(7) I can only type very slowly as I am quite a beginner. (C92)
(8) Can I pinch a ciggie? – Course you can. Would you like a menthol or a plain? (P71)
(9) Yes, we can send you a map, if you wish. (P86)
(10) Can they be on holiday? (P62)

In (7), the source of the potentiality is ascribed to characteristics internal to the participant, i.e. the (limited) typing skills. This raises an interpretation of ability. In (8) the source of the potentiality is ascribed to circumstances external to the participant, in this case the deontic source of the addressee and later the speaker. This raises an interpretation of permission. In (9) the source of the potentiality is ascribed to circumstances (mainly) external to the participant: there are maps available, there is a postal service, and the speaker is physically and mentally able to send a map. This raises an interpretation called root-possibility. Finally, in (10), the source of the potentiality is ascribed to knowledge, in this case about potential events. This raises the interpretation of epistemic possibility.

Different sources can be distinguished by using different paraphrases. For example, the root-possibility interpretation is preferably paraphrased by 'have the opportunity', whereas the epistemic possibility interpretation is preferably paraphrased by 'it could occur that' or 'it could be the case that'. Compare (11)

and (12), in which the exclamation marks indicate the preferred interpretation and the question marks the less plausible interpretation.

(11) Yes, we can send you a map, if you wish.
a. !We have the opportunity to send you a map.
b. ?It could occur that we send you a map.
→ external non-deontic source, root-possibility

(12) Can they be on holiday?
a. ?Do they have the opportunity to be on holiday?
b. !Could it be the case that they are on holiday?
→ epistemic source, epistemic possibility

Similar distinctions hold for the other basic senses. The possible combinations between sense and source are presented in Table 4-1, with some provisional labels. When the source of the modality lies in internal characteristics of the participant, the interpretations that arise are ability, volition (will, 'want to'), weak internal need and internal need. (Weak) internal need means that the participant is forced to do something because of inherent properties, as in *I need nine hours sleep every day*. In combination with external non-deontic sources, the root-interpretations arise. With external deontic sources, the meanings for each sense are permission, desirability, weak obligation and obligation. Whether each possible combination is in fact attested in languages will be discussed later.

Table 4-1. Combinations of sense and source

	SENSE			
SOURCE	**Potentiality**	**Disposition**	**Weak necessity**	**Necessity**
Internal	ability	volition	weak internal need	internal need
External				
Non-deontic	root-possibility	root-disposition	weak root-necessity	root-necessity
Deontic	permission	desirability	weak obligation	obligation
Epistemic	epistemic possibility	epistemic disposition	epistemic probability	epistemic necessity

4.2.3 Scope: participant-, event- and proposition-oriented

Although many semantic distinctions can be accounted for by the parameters sense and source, a third parameter is needed to describe finer distinctions. This is the parameter of scope. The third parameter stems directly from FG, in which expressions of modality are classified according to their scope, that is, the part of the utterance that is modified by the modal expression. The scope of a grammatical TMA expression may be the predicate, the predication or the proposition (see Chapter 2) (Dik 1997a; Hengeveld 1988, 1989, 2004b). If the scope is the predicate, the description of the relation or property predicated of the argument(s) is modified. In FG, this is called participant-oriented or inherent modality. It defines 'relations between a participant and the realization of the [state of affairs] in which he is involved.' (Dik 1997a: 241). If the scope is the predication, the event is situated in the real or imaginary world. This is called event-oriented or objective modality. It expresses the likelihood or actuality of the event. Finally, when the scope is the proposition, the truth of the propositional content is evaluated. This is called proposition-oriented or subjective modality. The speaker expresses his personal attitude towards the content of the proposition. Table 4-2 presents an overview of the different types of modality, based on scope.

Although the notion of scope is not generally used in the literature on modality, some authors do use the term subjectivity (among others) in relation to the speaker's attitude or degree of commitment towards the propositional content (Coates 1983; Langacker 1990; Lyons 1977; Traugott 1982, 1989, 1995, 1996). Furthermore, Foley & Van Valin (1984) distinguish modality types on the basis of scope. They divide modality in four categories, which they call: (i) modality: ability, obligation, intention; (ii) status: actuality, realis-irrealis; (iii) evidential and (iv) illocutionary force (1984: 224). The first category is similar to participant-oriented modality in FG. However, the categories (ii), (iii) and (iv) are all considered to have scope over the proposition, whereas in FG, event-oriented modality (ii) is assumed to operate at the predicational layer, proposition-oriented modality (iii) at the propositional layer and illocutionary force (iv) is located at the interpersonal and not at the representational level.

Table 4-2. Different types of modality according to scope

Type of modality	Scope over	Specification of
Participant-oriented modality ($\pi 1$)	Predicate	Realization of property/relation
Event-oriented modality ($\pi 2$)	Predication	Actuality of event
Proposition-oriented modality ($\pi 3$)	Proposition	S's attitude towards the proposition

Bybee also distinguishes between different types of modality on the basis of relevance to the verb: 'A category is **relevant** to the verb to the extent that **the meaning of the category directly affects the lexical content of the verb stem**' (Bybee 1985: 15). She makes a rough distinction between two types of modality. The first type includes FG's proposition-oriented modality and basic illocutions. According to Bybee it has the 'whole proposition in its scope, and does not only modify the verb. Furthermore, since it expresses the speaker's attitude, it does not have a direct effect on the situation described by the verb' (1985: 22). Bybee further distinguishes agent-oriented modality (similar to participant-oriented modality in FG), but she does not indicate what the relevance of this category is. From the layered model of FG a more fine-grained distinction follows: participant-oriented modality is most relevant to the verb as it directly modifies the action or property designated by the predicate (or verb); event-oriented modality is less relevant to the predicate, since it modifies the situating of the event, designated by the whole predication, and finally, proposition-oriented modality is least relevant to the predicate since it modifies the presentation of the propositional content.

An important point to stress is that the oppositions in scope do not coincide with the oppositions in source or in sense. On this point, I deviate from Van der Auwera (2001: 240) who states that there is a one-to-one correspondence between source and scope of modality, i.e., participant-internal modality would

Table 4-3. Combinations of scope and sense

	SENSE	
SCOPE OVER	**Potentiality**	**Disposition**
Predicate (π1)	x is not precluded from PRED-ing	x is disposed to PRED
Predication (π2)	e is not precluded from occurring	e is disposed to occur
Proposition (π3)	S does not preclude p's truth	S is disposed to conclude p

	SENSE	
SCOPE OVER	**Weak necessity**	**Necessity**
Predicate (π1)	x is expected to PRED	x is forced to PRED
Predication (π2)	e is expected to occur	e is forced to occur
Proposition (π3)	S expects p to be true	S is forced to conclude p

Notes. x = argument; PRED = predicate; e = event; S = speaker; p = proposition

be participant-oriented (π1), participant-external modality would be event-oriented (π2) and epistemic modality would be proposition-oriented (π3). I will, however, show that scope and source are different aspects of modal meanings and that both parameters are needed to describe the full array of modal distinctions. First, the meanings will be discussed that arise when scope and sense are combined. The basic senses may apply to the participant (x), the event (e) or to the propositional content (p). This results in different meanings, listed in Table 4-3.

The combination of scope and sense already results in twelve different meanings, but each of these meanings can be made more specific in language use as they also reveal the source of the modality. For example, there may be different sources that account for the fact that 'x is expected to PRED' or that 'e is forced to occur'. Participant-oriented modality (π1) that specifies the realization of the property or relation by the participants may have its source in participant-internal or participant-external factors. Event-oriented modality (π2) that specifies the actuality of the event, may have its source in general participant-external circumstances, deontic circumstances, such as moral, legal, or social norms or in terms of knowledge about events. Finally, proposition-oriented modality (π3) may have its source in the certainty of the speaker, or in his personal attitude about the content. The latter will be conceived of as a special case of deontic modality. Not every combination between source and scope is possible. The logically possible combinations are presented in Table 4-4.

If the source of the modality is participant-internal, then the scope can only be participant-oriented. But if the source is participant-external or epistemic, then different scopes are possible. This will be illustrated in the next sections.

Table 4-4. Possible combinations of source and scope

	SCOPE OVER		
SOURCE	**Predicate (π1)**	**Predication (π2)**	**Proposition (π3)**
Participant-internal	X		
Participant-external			
Non-deontic	X	X	
Deontic	X	X	X
Epistemic		X	X

4.2.3.1 External, non-deontic modality

Modal expressions that ascribe the source of the modality to participant-external, non-deontic circumstances can either have scope over the predicate (participant-oriented) or over the predication (event-oriented). In the former case, **a specific participant** is not precluded from, disposed to, expected to or forced to do something, because of external circumstances. In the latter case, however, it is not the specific participant, but **the event** that is not precluded, disposed, expected or forced to occur because of external factors. This difference will be shown with the basic sense of potentiality. If the scope is the predicate, then a specific participant is not precluded from doing something mainly because of extrinsic factors, and this raises the meaning of root possibility. Consider (13) and (14):

(13) Can you pick your own trousers up? (C94)
(14) I am afraid this is the bank's final word. I tell you this so that you may make arrangements elsewhere if you are able to. (C141)

If the scope is the predication, then the event is not precluded from occurring, and the occurrence of the event is independent of the involved participants. These meanings arise when the participant is non-specific, as in (15) and (16), or not mentioned at all such as in passive constructions. See (17) and (18).

(15) I know the place. You can get all sorts of things here. (P84)
(16) National pressure groups cannot exist without full time staffs and a regular income. (P91)
(17) Salts can easily be separated from the solid residue by dissolving them. (C98)
(18) Well, I'll see what can be done and give you a ring. (P84)

4.2.3.2 External, deontic modality

Modality expressions that ascribe the source of the modality to a deontic source can have scope over the predicate, the predication or the proposition. If the scope is the predicate, a specific participant is not precluded, disposed to, expected to or forced to do something because of an individual deontic authority. If the scope is the predication, an event is not precluded, disposed to, expected to or forced to occur because of a general deontic authority, such as a general rule or law. The occurrence of the event is independent on the involved participants. If the scope is the proposition, the speaker expresses his/her attitude towards the propositional content. These differences will be illustrated for the basic sense of necessity. Consider the distinction between participant-oriented (19) and event-oriented modality (20).

(19) You must tell me how to get to it. (C34)
(20) All students must obtain the consent of the Dean of the faculty concerned before entering for examinations. (C35)

In (19), a specific participant *you* is obliged to do something by an individual deontic authority, the speaker. In (20) the event of *all students obtaining consent of the Dean before entering examinations* is forced to occur because of a general deontic authority, the rules that hold at the faculties. The distinction between participant- and event-oriented deontic modality can be made clear by adding an adverb of location that indicates the location where the permission or obligation holds. If the deontic source is an individual, it is often impossible to add an adverb that specifies the location of appliance of the obligation or permission[5], see (21) and (23), whereas this is possible if the deontic source is a general rule, see (22) and (24):

(21) Can I borrow your pen (*here)? → participant-oriented (π1)
(22) Can I pay by credit card (here)? → event-oriented (π2)

(23) (*In this office) you mustn't put words into my mouth, Mr. Williams. (C39) → participant-oriented (π1)
(24) (In England) you must drive on the left side. → event-oriented (π2)

The general rule or law can apply to specific participants as in (22). In most cases however the participants are non-specific ((20), (24) (25)) or not mentioned at all (26).

(25) In the library you can take a book out and keep it out for a whole year unless it is recalled. (P103)
(26) No vehicle may be left in the University grounds during vacation. (C132)

Finally, the scope of deontic modality can be the complete proposition. Consider (27):

(27) The government must act. It must make up its mind about priorities – offices or houses, housing estates or luxury buildings. (P106)

[5] The location of the permission or obligation needs to be distinguished from the location of the property or relation. For example, *you can park you car here* (*at this particular spot*) does not yield an event-oriented reading since the adverb *here* modifies the action of parking, not the permission.

In (27), in contrast to (19) and (20), there is no actual obligation applied to the participants or the event. The speaker does not in fact lay his authority on the government, and there is no general rule that forces the event of the government acting to occur. With participant- and event-oriented deontic modality, obligation or permission belongs to the descriptive level just like is the case with participant-internal and participant-external modalities. In (19), the participant *you* is indeed obliged by the speaker) to do something. It can be paraphrased by 'x is obliged by the deontic authority S to do … '. The same holds for event-oriented deontic modality, where the general law or rule does indeed apply to the occurrence of the event. With proposition-oriented deontic modality on the other hand, the modal marker does not belong to the descriptive level: the speaker expresses that in his opinion, the proposition that the government acts and makes up his mind should be true. It is an imagined obligation, a thought or wish of the speaker, not a factual obligation that is ascribed to the participants or that holds for the event. The utterance in (27) cannot be paraphrased by 'I oblige the government to…', or 'there is a general rule that obliges the government to …' but rather with 'It is my opinion that the government should be obliged to …'. The speaker thus talks about a mental construct.

Notice that it is not a difference of commitment that distinguishes proposition-oriented modality from the other scope types. Both in (19) and in (27) the speaker is personally committed to the obligation, since he or she is the deontic source, but with participant-oriented modality it is not the main purpose of the modal to express the speaker's commitment, but rather to lay an obligation upon the addressee. The commitment of the speaker follows from conversational implicatures, not from using the modal. With proposition-oriented modality on the other hand, it is the main goal to express the speaker's attitude or commitment. With event-oriented deontic modality, it is in general irrelevant whether the speaker is committed to what is stated by the general rule.

4.2.3.3 Epistemic modality

The final category of modality in which a distinction in scope exists is epistemic modality. Here, the source of the modality is knowledge. An epistemic expression can have either scope over the predication or over the proposition. If the scope is the predication, the speaker presents the modal information as an **objective** epistemic statement about the actuality of the event. This use could be paraphrased as 'e is not precluded/ disposed/ expected/ forced to occur because of objective knowledge about events'. If the scope is the proposition, the speaker presents the modal information as a **subjective** epistemic statement about his personal commitment to the propositional

content or the amount of responsibility he takes for the truth of the proposition. A paraphrase would be 'S does not preclude / expects p's truth' or 'S is disposed / forced to conclude p because of the available premises'. The distinction between objective epistemic statements about the actuality of an event and subjective epistemic statements that report the stance of the speaker is not always clear-cut and many authors have conflated both uses. Notable exceptions are Lyons (1977) and especially Papafragou who refers to 'objective' modality as alethic (or logical) modality and says that alethic modality concerns '**mind-independent** abstract entities' (Papafragou 2000: 81, emphasis mine).

In distinguishing between event-oriented epistemic modality and proposition-oriented epistemic modality, it matters most how S presents his utterance in the given context, as **mainly** objective or **mainly** subjective. Both interpretations are in fact closely related: if S presents his utterance as objective—it can occur that e—it may imply that S does not preclude the truth of p. And if S presents his utterance as subjective—S does not preclude p's truth—it probably implies that the event e is not objectively precluded from occurring. Although there are no clear tests to distinguish between the two interpretations, it is possible to reveal the communicative intention by using paraphrases and/or by adding adverbs. This will be illustrated for the basic sense of potentiality. First of all, with objective epistemic modality it is acceptable to add the (subjective) adverb *certainly*, whereas this is strange for subjective epistemic modality, since subjective certainty and subjective potentiality (uncertainty) express a contradictory stance (Hengeveld 1988). Secondly, utterances with objective epistemic modality are preferably paraphrased by: 'there is a possibility that …', or 'it can occur that …', whereas utterances with subjective epistemic modality are preferably paraphrased by: 'I suppose that …, but I'm not sure' or 'I doubt whether …'. The application of the tests are illustrated in (28) and (29):

(28) The only snag is that it has been raining (much later than is usual) and I could get held up for anything up to a week. (C108)
a. !I certainly could get held up….
b. !There is a possibility that I'll get held up for anything up to a week.
c. ?I suppose that I'll get held up …., but I'm not sure.
→ *could* is used OBJECTIVELY, event-oriented (π2)

(29) January I suppose, there may be an interview round about January. (C137)
a. ?there certainly may be an interview round about January.
b. ?there is a possibility that there will be an interview round about January.
c. !I suppose that there will be an interview round about January but I'm not sure.
→ *may* is used SUBJECTIVELY, proposition-oriented (π3)

In sum, there are two types of epistemic modality: epistemic modality that describes the actuality of the event and epistemic modality that indicates how certain the speaker is about the truth of the proposition. There are some remarks to be made about the expression of the actuality of events in combination with sense. When the basic sense is disposition, epistemic event-oriented modality expresses that e is disposed to occur (from an objective point of view). This can be considered a specific instantiation of the basic modal sense of disposition, but at the same time, the resultant meaning is closely related (or maybe even identical) to what a future tense marker expresses: it is presented as an objective fact that the event is disposed to occur. The relation between modality and future tense will be worked out in section 4.3.1.

Furthermore, within the sense of necessity, event-oriented epistemic necessity does not seem to exist, at least not without negation. Objective necessity denotes that 'of the only possible e, which is e_1, e_1 is the case'. This could be regarded the default situation for every utterance. It seems communicatively unimportant to express that e is objectively necessary, since that is the normal, unmarked communicative situation. There is no need to specify that only e_1 is a possible actual event, unless the actuality status of e_1 is somehow special, because there are other possible e's. There is, however, **negated** epistemic objective necessity which expresses 'not necessarily e_1', with the implication that 'possibly e_{not1}'. It is semantically closely related to epistemic possibility. In English, it can be expressed by *need not* or *doesn't have to* + negation. Examples are:

(30) Oh gosh, getting married is an awfully complicated business. [other speakers argue] Actually it <u>needn't</u> be – it can be very straightforward. (C50)
(31) He <u>doesn't have to</u> be at home: he could have gone straight to Caroline.

These utterances can be paraphrased as: 'e does not necessarily occur'.

4.2.4 Classification of modality

Three parameters have been discussed on which the meaning of a modal expression may differ: sense, source and scope. All three parameters are necessary for the classification of modality as there are minimal differences between modal expressions on each of the parameters. This will be shown for English.

Firstly, the meaning of modal expressions can differ only on the parameter of sense. Consider the examples in (32) and (33):

(32) I can jump very high.
(33) I wanna jump very high.

Both sentences have scope over the predicate and the modal source of *can* and *wanna* is participant-internal. However, the sense is different: in (32) an expression is used (*can*) that indicates a sense of potentiality, whereas in (33) an expression is used (*wanna*) that indicates a sense of disposition. The paraphrase for (32) is: 'x is **not precluded from** jumping because of intrinsic factors', which raises the specific meaning of ability. In (33), x is **disposed to** jump, because of intrinsic factors, which raises the specific meaning of volition.

Secondly, the meaning of modal expressions may differ only on the parameter of source. Consider the examples in (34) and (35):

(34) Wow, you can jump five meters! Unbelievable.
(35) Everything is ready. You can jump now.

Can in (34) and in (35) has scope over the predicate and its general sense is potentiality. The only parameter on which *can* in both utterances differs is the source. In (34) the source of the potentiality is participant-internal: x is not precluded from jumping because of **intrinsic factors**. This raises the meaning of ability. In (35) the source of the potentiality is participant-external: x is not precluded from jumping because of **external factors**. This raises the meaning of root-possibility.

Finally, the meaning of modal expressions may differ only on the parameter of scope. See (36) and (37):

(36) You may borrow my book for three weeks if you want.
(37) In the library, you may borrow a book for three weeks.

The general sense of both utterances is potentiality and the source of the potentiality is deontic. This yields the interpretation of permission in both utterances. What is different, however, is that the permission in (36) concerns

the specific participant *you* and in (37) the event of borrowing a book. The scope of *may* in (36) is the predicate; this is participant-oriented modality, meaning **x is not precluded from** borrowing because of an individual deontic authority. In (37) the permission concerns the event of borrowing a book for three weeks by any participant (non-specific *you*). The scope of *may* is the predication; this is event-oriented modality, meaning **e is not precluded from occurring** because of a general deontic authority.

The examples in (32)-(37) illustrate that sense, source, and scope operate independently to a certain extent. Therefore, all parameters are necessary to account for the semantic distinctions of modal expressions. The combination of the parameters is presented in Table 4-5 and leads to the specific modal meanings listed in the individual cells, such as root-necessity or desirability. Within a basic sense, each cell is semantically related to the adjacent cells in that they only differ on one of the parameters. Furthermore, a cell at a specific location within a basic sense is related to the cell at the similar location in the adjacent basic sense: for instance, ability is related to volition. The dotted line between the two subsources of participant-external modality indicates that both categories are semantically related to the previous row of participant-internal modality and to the next row of epistemic modality. In English, subtypes of potentiality are expressed by *can*, *could*, *may* or *might*; subtypes of disposition by *will*, *shall*, *would*, or *wanna*; subtypes of weak necessity by *should*, *ought to* or *be supposed to*: and subtypes of necessity by *must*, *need to*, *have (got) to*, or *got to*.

The classification in Table 4-5 could be considered a representation of a conceptual space. Which categories are actually expressed and distinguished linguistically is a language-specific characteristic. In section 6.2.5 the modal system in English will be discussed in detail and in Chapter 7 crosslinguistic variation in modal systems will be examined.

Whether this classification of modality should be regarded as a polysemy account, in which a single expression has separate related meanings, or as a monosemy account, in which a single expression has one underdetermined meaning that in combination with pragmatic inferences gives different contextual interpretations, is not a very relevant issue in my opinion (see Papafragou 2000 for a discussion). Speakers use expressions in different contexts with different intentions: it is beyond the scope of this thesis to determine whether language users have stored one item together with the pragmatic conventions for the possible specific uses, or several items for which the semantic relations are specified. Possibly, they use both strategies.

Table 4-5. Classification of the domain of modality along the parameters sense, scope, and source

		SENSE					
		POTENTIALITY			DISPOSITION		
SOURCE	**SCOPE**	**Participant-or.**	**Event-or.**	**Proposition-or.**	**Participant –or.**	**Event-or.**	**Proposition-or.**
Participant-internal		ability			volition		
Participant-external	Non-deontic	root-possibility	root-possibility		root-disposition	root-disposition	
	Deontic	permission	permission	permission	desirability	desirability	desirability
Epistemic			possibility	uncertainty		disposition/ future tense	prediction

Notes. or. = oriented ; nec. = necessity ; oblig. = obligation

SENSE					
WEAK ENTAILMENT			ENTAILMENT		
Participant-or.	**Event-or.**	**Proposition-or.**	**Participant-or.**	**Event-or.**	**Proposition-or.**
weak need			need		
weak root-nec.	weak root-nec.		root-necessity	root-necessity	
weak oblig.	weak oblig.	weak oblig.	obligation	obligation	obligation
	probability	weak certainty		necessity	certainty

4.2.5 Summary

Modality can best be defined on the basis of three parameters: **sense** conveys the basic meaning of a modal expression, on a scale from potentiality to necessity; **source** concerns the factors to which the modality is ascribed, participant-internal, participant-external or epistemic source; the **scope** of modality is the part of the utterance that is modified. The parameter of scope is most important to the remainder of this thesis. Grammatical modal expressions can have scope over the predicate; these expressions function as π1-operators (participant-oriented modality). Second, grammatical modal expressions can have scope over the predication; these expressions function as π2-operators (event-oriented modality). Third, grammatical modal expressions can have scope over the proposition; these expressions function as π3-operators (proposition-oriented modality).

4.3 RELATED DOMAINS

4.3.1 Future tense and prospective aspect

As was already mentioned briefly in section 4.2.3.3, there is a close relationship between future tense and modality. On the one hand, modal expressions very often have future time reference: they do not describe or refer to an event that is remembered or currently perceived, but to an event that is imagined. There is often a strong implicature that the event described will take place in the (near) future. On the other hand, future reference has a sense of modality. This is a commonly accepted stance; Lyons, for example, states that future tense is partly temporal and partly modal in that there is always an element of prediction involved. (Lyons 1977: 677). Comrie (1985), in a similar vein, claims that:

> There is a sense in which the future is clearly different from the past. The past subsumes what may already have taken place and, barring science fiction, is immutable, beyond the control of our present actions. The future, however, is necessarily more speculative, in that any prediction we make about the future might be changed by intervening event, including our own conscious intervention. (p.43)

Mithun (1995: 378) claims that languages that systematically mark irrealis (see 4.3.2), often include future events in the irrealis domain. Finally, Palmer states that 'the future is not fully known and it is always no more than a reasonable assumption that a future event will ensue' (2001: 104-05).

The distinction between past and present tense is a pure distinction of tense, whereas the distinction between future and non-future tense often involves also a difference in the definiteness or factuality of the event.

> What is conventionally regarded as the future tense (in languages that are said to have a future tense) is rarely, if ever, used solely for making statements or predictions, or posing and asking factual questions, about the future. It is also used in a wider or narrower range of non-factive utterances, involving supposition, inference, wish, intention and desire. (Lyons 1977: 816)

Similar claims can be made for prospective aspect, as in *Mary is going to write a letter*. When a participant is engaged in the pre-state of an event, it is probable, but not necessarily the case that the event will be realized. Furthermore, the being in a pre-state of an action may consist of having the intention to do that action, which is a modal notion and not only an aspectual one. In general, the inference that the event will in fact take place is much stronger for future tense than for prospective aspect.

Within the category of disposition *will* and *would* can express epistemic, event-oriented modality. This can be paraphrased by 'e is disposed to occur', which can hardly be distinguished from a future tense reading. There is thus a close relationship between the modal category of disposition and the future tense in English. Bybee and colleagues (Bybee, Pagliuca, & Perkins 1991: 279-80; Bybee et al. 1994) suggest that there is a crucial bridge from volition (and other categories) to future, which they refer to as **intention**. When *will* is combined with a first person, and the event is under the control of the first person, then this indicates not only that the subject is **willing** to act, but it also stresses that the event will be realized in the future, if not cancelled by unexpected circumstances. See (38) and (39):

(38) I'll get you a map. (C174)
(39) But I will bring you more today I promise. (C174)

The label 'intention' suggests a participant-internal source, but that is a too narrow conception as the notion also implies that there are no external circumstances that prevent x from doing something. Where should intention be located in the classification of modality in Table 4-5? The semantics of 'intention' lie in between volition, which is participant-internal participant-oriented modality, and future, which may be conceived of as epistemic, event-oriented modality. Such utterances can function as a promise. This meaning might occupy the cell of root-disposition, probably with scope over the predicate, but it may as well be interpreted as a future tense restricted to first person.

I do not think that a strict decision has to be made whether future tense belongs to the domain of tense or of event-oriented modality, and whether prospective belongs to aspect or to participant-oriented modality. Both categories may be conceived of as strong links between different conceptual domains and there may be uses in which the tense or aspect senses are most prominent and uses in which the modal senses are most prominent. For English, the involved expressions (*will* and *be going to*) seem to denote most prominently tense and aspect. They are used most frequently in opposition to tense and aspect markers, respectively, rather than in opposition to modal markers. For this thesis, the main point is that future tense and possible modal implications is analyzed as π2-operator and prospective aspect and possible modal implications as π1-operator.

4.3.2 Irrealis

A second domain related to modality is the domain of irrealis. Evidence for its linguistic relevance is found in several languages, among others Central Pomo (Mithun 1995), Tok Pisin (Romaine 1995), Burmese and Dyirbal (Comrie 1985: 50-52), Caddo and Northern Iroquian languages (Chafe 1995). Irrealis is not crosslinguistically uniform, but in general it includes notions like future, negatives, yes-no questions, modality (necessity, possibility), conditions, imperatives, and prohibitives. Languages that mark irrealis differ in the constructions they mark as such, but 'counterfactuals and conditionals, are generally classified as Irrealis in all languages with a grammaticized Irrealis/Realis distinction.' (Mithun 1995: 376). Within this thesis, the label of irrealis will be used to refer to expressions that have hypothetical (40) and counterfactual (41) interpretations:

(40) If she had time, Mary would write a letter.
(41) If she had had time, Mary would have written a letter.

The definition of hypothetical is adopted from Bybee et al. (1994: 322) and here presented in D5:

D5. A **hypothetical** statement indicates that 'the situation is unreal or imagined, but one that could be true'.

The speaker is thus neutral about whether the conditions for realization of the event are or will be fulfilled.

The definition of counterfactuals is also adopted from Bybee et al. (1994: 322) and here presented and in D6:

D6. A **counterfactual** statement describes an 'unreal or imagined situation that could have been true but was not.'

Counterfactuals express that the condition(s) for realization of the event are not fulfilled.

Many languages that do not have a systematically marked opposition between realis and irrealis do have special expressions for hypothetical and counterfactual statements. In several languages, the same morphemes are used for marking past tense and hypothetical or counterfactual events. This led Steele (1975) and others to claim that the past tense and hypothetical events share the meaning 'distant from present reality'. However, Bybee stresses that it is never the past tense marker alone that accounts for the hypothetical reading, but the combination of past tense morphology and a modal verb, subjunctive mood, a hypothetical marker (such as *if*), or imperfective aspect. Diachronically, it is not the remoteness of the past tense that develops a hypothetical sense, but 'rather the fact that past combined with modality leaves open the possibility that certain conditions on the completion of the predicate have not been met.' (Bybee 1995: 514). Not all languages make a distinction between hypothetical and counterfactual events, but, instead, they use only one general irrealis marker that covers both notions. Hypothetical and counterfactual expressions are closely related to event-oriented (objective) epistemic modality (π2). Event-oriented modality situates the event in actuality in terms of the scale of senses: the event occurs potentially or necessarily in this world. Irrealis expressions relate the event to a hypothetical or counterfactual world. In particular hypotheticality and epistemic possibility are closely related and in some languages expressed by a single element. Other languages use one and the same expression for epistemic possibility and future tense. (See 7.5.2.1).

In FG, hypothetical and counterfactual expressions are analyzed as π2-operators that indicate the actuality of the event: the event the speaker has in mind is related to an unreal, non-actual world. These expressions modify the predication and contribute to the situating function of the utterance.

4.3.3 Evidentiality

The final domain to be discussed is the domain of evidentiality. The definition used in this thesis (D7) is based on Dik (1997a: 242) and Palmer (2001: 8):

D7. **Evidential** expressions indicate the source of knowledge or the kind of evidence the speaker has for the proposition.

Consider the following examples of lexical (42)-(43) and grammatical (44) expressions of evidentiality:

(42) I saw that Mary has written a letter.
(43) People say that Mary has written a letter.
(44) Mary must have written a letter.

Chafe (1986: 262) and Mithun (1986: 89) both define evidentiality as marking the reliability of the information. Common distinctions[6] within the domain of evidentiality are between sensory (42) and non-sensory evidence or between direct and non-direct evidence. Within the category of sensory evidence there may be a distinction between visual, non-visual and auditory evidence. Another evidential category that is often expressed is the function of hearsay (also referred to as quotative or reportative), see (43), which indicates that the source of the speaker's knowledge is the utterance of someone else. Finally, there are expressions that indicate that the speaker's knowledge is an inference made from non-sensory evidence. See (44).

It may be clear form this discussion that evidentiality is analyzed in FG as an operator with scope over the proposition ($\pi 3$): it expresses the reliability of the propositional content by indicating the source of the information. How did the speaker acquire this information? Evidential markers thus modify the presentation of the propositional content.

Evidentiality is related to modality in that the notion of inference occurs both as a specific distinction within the system of proposition-oriented (subjective) epistemic modality and within evidentiality. Furthermore, in some languages, modal auxiliaries have come to express evidential notions. For example, German uses *sollen* ('shall') to express hearsay. See (45):

(45) *Und das soll gut sein?*
And that shall good be
'Is it said to be good?'

4.4 CONCLUSION

In this chapter I discussed the semantics of modality and related notions. The domain of modality was described using the parameters of sense, source and scope. The minimal differences in the interpretation of modal expressions can only be accounted for when all three parameters are taken into account, as there is no one-to-one relation between the parameters.

Grammatical expressions of modality can have scope over the predicate, the predication or the proposition, depending on their specific function. The domain of irrealis covers notions of hypothesis and counterfactuality indicating

[6] Cf. Willett (1988) for an extensive study on evidential functions that occur crosslinguistically.

that a situation is non-actual. Expressions of irrealis function as π2-operators. Expressions of evidentiality encode the source of knowledge or the kind of evidence the speaker has for the proposition to indicate the reliability of the proposition. These expressions function as π3-operators.

Table 4-6 presents an overview of the TMA domains and their subcategories discussed in this chapter. There are several semantic relations within and between the domains in Table 4-6. An additional relationship exists with future tense and prospective aspect.

In Chapter 5 the hierarchical relations between different TMA domains will lead to concrete predictions about linguistic implications of the Scope Hierarchy.

Table 4-6. Classification of modality, irrealis and evidentiality according to scope

TMA domain	Scope over
Participant-oriented modality - internal *ability, volition, (weak) need*; - external, non-deontic *root-possibility, root-disposition, (weak) root-necessity*; - external, deontic *permission, desirability, (weak) obligation*	Predicate (π1)
Event-oriented modality - external, non-deontic *root-possibility, root-disposition, root-(weak) necessity*; - external, deontic *permission, desirability, (weak) obligation*; - epistemic *epistemic possibility, (future,) probability, necessity* Irrealis *hypothetical, counterfactual*	Predication (π2)
Proposition-oriented modality - epistemic *uncertainty, prediction, (weak) certainty, inference;* - deontic *permission, desirability, (weak) obligation* Evidentiality *sensory evidence, inference, hearsay, etc.*	Proposition (π3)

Chapter 5

Implications of the Scope Hierarchy

5.1 INTRODUCTION

In section 2.5 it was argued that operators with wider scope modify more complex semantic units that are conceptually more abstract, and that operators with wider scope are communicatively less motivated than operators with narrower scope. I expect that semantic complexity, conceptual abstractness and communicative motivation play an important part in the limits on language variation. What is conceptually more abstract, communicatively less needed and semantically more complex occurs probably less frequently in human language systems. From the viewpoint of FG, operators with wider scope are more marked than operators with narrower scope. It is thus assumed that there is an implicational hierarchy as in (1):

(1) π1-operator $\subset$ π2-operator $\subset$ π3-operator,

in which '$\subset$' means, 'is implied by' or 'is less marked than'. Consequently, it is to be expected that operators with wider scope behave differently from operators with narrower scope both in languages of the world and in stages of child language. Which differences may be expected will be discussed in this chapter.

Each category of operators in (1) represents specific domains of TMA. In Chapters 3 and 4 I discussed the analysis of different TMA domains with respect to their scope. A summary of these findings is presented in Table 5-1, which unites Table 3-2 and Table 4-6. This table shows to which class of operators the different TMA domains belong. It should be stressed that π1-operators with scope over the predicate, i.e., aspect, property quantification and participant-oriented modality, are considered to serve a similar communicative function in the utterance, namely modification of the predicate. Therefore, they are conceived of as a single category of modifiers. The same holds for different expressions of tense, event-oriented modality, event quantification and irrealis that all function as π2-operators that modify the predication and for different expressions of proposition-oriented modality and evidentiality that all function

Table 5-1. Classification of TMA domains according to scope

TMA Domain	Scope over	Operator
Aspect Property quantification Participant-oriented modality	Predicate	π1
Tense Event quantification Event-oriented modality Irrealis	Predication	π2
Proposition-oriented modality Evidentiality	Proposition	π3

as π3-operators that modify the proposition. A specification of (1) is presented in (2):

(2) {aspect, property quantification, participant-oriented modality} ⊂ {tense, event quantification, event-oriented modality, irrealis} ⊂ {proposition-oriented modality, evidentiality}

The implicational hierarchy is assumed to have reflections in adult and child language. This chapter will discuss the specific linguistic implications of the Scope Hierarchy. As this research is about **grammatical** markers of TMA, first a closer look is needed into the evolution of grammatical markers in language, i.e. into grammaticalization processes. This will lead to specific hypotheses about diachronic development, frequency, synchronic configurations, and morphology and syntax of TMA expressions. It will also lead to the formulation of a specific hypothesis about the order of acquisition of TMA expressions in first language development.

5.2 GRAMMATICALIZATION

In many theoretical models of language, including FG, a sharp distinction is made between lexical and grammatical items, or, similarly, between content words and function words. Sapir (1921: 25) spoke of 'material content' (or lexical meaning) and 'relational content' (or grammatical meaning). Although languages universally distinguish between the two types of elements 'a given

Table 5-2. Characteristics of lexical and grammatical items (Bybee et al. 1994: 5-8)

Lexical item	Grammatical item
Specific meaning	General / abstract meaning
Selection restrictions	No selection restrictions
Optionally used	Systematically/obligatorily used
Relatively infrequent	Relatively frequent
Flexible syntactic position	Rigid syntactic position
Phonologically rich	Phonologically reduced
Member of large open class	Member of small closed class

concept may in one language be treated as though it were material, while in another language the same concept appears as relational' (Givón 1984: 48). Lexical elements are independent entities, whereas grammatical elements are dependent entities; they relate lexical elements with one another, or modify their connotation. In general, the differences between a typical lexical and typical grammatical element can be described as in Table 5-2. Haspelmath (1999: 1056) adds that there is also a correlation with modes of mental processing: lexical items are processed deliberately and consciously, whereas grammatical items are processed automatically and unconsciously.

Although most theoretical models suggest otherwise, the distinction between the lexical and grammatical extremes is not sharp, but rather continuous. Diachronically, 'grammatical morphemes develop gradually out of lexical morphemes or combinations of lexical morphemes with lexical or grammatical morphemes.' (Bybee et al. 1994: 4) This process is referred to as **grammaticalization** (or grammaticization).[1] Grammatical items or **grams** (after Bybee et al.) evolve from lexical items and during this process they will increasingly take on the characteristics in the right column in Table 5-2. It is, however, hard to define necessary and sufficient characteristics, so that it is difficult to say at which point exactly an item should be defined as grammatical. There are many elements in a language that show some, but not all of the properties of either the lexical or the grammatical pole. For example, prepositions show characteristics of both sides and periphrastic constructions are also notoriously difficult to classify (Muysken 2006; Olbertz 1996).

[1] See among many others Bybee (1985), Heine, Claudi & Hünnemeyer (1991), Heine (1993), Hopper & Traugott (1993), Pagliuca (1994), Lehmann (1995), Ramat & Hopper (1998), Fisher, Norde & Perridon (2004), Heine & Kuteva (2005).

Categories of lexical and grammatical items are thus imprecise: it is impossible to define the categories in such as way that 'for every member *x* of its domain (that is, the set of things to which the category can be meaningfully applied), the definition determines a truth-value to the statement that *x* belongs to the category in question' (Dahl 1985: 3). Section 6.2.1 discusses the impreciseness of grammatical elements in this thesis.

In order to predict what the influence of scope may be on TMA systems, it is important to understand the processes by which grammatical TMA expressions arise in languages. Grammaticalization results from semantic or functional change, morphosyntactic processes, and phonetic reduction. Firstly, the meaning of an item becomes more general and abstract and correspondingly, the range of contexts in which it can be used becomes wider. This process is referred to as desemanticization (Heine 1993), semantic generalization (Bybee & Pagliuca 1985), bleaching (Givón 1975) or erosion (Lehmann 1995). Because of the increasing generality of meaning and loss of specificity, the selection restrictions on the arguments or type of main predicate with which the item can combine are loosened. For example, lexical verbs that are on their way towards becoming an auxiliary, typically change from combining only with a human agentive subject, to combining with all kinds of subjects, and from combining with a complement that expresses a concrete object or location to a complement that expresses a dynamic situation (Heine 1993: 54). For example, a common semantic change is that of a lexical verb meaning *want* changing to a morpheme denoting future tense. Verbs of wanting typically combine with two arguments: an animate subject and a concrete object as for the Dutch *wil* 'want' in *ik wil een koekje* 'I want a cookie'. In a next stage, the verb may come to combine with verbal complements *ik wil lezen* 'I want to read' or with an inanimate being *de auto wil niet starten* 'the car does not want to start'. When it further develops into a future meaning, the selection restrictions on the arguments gradually disappear completely, as has happened with *will* in English: any subject is allowed and any type of complement, as can be seen in examples such as *the stone will fall* or *economy will rise*.

As the applicability of an item increases, it will become much more frequent in discourse: there are far more contexts in which it may be used. In a next stage, the use of the item is no longer restricted to contexts where it adds semantic content. It may now be used when the semantics are in fact redundant, whenever it is compatible with the context. This may lead to a stage in which it becomes meaningful not to express the item: the absence of item X comes to denote 'not X'. For example, the absence of a past tense marker may come to mean 'non-past tense', so that a past tense marker becomes obligatory in every context that concerns the past tense, which again, results in an increase in frequency. Grammatical items may develop this systematic, obligatory use in

contrast to lexical items: it is never the case that the absence of a lexical item Y means 'not Y', for example, it is not the case that every sentence without the adverb *yesterday* means 'not yesterday'. Note, however, that not every grammatical marker is obligatorily used.

Secondly, grammaticalization is characterized by morphosyntactic change. A grammaticalizing morpheme or construction becomes phonologically and semantically more dependent on surrounding material, which leads to an increasing rigidification of the syntactic position of the morpheme (Bybee et al. 1994: 7). Its syntactic position is less and less free. Furthermore, decategorialization of the source item takes place (Heine, Claudi, & Hünnemeyer 1991a): it loses the characteristics of a typical verb, noun, adjective or adverb. For example a verb on its way to becoming an auxiliary loses verbal properties, such as the ability to form imperatives, to be nominalized, to have an infinitival form, to passivize, or to be negated separately. It may no longer have a noun as its complement nucleus, but instead a (nominalized or nonfinite) verb.

Thirdly, grammaticalization is characterized by phonological reduction. There is quantitative reduction: forms become shorter, because phonemes erode or fuse with other phonemes or because the articulation is compressed so that the temporal duration of the item is decreased. There is also qualitative reduction: phonological segments stem more and more from the unmarked set of phonemes of the specific language. (Hopper & Traugott 1993: 145), (Bybee et al. 1994: 6). Heine (1993: 56) mentions that a verb loses its ability to carry distinctive tone or stress.

During grammaticalization there is a stage in which a single item is used both in contexts where it shows mainly lexical characteristics and in contexts where it shows mainly grammatical characteristics. The 'grammatical' use is at first often restricted to a specific construction and it is this specific construction that forms the input for the grammaticalization process. In the process of grammaticalization the grammatical use gradually becomes more frequent, possibly, but not necessarily, at the cost of the lexical use. In sum, the more grammaticalized an item is:

- the more it loses in semantic complexity, functional significance and/or expressive value
- the more it loses in pragmatic and gains in syntactic significance
- the more reduced is the number of members belonging to the same morphosyntactic paradigm
- the more its syntactic variability decreases, the more its position within the clause becomes fixed
- the more its use becomes obligatory in certain contexts and ungrammatical in others

- the more it coalesces semantically, morphosyntactically, and phonetically with other units
- the more it loses in phonetic substance (Heine, Claudi, & Hünnemeyer 1991b: 15-16)

When an item is grammaticalized, the development does not stop: the item tends to generalize further in meaning and to reduce further in size. A common development is that several items generalize in meaning and these generalized meanings come to overlap. For example, there may be different items, for example a prospective, a volition and an obligation marker, that all develop towards the more general meaning of future tense. This leads to diachronic competition between the different elements and one or more of them may become extinct.

The remarkable thing about grammaticalization is not so much that it exists, but rather that many analogous developments are attested in unrelated languages. Just to mention a few, sources for functional items originate over and over again in general terms for movement, postures, locations and body parts (Bybee 2003a: 151-52); The word for 'say' developed into a marker of direct quotation in several languages, among others Khmer, Buru, Saramaccan and Twi (Heine & Kuteva 2002: 267-68); A completive or perfect marker has developed from a lexical verb meaning *finish* in e.g. Bantu languages, Cantonese, Tok Pisin, Lao, Engenni, Tucano, and American Sign Language, (Bybee 2003a: 149). Heine & Kuteva (2002) collected several hundred universal grammaticalization paths, universal in the sense that they have independently occurred in unrelated languages. The actual goal of linguistics, however, is not only to collect universals but rather to understand why they exist. We want to know what are the 'true universals', the 'mechanisms of change that propel grams along these paths of development.' (Bybee et al. 1994: 302). These mechanisms that create the changes should be understood 'in terms of more basic cognitive and interactive processes.' (Bybee 2003a: 151). What are the universal cognitive and communicative mechanisms that underlie grammaticalization?

5.3 COGNITIVE MECHANISMS AND COMMUNICATIVE NEEDS

5.3.1 Pragmatic inference

When we want to understand universal patterns, a closer look is needed into the cognitive processes involved in grammaticalization. Particularly the process of semantic change needs some elaboration. The change in meaning that morphemes undergo in the process of grammaticalization is not arbitrary or random. Sweetser (1990: 9) states that '(…) new senses are acquired by

cognitive structuring' and that 'multiple synchronic senses of a given word will normally be related to each other in a motivated fashion.' What exactly is this motivated relation between different senses?

5.3.1.1 Metaphor and metonymy

There are two important mechanisms or motivations that may play a part in semantic change: metaphor and metonymy. Metaphor is a figure of speech whereby a certain (abstract) concept is understood as if it were another (concrete) concept. Both concepts are related in the mind of the speaker by analogy or iconicity. Sweetser claims that the most important mechanism of semantic change is **metaphorical transfer**. She states that:

> we model linguistic expression itself not only (a) as a description (a model of the world), but also (b) as action (an act in the world being described), and even (c) as an epistemic or logical entity (a premise or a conclusion in our world of reasoning). (1990: 21).[2]

Human beings understand epistemic or logical entities in terms of real-world entities. They transfer concepts and vocabulary from the more accessible external sociophysical world to the less accessible abstract internal world of reasoning (1990: 31). As discussed in 4.2.2, Sweetser claims that the basic sense of modal auxiliaries is by metaphorical extension applied to the internal mental world. Logical necessity is 'the mental analogue of sociophysical force, while logical possibility is the mental (or epistemic) analogue of permission or ability in the real world.' (1990: 30). The same metaphor is used in other areas of the linguistic system, such as with verbs of sensory perception (*see, grasp*) are used for mental perception (meaning 'know', 'understand'). Metaphorical transfer thus involves the application of a certain grammatical element or gram to a more abstract world, while the sense of the gram is maintained. A serious problem with the metaphor model is that it involves 'a discrete "jump" from one domain to another' (Heine 1993: 97), whereas the process of grammaticalization supposes a gradual change.

A second mechanism of semantic change is **metonymy**, also referred to as **pragmatic** or **context-induced inference**, or **conventionalization of implicature** (see e.g. Bybee 1988; Bybee 2003a; Heine et al. 1991b; Hopper & Traugott 1993; Traugott 1989, 1996). It is defined as:

> a figure of speech whereby the name of one entity e1 is used to refer to another entity e2 which is contiguous to e1. (…) The essence of metonymy resides in the possibility of establishing connections between entities which co-occur within a given conceptual structure. (J. R. Taylor 1989: 122-24)

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[2] Notice the similarity in formulation with the layers in FG that function to describe, to refer and to transfer propositional content.

Pragmatic inference is a basic principle of communication. Speakers make inferences when they encode the intention they want to communicate and addressees make inferences when they want to decode the communicated intention. They both use their knowledge of the preceding context, the current speech situation and their general knowledge of the world as they infer what the pragmatic information of the interlocutor is. Speakers anticipate on the interpretation of addressees by estimating the pragmatic information of the addressee and encode their intention in such a way that addressees are probably capable of reconstructing their intention by inference. Addressees make an estimation of the pragmatic information of the speaker when they try to infer what the speaker has tried to communicate by the linguistic forms he or she has chosen to use. The utterance in itself does not establish the relation between the intention of the speaker and the interpretation of the addressee but rather mediates it and in this sense communication is purely a matter of pragmatic inference.

Pragmatic inference plays an important role in semantic change. Within a certain context, a specific expression may have certain implicatures about related senses, for example, when someone says *I need to go now*, it only encodes that it is somehow necessary for the speaker to go, but it is also very probable that the speaker will indeed leave soon. If an expression occurs frequently in a context in which these implicatures are present, then the expression becomes frequently associated with the inference and language users come to 'assume that the inference is a necessary part of the meaning of the form' (Bybee et al. 1994: 197). The implicature may become conventionalized and form part of the meaning: the item has now acquired a secondary sense, besides its primary sense. After this, the use of the item may become restricted to contexts in which the new meaning is appropriate: the secondary sense becomes the primary sense, whereas the original meaning becomes the secondary sense. Eventually, the original meaning may disappear completely. For example, a perfect aspect marker, which selects the post-state of an event (see 3.3.3), implies that an event has taken place, although this implicature may in most cases be irrelevant to the conversation. If however, the perfect is often used in contexts where not only the post-state of the event is relevant, but also the fact that the event has taken place, or in contexts where the post-state is even less relevant than the fact that the event has taken place, then the implicature of the past tense is highlighted and gradually becomes part of the meaning. The perfect construction may at first develop a past tense use besides its perfect aspect use and gradually lose its perfect aspect use.

Metaphor and metonymy are not necessarily mutually exclusive mechanisms. Both Goossens (1995) and Heine et al. (1991b) argue that they complement one another and this position is now widely accepted. Although metaphorical

transfer involves discrete, discontinuous steps from one cognitive domain to another, there is also a gradual change: there is a continuous extension from using the item in linguistic contexts where only the 'concrete' meaning is appropriate, to contexts where there is ambiguity between the concrete and more abstract reading, and from there, to contexts where only the more abstract reading is appropriate. The metaphorical interpretation is in fact an implicature within a certain context. This may be illustrated with an example from Traugott & König (1991) for the modal auxiliary *must*:

> *Must* in the epistemic sense of 'I conclude that' [is] derived from the obligative sense of 'ought to' by strengthening of conversational inferences and subjectification. If I say *She must be married* in the obligation sense, I invite the inference that she will indeed get married. This inference is of course epistemic, pertaining to a state of affairs that is anticipated to be true at some later time. (p.209)

5.3.1.2 Polysemy and ambiguity

Within the process of semantic change, ambiguity or polysemy of a specific morpheme is a common (and maybe even necessary[3]) phase: there is a stage in which the morpheme is used with different interpretations. Coates (1983: 15-17) distinguishes between two kinds of 'overlapping' senses (polysemy): ambiguity and merger. Ambiguity yields an 'either/or' interpretation: either sense A or sense B is a possible interpretation, but the two interpretations are mutually exclusive. Consider (3):

(3) He must understand that we mean business.

Must in (3) expresses either 'surely he understands that we mean business' or 'it is essential that he understands that we mean business' (Coates 1983: 16). The second type of polysemy is merger, which yields a 'both/and' interpretation: both sense A and sense B are possible interpretations and both interpretations are mutually compatible. Consider (4):

(4) Rutherford suggested to Marsden that he should follow this up.

Should in (4) gets the interpretation of weak obligation, but also of a quasi-subjunctive. (Coates 1983: 17).

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[3] According to Sweetser, 'no historical shift of meaning can take place without an intervening stage of polysemy' (1990: 9).

Schematically, semantic change can be represented as in (5) in which the sense in between brackets is the less common interpretation. The secondary sense, B, can arise through metaphor or metonymy:

(5) Ambiguity: A → {A (or B)} → {A or B} → {B (or A)} → B
Merger: A → {A (and B)} → {A and B}→ {(A and) B}→ B

The semantic change of a linguistic item can result in an extra sense which is in general more abstract, referred to as specialization of meaning (A → AB), or it can result in the loss of a sense, called generalization of meaning or bleaching (AB → B). The more specialized and the more generalized interpretation may be used at the same time in a synchronic stage of language, in which case we speak of polysemy.

It should be stressed that different types of semantic change are possible and that the above representations may be too simplistic. For example, a specific item could trigger different implicatures in different contexts. As a result, the item may develop more than one secondary sense, yielding a 'split' in the semantic development, as represented in (6):

(6) A → AB → B
↘ AC → C

Other scenario's are conceivable: two senses may be involved, the first sense may remain present for a long time, secondary or third senses may become primary senses, etcetera. Bear in mind that an earlier interpretation does not have to disappear immediately when a new interpretation gets conventionalized: different interpretations may co-exist in a single stage of language.

5.3.2 Automaticity

For the different processes of grammaticalization (semantic change, morphosyntactic rigidification and phonological reduction), frequency of use is an essential factor. It is, however, impossible to tell the cause from the result. On the one hand, frequent use is a necessary condition for grammaticalization to take place; on the other hand, the process of grammaticalization induces frequent use. Frequent repetition of a linguistic construction leads to greater ease of processing, that is, automatization of cognitive processes. When a single task is executed repeatedly, one needs less time and effort to execute it. The duration of distinct sequential acts within this task decreases and several acts come to overlap or even fuse into one. Automatization is a driving force in grammaticalization. Only if an item is used frequently in a context that triggers a specific implicature, this implicature may become conventionalized as part of

the meaning. Furthermore, repetition of an item causes semantic bleaching through the cognitive process of habituation: if a stimulus is repeated frequently, the level of response of an organism tends to decrease (Bybee & Hopper 2001a: 13; Haiman 1994). Linguistic elements that are used frequently, gradually loose their original strength and their contribution to the information value of the utterance decreases. This leads to 'inflation' of meaning (Dahl 2001). Grams add less specific information to the discourse than lexical elements. Automatization also plays a part in syntactic rigidification. If two or more elements co-occur frequently in sequence, the accessibility for this specific string improves and pronunciation takes less time. The construction will become tighter and a string of morphemes may even fuse into one single morpheme (Bybee & Scheibman 1999). Automatization, then, also underlies phonological reduction, as the magnitude of articulatory gestures is reduced and distinct articulatory acts come to overlap (Bybee & Hopper 2001a: 11).

5.3.3 Communicative needs

Why does grammaticalization occur at all? Bybee et al. (1994: 298) argue that grammaticalization cannot be explained simply in terms of communicative need. There are several reasons why it cannot be maintained that languages **need** a specific grammatical item: no single gram type is universal, two or more markers may express the same function, inflectional markers are often redundant and some grams create rather than solve ambiguity. Discourse is structured and organized, but regularities and structures also **coincidentally result** from discourse. At first, in the stage where speakers regularly, but not yet consistently, make pragmatic inferences, these inferences are not yet part of the meaning, and 'conceptual manipulation is still largely provisional, unstable, "epiphenomenal".' (Heine et al. 1991b: 77) In the next phase, when inferences of a certain construction become adopted in the meaning,

> the amount of morphological and syntactic repetition increases, there are recurrent strategies for building discourses, and there are emergent grammatical regularities. This is the phase where grammatical concepts are stabilized, or conventionalized, and develop into distinct 'senses'. (Heine et al. 1991b: 77)

Grammar, then, would be mechanistic or **emergent** (Bybee et al. 1994: 298, 300; Hopper 1987, 1998) rather than functional or goal-directed. That grammar emerges does not imply that grammar has no function: it is just not created for a specific purpose. When grammar has emerged, it allows speakers to organize and present information without foregrounding it, as lexical expression does (Bybee et al. 1994: 299). Besides that, grammar facilitates production through automatization. Because morphemes and word order are supplied automatically, the speaker's attention can be fully directed to the propositional

content. 'The advantages of automation can explain why categories or structures become obligatory despite the fact that they are not always strictly necessary for communication' (Bybee et al. 1994: 300).

Although I agree to a certain extent with the view that grammar is emergent and not goal-directed, I have strong objections to Hopper's claim that grammar is continuously created on the spot, in discourse. In my view, a construction that is conventionalized forms quite a stable instrument in the repertoire of speakers for encoding their communicative intentions. I furthermore disagree with the strong rejection of the role of communicative need in the development of a gram. Although it is beyond doubt that speakers do not consciously innovate a construction for the purpose of creating an extra gram, the context in which a new gram develops is in language use; the grammaticalizing construction is continuously used for fulfilling a certain communicative need, with a certain communicative intention. It is true that no single gram type is universal and that every language has its own set of grammatical expressions, but the total set of grammaticizable notions is restricted. Aspect, tense and modality are typically grammaticalized in languages of the world, but for example the color, material or symmetry of a participant or geometric concepts are never grammatically expressed (Talmy 1985, 1988b). Certain concepts are and others are not grammatically expressed in languages and certain lexical elements do and others do not function as the source for grams. This means that 'certain meanings of linguistic units are universally much more basic to speaking than others (e.g. 'possession', 'instrument' are more basic than 'bicycle' or 'moon' in this sense)' (Haspelmath 1999: 1055-56). Only general meanings, meanings that are needed in many contexts, will be used so frequently that they may enter the grammaticalization path.[4] In my view, communicative need is a driving force in grammaticalization: not in the sense that language users need new grams but in the sense that communicative need of a construction determines whether that construction may enter the grammaticalization path.

Communicative need is closely related to general rules of communication. Haspelmath (1999), based on Keller (1994), presents five 'Maxims of action' that play a part in communication. Compared to Grice (1975), Haspelmath shifts the accent to sociological processes[5]:

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[4] In Haspelmath's words: 'It is difficult to prove that grammatical items are so frequent because their meanings are needed more often than those of other items, but it seems plausible to me' (1999: 1056).

[5] Cf. also Enfield (2003) for an elaborate exposition on the role of sociolinguistic factors on language change and language contact.

1. Hypermaxim:	talk in such a way that you are socially successful, at the lowest possible cost.
2. Clarity:	talk in such a way that you are understood.
3. Economy:	talk in such a way that you do not expend superfluous energy.
4. Conformity:	talk like the others talk.
5. Extravagance:	talk in such a way that you are noticed. (Haspelmath 1999: 1055)

The five maxims are often competing. Speakers may use an innovative construction when they want to be noticed (fifth maxim), but this maxim goes against the fourth maxim and perhaps also against the third and second. Other speakers may adopt this innovation according to the Maxim of Conformity, first only in contexts where they want their utterance to be noticed (Maxim of Extravagance). Whether a new construction spreads or not depends on the social influence of the primary and secondary innovators and on whether the meaning of the construction is basic to communication. When the innovation is used frequently and ever more speakers incorporate the new construction in their repertoire, the 'extravagancy' of the new construction weakens (inflation) and it now spreads throughout the linguistic community only because of the maxim of conformity. If the construction is used frequently, it will become more predictable for the addressee and its processing will become more automatized. This may cause phonological reduction (Maxim of Economy) without violating the Maxim of Clarity.

What may be added to this picture is that different individuals within one linguistic community may independently invent the same construction, which probably increases the speed of grammaticalization, or they may invent different constructions for a similar communicative intention, which results in competition of constructions. The fact that there may be two or more markers to express the same function is easily understood if grammaticalization is viewed as a process (unconsciously) instigated by individual language users who continuously seek new ways to make themselves noticed.

5.4 QUESTIONS AND HYPOTHESES

Operators are the result of grammaticalization. In what way is the scope of operators related to grammaticalization? How is the Scope Hierarchy in fact reflected in linguistic domains? In this section specific hypotheses will be derived with respect to the diachronic development of TMA expressions (5.4.1), their crosslinguistic and language internal frequency (5.4.2), their possible synchronic configurations (5.4.3), their expression form (5.4.4) and expression order (5.4.5). From the hypotheses on synchronic configurations further hypotheses follow concerning the acquisition order of TMA expressions (5.4.6).

5.4.1 Diachronic development

The first domain in which the scope of TMA may be reflected is in diachronic development. TMA expressions develop through grammaticalization which is a primarily unidirectional process: linguistic elements develop towards the grammatical pole, but not towards the lexical pole (Givón 1975; Haspelmath 1999). Although the semantics of a specific item may become more or less specified, the combination of semantic generalization and morphosyntactic and phonological changes describes a one-way-direction, an in general irreversible process. Some counterexamples are attested, but they are very scarce (Campbell 1991; Joseph & Janda 1988; Newmeyer 1998; P. Ramat 1992). It should be noted that a cyclic development is not in contradiction to unidirectionality: a grammatical item may re-enter the grammaticalization process in a new construction, on a new path.

In Figure 5-1 a possible, unidirectional, semantic path for a single linguistic item is represented. In this path, Meaning 3 develops into two different meanings, Meaning 4 and Meaning D, which in turn develop further into Meaning 5 and Meaning E, respectively.

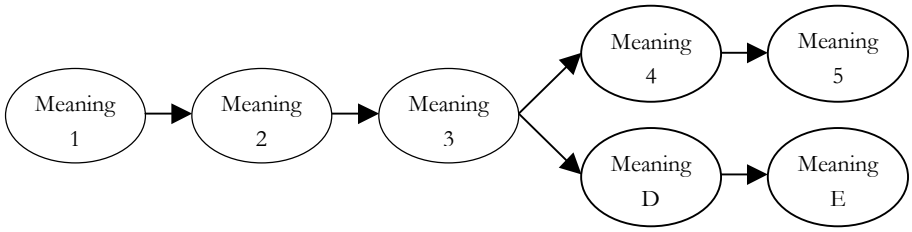

Figure 5-1. Representation of a semantic or grammaticalization path

How do the meanings on the left and on the right end of the path differ? The process of grammaticalization is regarded as a development from less to more abstract meanings (e.g. Bybee et al. 1994; Heine et al. 1991b; Sweetser 1982), from referential to interpersonal functions (Heine et al. 1991b; Traugott 1982) and from specific to general meanings. Meaning 1 will thus be most concrete and specific and the meanings 5 and E will be most abstract, general and interpersonal.

Regarding TMA expressions in FG, the wider their scope is, the more abstract, general, and interpersonal their meanings are. Predicate operators help in building up a proper description: they specify the action or property ascribed to the first argument, designated by a verbal or non-verbal predicate. These operators serve a fairly concrete and specific function and they may apply selection restrictions on the arguments, since not every argument combines with every modification of a property or relation. Predication operators help

locating the event in time and actuality. They play a part in relating the event to the real world or an imaginary world and they probably do not or less often apply selection restrictions on the arguments or predicate. Proposition operators have the most abstract, interpersonal and general function in that they express the speaker's attitude or belief with respect to the propositional content. They modify the abstract function of the 'presentation of the content'. TMA expressions with narrow scope (π1) have the least abstract and most specific meanings and are thus more to the left side on the grammaticalization path, whereas TMA expressions with wide scope (π3) have the most abstract and general meanings and are on the right side of the path. TMA expressions with medial scope (π2) are in between those two.

Metaphor and metonymy are the driving mechanisms in semantic change of TMA expressions. A gram that has narrow scope could get used in contexts where a wider scope interpretation is a possible inference, for example, from a perfect aspect expression past tense reference may be inferred. By the process of metaphor our minds make sense of a wider scope interpretation. The core sense of the gram, at first only used to modify the property or relation, is used metaphorically to modify the event or the propositional content. If the context in which the wider scope interpretation is possible occurs frequently, this interpretation can get conventionalized and the gram can become polysemous and come to function as two different operators. Both the mechanism of metaphor and the mechanism of metonymy are relevant to a change in scope. It is, however, also possible that the sense of an operator changes without a change in scope. In that case metaphor is not a relevant mechanism: it is only the conventionalization of implicature that can account for specialization or generalization of meaning.

It is to be expected that the semantics of a morpheme only change towards generality and towards abstractness and not the other way around. TMA expressions should therefore diachronically develop from π1-operator to π2-operator to π3-operator and not in the other direction. FG, then, predicts that scope increases in the process of grammaticalization (cf. Hengeveld 1989: 142). Note that this hypothesis concerns semantic scope, not structural scope. Lehmann (1995) has claimed that structural scope decreases in grammaticalization whereas Tabor & Traugott (1998) have presented evidence that structural scope increases.

The research question and hypothesis on the influence of the Scope Hierarchy on diachrony of TMA expressions is formulated in Q1 and H1:

Q1: *What is the diachronic development of TMA expressions?*

H1: Diachronically, operators show an increase in scope, and develop in the direction from π1-operator to π2-operator to π3-operator.

5.4.2 Frequency and variation

A second area in which the Scope Hierarchy is probably reflected is in the frequency of operators. There are different types of frequency: token frequency of language-specific TMA expressions, the number of expressions that belong to a specific class of operators and crosslinguistic incidence of operators.

The predictions about the frequency of operators are primarily based on two factors that both play a part in grammaticalization: diachronic competition and communicative motivation. These notions have to be explained first. Diachronic competition occurs when different grams generalize in meaning and come to cover (partially) overlapping semantic spaces. So, at later stages of development, different diachronic paths converge to more general meanings. This leads to competition between the different grams with the result that only one or a few of the grams involved prevails for the more abstract function while the others gradually disappear (Bybee et al. 1994: 8, 15). Furthermore, grams may lose phonetic saliency in the course of time and their meaning may inflate and newer, more salient grams, may gradually replace the older grams (Dahl 2001). Thus, although the course of development of a gram runs from less to most abstract and general meanings, grams may also completely die out and never reach the most abstract level. As was argued in 5.4.1, π1-operators are expected to be earlier on grammaticalization paths than π2-operators, and π2-operators are in turn earlier on these paths than π3-operators. This means that developmental paths of different grams with narrow scope converge when scope increases, and that in the course of time younger grams may replace older grams in a bottom-up direction. What this means for the different types of frequency will be discussed below.

A second factor that plays a role in frequency is the communicative motivation of the function of an operator. Dahl argues that the communicative motivation of items decreases when they grammaticalize further:

> Both semantic bleaching and the diminished reliance on relevance considerations lead to a general decrease in **communicative motivation** of an item. Thus, when an item is grammaticalized, its content becomes less significant to the communication. (…) The communicative motivation for a tense morpheme marking past time reference is arguably less the more early the time reference is derivable from the context (Dahl 2000: 9).

The communicative motivation of TMA expressions depends, in other words, on their predictability or specificity in meaning. In FG, the function of operators with wider scope is communicatively least motivated. Most motivated is the function of predicate operators (π1) with narrow scope. These operators specify the description of the event, which takes place in nearly every utterance. The modifications that predicate operators make involve such specific changes in this description that this information has to be expressed linguistically. It is

impossible to predict or infer from context, and it is impossible to deduce this information from intonation or non-verbal clues. Predication operators (π2) are communicatively less motivated than predicate operators. Predication operators help to situate the event in the real or imagined world: here, the context often helps the addressee to establish the referential point, sometimes by inference, sometimes by adverbial markers, so that operators involved with tense, event quantification or actuality, more often than predicate operators present information that is to a certain extent redundant. Finally, proposition operators (π3) seem to be communicatively least relevant of fundamental. The commitment of the speaker to the propositional content is irrelevant in most utterances, since speakers are by default committed to the truth of the propositional content. Furthermore, both intonation and facial expression may indicate the speaker's attitude or commitment, or the commitment may be inferred from predication operators for actuality. In sum, it is assumed that if the scope is wider, the operator has a less fundamental role in communication.

Diachronic competition and communicative motivation influence the different types of frequency. With respect to token frequency, it is in general stated that an item in the process of grammaticalization shows a dramatic increase in use (Bybee 2003b; Bybee et al. 1994: 8; Krug 2000: 74). When its semantics become more general, the gram is applicable in more contexts. It comes to be used redundantly and eventually obligatorily, so that the discourse frequency keeps increasing long after grammatical status has been reached. This sketch of development is, however, too simplistic, since it applies only to a certain stage in the development and only to certain grams. The token-frequency of a lexical element will indeed increase dramatically when it becomes grammatical, but once fully part of the grammar, many expressions gradually die out because of diachronic competition. Those grams that do survive the sorting out, however, are not necessarily used more frequently either because their communicative motivation may decrease. It all depends on the obligation of expression: certain grams may be obligatorily expressed in a specific language and these grams will in fact be used very generally and frequently, like tense in English. Other grammatical expressions, however, remain optionally expressed and this scenario seems to take place more frequently. These non-obligatory expressions are in continuous competition with lexical expressions, for example the grammatical expression for uncertainty in English *might* competes with the lexical construction *I suppose that*. Depending on whether an expression becomes obligatory, the discourse frequency of a gram may either continuously increase until it is used in every sentence with which its meaning is compatible, or its frequency may remain stable, or even slowly decrease so that the gram dies out. The token frequency of grams in discourse, then, is in general not expected to increase when they are further on the grammaticalization path.

Because many grams die out, it may be expected that after their first stage as a "real" grammatical element, the frequency of grams **on average** becomes lower.

In terms of the Scope Hierarchy, it is expected that those expressions that are more at the beginning of a grammaticalization path, with narrower scope, are on average more frequently used than those that are at the end of a grammaticalization path, with wider scope. This is partly due to a decrease in communicative motivation, and partly due to diachronic competition. These factors will reduce the token frequency of operators with wider scope, if they have not become obligatory. This hypothesis is in line with Bybee's claim (1985: 23) that the relative frequency of inflectional markers depends partly on relevance, that is, the more relevant a marker is with respect to the verb, the more frequently it is expressed.

Not only the token frequency of language-specific grams, but also the number of expressions that belongs to a specific class of operators is expected to correlate with scope. The disappearance of grams because of converging semantic paths probably leads to a reduction in the number of different grams upon the grammaticalization cline; since π1-operators are assumed to be located at the starting point of grammaticalization, it is to be expected that this group has most members; there is not much overlap in meaning as the meanings are still rather specific. When items further generalize in meaning and become π2- or π3-operators, there is more overlap in meaning and more competition with other expressions so that fewer expressions remain. Secondly, a decrease in communicative motivation leads to a reduction in variation for wider scope operators. The information added by π1-operators is most specific, hence, the number of expressions needed for the different modifications of the description of the event should be largest. The information added by π2-operators is more general and hence, the number of expressions needed for the different modifications of location of the event is probably lower. Finally, the information added by π3-operators is most general and the number of expressions needed for the different modifications of the content is probably lowest. The classes of grams with wider scope, that express more general meanings, are thus expected to be smaller than the classes of grams with narrower scope, that express more specific meanings.

Finally, it may be expected that the crosslinguistic occurrence of operators correlates with scope. Since the function of π1-operators is communicatively most motivated, most languages will have grammatical expressions that fulfil this function, whereas grammatical expression of the less motivated functions of π2- or π3-operators should be less widespread.

In sum, the research questions and hypotheses on frequency are:

Q2a: *What is the token frequency of TMA expressions?*
H2a: The token frequency of π1-operators is higher than or equal to the frequency of π2-operators and the frequency of π2-operators is higher than or equal to the frequency of π3-operators.

Q2b: *What is the size of operator classes?*
H2b: The class of π1-operators has more members than or an equal number of members as the class of π2-operators and this class has more members than or an equal number of members as the class of π3-operators.

Q2c: *What is the crosslinguistic incidence of operator types?*
H2c: The crosslinguistic incidence of π1-operators is larger than or equal to the incidence of π2-operators, which in turn is larger than or equal to the incidence of π3-operators.

5.4.3 Synchronic configurations

What are the possible synchronic configurations of operators? First, a general hypothesis can be formulated with respect to possible variation in TMA systems. A basic assumption in this thesis is that π3-operators are more marked than π2-operators and π2-operators are more marked than π1-operators because the function of operators with wider scope is communicatively less motivated and more complex. For many linguistic features, it is the case that languages only have more marked features if they also have the unmarked features. With respect to operators, this leads to the expectation that modification with more abstract meaning and wider scope can only be expressed grammatically in a language as long as modification with less abstract meaning and narrower scope can also be expressed by grammatical means. For the synchronic inventory of operators within a single language this implies that a language does not allow grammatical modification of the proposition if it does not also allow grammatical modification of the predication and this is in turn not allowed if the language does not also allow grammatical modification of the predicate. In other words, there will be π3-operators only if there are also π2-operators, and π2-operators only if there are also π1-operators. This implication does not hold the other way around. This results in hypothesis 3a:

Q3: *What are possible synchronic configurations for TMA expressions?*
H3a: The presence of operators with wider scope depends on the presence of operators with narrower scope according to the hierarchy: π1-operator ⊂ π2-operator ⊂ π3-operator.

Second, a hypothesis may be formulated that is restricted to single linguistic elements. As already stated in section 5.2, similar developments in grammaticalization are reported crosslinguistically. Human beings that speak different languages make similar inferences; they relate new meanings to earlier meanings in similar ways. Apparently, there are universals in what human beings consider contiguous senses.

> The claim is that the abstract meanings of grammatical constructions arise from common patterns of inference. The types of meanings that arise in this way suggest that hearers are commonly working to infer as much as possible about the relations of narrated descriptions to the current speech situation and to the speaker's subjective evaluation of it. (Bybee 2003a: 156)

This leads to the prediction that certain semantic changes should be possible or probable, while others will not occur. In order to clarify relations between senses, universal semantic or conceptual spaces are described (see 1.2):

> A semantic map is a geometric representation of meanings or, if one likes, uses, and of the relations between them. Meanings/uses and their connections thus constitute a semantic space. As employed in linguistic typology, the map describes and constrains languages that venture their grammars and/or lexicons into this space, both with respect to diachrony and synchrony (Van der Auwera & Plungian 1998: 86).

I assume that the semantic development of a gram is determined by conceptual continua. It is language-specific which categories are expressed by the same item, but the division is not arbitrary: conceptual spaces are universal. I adopt the hypothesis of Van der Auwera & Plungian (1998: 113) that if a single gram expresses more than one meaning, it may only express **adjacent** meanings or fields on a single developmental path. This is illustrated in Figure 5-2, where two possible synchronic configurations are presented. The bold meanings are the interpretations that are currently used in the language. The dotted meanings on the left side have died out; the dotted meanings on the right side have not (yet) emerged. It is predicted that meanings to the right of a single path can only develop out of their adjacent meanings on the left. Furthermore, a meaning will not die out if its adjacent meanings on the right and on the left side are still in use.

Both configurations in Figure 5-2 are expected to occur: In the top configuration, one expression covers the adjacent meanings 2, 3, 4, and 5 that are on a single path. In the bottom configuration, meaning 4 and 5 are on different grammaticalization paths than meaning D and E. So here as well one expression only covers adjacent meanings on single paths. Meaning 3 has died out.

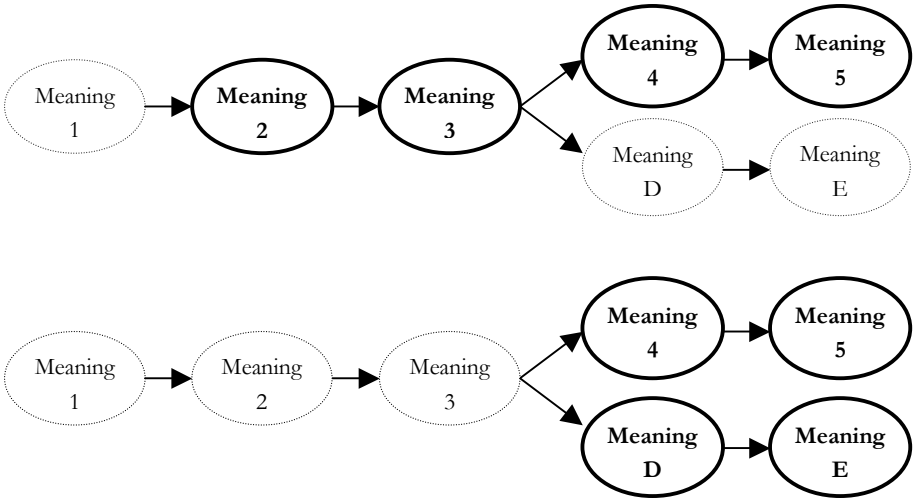

Figure 5-2. POSSIBLE synchronic configurations of polysemy (adapted from Figure 20, 21, Van der Auwera & Plungian 1998)

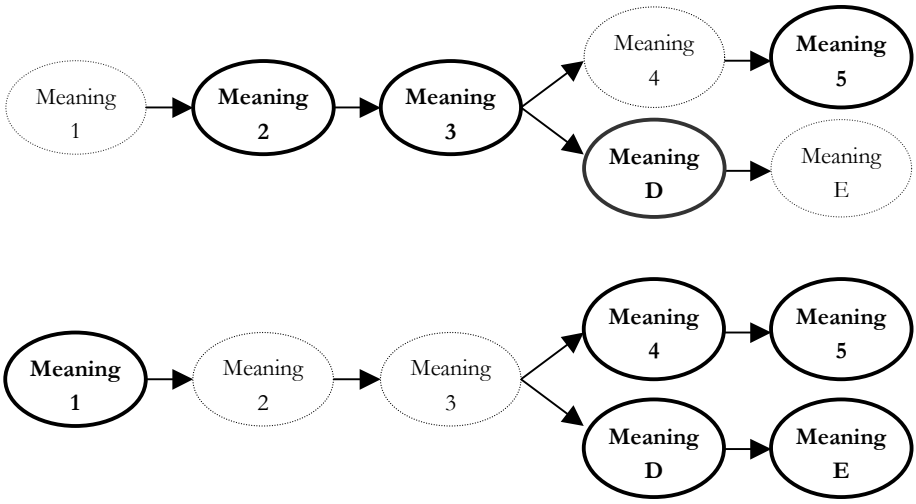

Figure 5-3. IMPOSSIBLE synchronic configurations of polysemy (adapted from Figure 22, Van der Auwera & Plungian 1998)

Figure 5-3 presents two configurations that are expected to be impossible. In the first configuration, the absence of Meaning 4 is disallowed: there is a gap in

the path from Meaning 2 to Meaning 3 to Meaning 4 to Meaning 5. In the second configuration, the presence of Meaning 1 in combination with the absence of Meaning 2 and 3 is disallowed. There is no continuous line of adjacent meanings.

What does the adjacency hypothesis imply with respect to the scope of operators? The hierarchical structure of the clause and the location of operators in the FG model are supposed to play a role in the semantic or conceptual continua that relate to TMA. Expressions for adjacent notions on a semantic path will have similar scope or show a minimal difference in scope. Single TMA expressions will only express multiple semantic notions that are adjacent on a path and as semantic paths probably show a gradual increase in scope, there will be no single gram that can modify the predicate and the proposition but not the predication. This prediction not only holds for polysemous items, but also for portmanteau expressions: two forms will only fuse into a single form expressing multiple meanings if they co-occur very frequently. It is assumed that the categories with adjacent scope (π1- and π2-operators or π2- and π3-operators) are conceptually stronger related than categories with non-adjacent scope (π1- and π3-operators); categories with adjacent scope will, therefore, more often co-occur than categories with non-adjacent scope and, as a consequence, have more chance to fuse.

In sum, this leads to a second hypothesis with respect to synchronic configurations:

Q3: *What are possible synchronic configurations for TMA expressions?*

H3b: A single expression can only cover adjacent regions in semantic space. As a result, a polysemous or portmanteau expression will only have semantic functions with similar or adjacent scopes.

5.4.4 Expression form

The Scope Hierarchy may also be reflected in the morphology of TMA expressions. It was discussed in section 5.2 that grammaticalizing items undergo various morphosyntactic and phonological changes. They tend to become phonologically reduced (in length and in phonological contrasts), to lose properties of the original lexical category (verb, noun etcetera, 'decategorialization') and to get a more fixed position with respect to other items or even fuse with other items (rigidification). It may be hypothesized that an item further on a grammaticalization path exhibits an equal or higher degree of formal grammaticalization than an item earlier on this same path (cf. Van der Auwera & Plungian 1998: 115-16).

The most common grammatical expression forms are periphrases, auxiliaries, particles, inflection, stem-or tone changes and reduplication. How are these

expression forms related to the degree of formal grammaticalization? Although it is claimed that more grammaticalized items are more fused (Bybee et al. 1994: 40), the general language type, whether it is isolating on the one hand or fusional or agglutinative on the other hand, may be of great influence on the highest possible degree of formal grammaticalization. It may be expected that within isolating languages the major development runs from periphrasis or auxiliary to particle, whereas in fusional or agglutinative languages, the major development is from periphrasis or auxiliary to inflection, the latter types being more reduced, having a more rigid position and showing least lexical properties.

The above hypothesis cannot straightforwardly be translated in terms of scope. Although the diachronic development of operators is expected to run from narrow to wide scope and not the other way around, not every grammaticalization path necessarily runs from π1-operator up to π3-operator. There is thus no one-to-one relationship between age and scope of grams. First, when lexical elements become grammatical they may be used as π2- or π3-operator immediately, without going through a stage in which they function as π1-operator. Furthermore, grammatical elements may be very stable in a language: for example, past en present tense markers in English are among the oldest grams, and they have been used to encode tense for centuries. In this function, they have medial scope and as the diachronic paths in Chapter 7 will show, these markers are not expected to develop senses with wide scope. It is also not the case that an increase in generality of meaning necessarily correlates with scope, since the meaning of an item may generalize while the scope remains the same. For example, a progressive marker may develop into an imperfective marker, which is more general in meaning (it also includes continuous interpretation) but has the same scope. In spite of these objections, I pose as a working hypothesis that wider scope correlates with a higher degree of formal grammaticalization. By formal grammaticalization I understand a more rigid syntactic position, less lexical properties and phonologically more reduced items.

To conclude, this leads to question and hypothesis 4:

Q4: *What is the expression form of TMA expressions?*

H4: Operators with wider scope show a higher or equal degree of formal grammaticalization than operators with narrower scope.

5.4.5 Expression order

A final domain in adult languages in which the scope of operators may be reflected is the syntactic order of TMA expressions. In FG it is supposed that constituent ordering adheres to certain universal and potentially competing

principles. The first general principle that is relevant here is the Principle of Iconic Ordering (cf. Haiman 1983, 1985):

> Constituents conform to [the Principle of Iconic Ordering] when their ordering in one way or another iconically reflects the semantic content of the expression in which they occur. (Dik 1997a: 399)

A second principle relevant to TMA expressions is the Principle of Centripetal Orientation:

> Constituents conform to [the Principle of Centripetal Orientation] when their ordering is determined by their relative distance from the head, which may lead to "mirror-image" ordering around the head. (Dik 1997a: 401)

The constituents x, y, and z comply with this principle if they are expressed with respect to a Head constituent as for example zyxH, zyHx, zHxy or Hxyz. Both ordering principles predict that the hierarchical relations of operators will be represented in their relative ordering with respect to the predicate, as follows: π3 π2 π1 Predicate π1 π2 π3 (cf. Hengeveld 1989: 141). This hypothesis is a refinement of prediction II in Bybee (1985: 24): 'If linguistic expression is iconic, then we would predict that the categories that are more relevant to the verb will occur closer to the stem than those that are less relevant.'

Q5: *What is the expression order of TMA expressions?*
H5: The expression order of TMA expressions iconically reflects the scope relations as follows: π3 π2 π1 Predicate π1 π2 π3

5.4.6 Language acquisition

Hypothesis 3a and 3b lead to specific expectations with respect to language acquisition. The general question to be investigated in this thesis is whether the limits on possible synchronic configurations of linguistic properties in languages also hold for stages of child language. It is expected that this is in fact the case, since there are similar underlying "true" universals, that is, universal cognitive and communicative factors. As was already argued in 1.3, only if the acquisition of linguistic elements follows the order of a markedness scale, from least marked to more marked, the language system of a child is in each stage in accordance with the predicted limits on synchronic variation. With respect to TMA, this leads to Q6 and H6:

Q6: *What is the acquisition order of TMA expressions?*
H6: The acquisition order of TMA operators follows the order of the Scope Hierarchy, π1-operator ⊂ π2-operator ⊂ π3-operator. Because of increasing complexity and decreasing communicative need, the

acquisition order of TMA expressions is π1-operators before π2-operators, and π2-operators before π3-operators.

Furthermore, as argued in 5.4.3, it is assumed that there are universal conceptual spaces that lead to similar diachronic paths in unrelated languages. For adult languages, it is expected that single linguistic items can only simultaneously express those meanings that are adjacent on such a path, so that at all times, the semantic relatedness is reflected in a synchronic stage of language. It may be expected that stages in child language will show the same picture, since conceptual maps are universal. This implies that also in child language, single items may only express meanings that are adjacent on a path. With respect to the acquisition order of the different meanings of polysemous items, this implies that children will acquire meanings in an order that reflects the semantic relatedness. In sum, this is formulated as:

Q7: *In what order are the different functions of polysemous items acquired?*

H7: At any stage in language acquisition, a single expression can only cover adjacent regions in semantic space. As a result, a polysemous or portmanteau expression will only have semantic functions with similar or adjacent scopes.

5.5 CONCLUSION

The main question of this thesis is: are the limits on variation in adult languages of the world identical to the limits on variation in stages of language acquisition? It is expected that markedness scales or implicational hierarchies are reflected both in adult language and in stages of child language. Whether this is indeed the case will be tested in the domain of TMA and a markedness scale based on scope is expected to have reflections in language variation. Thus, the more specific question in this thesis is: does the hierarchy π1-operator ⊂ π2-operators ⊂ π3-operator in the domain of TMA account for the limits on variation in adult languages and in stages of child language? In this chapter, several hypotheses were derived, mainly on the basis of grammaticalization theory, with respect to the kind of linguistic reflections that may be expected. Questions 1 to 5 will be examined in one particular language, English, and in a crosslinguistic survey of 76 unrelated languages in Chapter 6 and Chapter 7, respectively. Questions 6 and 7 will be investigated in detail in English (Chapters 8 and 9) and in a more general crosslinguistic study on the acquisition of TMA expressions in 24 different languages (Chapter 10)

Part II ***Typology***

INTRODUCTION TO PART II

Now that the theoretical foundations of TMA have been defined in Part I, language-specific systems can be analyzed. Although variation is expected in the TMA systems of different languages, it was argued in 1.2 that it is also expected that this variation is not arbitrary. One factor that is supposed to define limits on variation is the scope of operators. Operators modify different parts of an utterance and, as a consequence, they serve different semantic and communicative functions. According to the Scope Hierarchy, operators with wide scope ($\pi 3$) are more marked than operators with medial scope ($\pi 2$) which in turn are more marked than operators with narrow scope ($\pi 1$): $\pi 1$-operator $\subset$ $\pi 2$-operator $\subset$ $\pi 3$-operator. Wide scope correlates with more complex and more abstract functions (see section 2.5).

The general hypothesis in this thesis is that scope accounts for the possible variation in grammatical TMA systems both of adult languages and of stages in child language (5.5). Part II investigates the limits on variation in the TMA systems of adult languages, or, in the standard terminology, the limits on the **typological** variation in the domain of TMA. The question is whether the Scope Hierarchy is actually reflected in several domains of language, diachrony, frequency, synchronic configurations, expression form and expression order, such as formulated in 5.4. Chapter 6 will test the hypotheses H1 to H5 in the TMA system of English. There, the role of scope is investigated in detail. Chapter 7 will compare the TMA systems of 76 different languages to one another. This chapter will test H1 to H5 across languages and examine more generally the influence of scope on the possible variation in TMA systems.

Chapter 6

TMA in English

6.1 INTRODUCTION

The TMA system of English has been the subject of an enormous number of studies. There is no other TMA system to which so many monographs, book chapters, and articles have been devoted. Yet it cannot be claimed that the definitive description has yet been achieved. The domain of TMA is very complex. Inevitably, this chapter cannot cover all the literature on this subject. The focus here will be on the role of scope in English TMA, and many other interesting topics will be ignored. The question is: is the Scope Hierarchy reflected in English?

In Chapter 5 hypotheses were derived on the basis of the Scope Hierarchy with regard to diachrony, frequency, synchronic configurations, expression form and expression order. In this chapter, these hypotheses will be explored to see if they make the correct predictions for English. As a first step, an inventory is made of the grammatical TMA expressions in English. Criteria are given as to which expressions should be considered grammatical and belong to the set of TMA operators. For each operator in English, the semantic functions and scope will be discussed (6.2). The inventory of TMA expressions serves as the basis to examine whether English indeed shows the predicted linguistic patterns.

The hypotheses derived in Chapter 5 are tested for English. Section 6.3 discusses the diachronic development of English TMA expressions and will test H1 (see 5.4.1). In section 6.4 the frequency of TMA expressions is examined. H2a (see 5.4.2) about token frequency is tested in corpus data of adult conversations and H2b (see 5.4.2) about the size of operator classes is tested on the basis of the inventory presented in 6.2. Not only is the Scope Hierarchy expected to be reflected in diachrony and frequency, the possible synchronic configurations of a TMA system are also supposed to be restricted by the Scope Hierarchy. Hypotheses H3a and H3b (see 5.4.3) will be tested in 6.5. The inventory of TMA expressions forms the basis for testing H3a and the semantic paths that result from the diachronic survey for H3b. In section 6.6 the English expression forms of TMA expressions will be examined to see whether they are in line with H4 (see 5.4.4). Finally, section 6.7 is dedicated to the expression

order of TMA expressions, which is expected to reflect scope as formulated in H5 (see 5.4.5).

6.2 INVENTORY OF TMA EXPRESSIONS

Which TMA functions are grammatically encoded in English? Before the configuration of TMA functions in English can be determined, the expressions to be considered grammatical have to be defined. This will be the subject of 6.2.1.

In 6.2.2-6.2.6 the specific expressions and functions within the different TMA domains are discussed. As a functional model of language should account for actual language use (in contrast to sentences made up by linguists), the inventory of TMA expressions is almost entirely based on corpus data. It relies heavily on earlier work on TMA in English, in particular the corpus-based studies on modality of Coates (1983) and Palmer (1990) and the general corpus-based grammar of English of Biber, Johansson, Leech, Conrad & Finegan (1999). Examples from these sources are referred to with C for (Coates 1983), P for (Palmer 1990) and B for (Biber et al. 1999), followed by the page number. Additional data were collected from the Collins' Wordbanks Online English Corpus (titania.cobuild.collins.co.uk /form.html), abbreviated as CWO, and from the World Wide Web (indicated by the URL). Every attempt was made to use examples from conversational data, or else, from informal registers. Although the corpus examples formed the majority of data, a few examples had to be made up in order to illustrate a certain use or interpretation. Most of the literature and corpus data available are on British English. However, as the data in this chapter will later be compared to child American English (Chapters 8 and 9), some specific properties of American English will be discussed.

6.2.1 Criteria for grammaticality

Before the TMA system of English can be defined, it must be made clear what the limitations of this study are. Firstly, this study is restricted to the domains of aspect, tense, and modality and the related domains quantification, irrealis and evidentiality, such as defined in Chapters 3 and 4. This excludes, for example, imperative and negation and constructions like *try to*, *happen to* and *dare (to)*.

Secondly, this thesis is restricted to **grammatical** expressions, as opposed to lexical expressions. Section 5.2 showed that the boundaries between grammatical and lexical elements are not clear-cut. However, for this research, it has to be decided which items should be included and which excluded. Clear lexical items are adverbs, nouns and adjectives, such as for example the words *probably*, *maybe*, *expectation*, *capacity*, *certain,* and *possible*. Clear grammatical items

are the tense inflections and irregular forms for past and present tense. More difficult constructions, however, are periphrastic constructions (periphrases), with two verb-like elements, a finite verb and a non-finite verb, such as an infinitive with or without *to*, a past participle (*-ed*) or a gerund (*-ing*). Examples are *must go*, *be able to see*, *appear to snow, stop running*, *be closed* and *have talked*. Which of these expressions are grammatical and which are lexical?

Olbertz (1996: 26) defined a grammatical periphrastic construction as consisting of the inseparable combination of an auxiliarized finite verb with a specific non-finite verb in which the finite verb agrees with the first argument of the non-finite verb.[1] There are two important aspects to this definition: the finite verb is an auxiliarized verb, which means that syntactically it functions as a modifier of the main, non-finite verb. When the construction is lexical, the finite verb is the main verb and the non-finite verb functions as part of an argument or adjunct of the main verb. The second important feature is that a periphrasis functions as an inseparable construction: its meaning is not identical to the interpretation of its components. Because of both properties, a grammatical periphrasis shows different uses in language than a lexical combination. This makes it possible to distinguish between the two.

Firstly, an important characteristic of a lexical verb (in contrast to an auxiliary) is its potential to occur on its own, without a complement. Constructions in which the finite verb with non-finite complement can be replaced by the finite verb only (b-sentences), or by a finite verb and a nominal complement (c-sentences) are therefore considered lexical (Olbertz 1996: 34). Consider (1) and (2):

(1) a. I stopped working at eight.
b. I stopped at eight.
c. I stopped it.

(2) a. I was going to work at eight.
b. *I was going at eight.
c. *I was going it.

In (1), *stop* may occur on its own, without the complement *working* (1b) or with a nominal complement *it* (1c) It is therefore a lexical element. In contrast, *be going to* in (2) cannot occur without a complement (2b) or with the nominal complement *it* (2c) without changing its meaning and it should therefore be considered a grammatical construction. Many English verbs that express an aspectual notion, for example, *stop*, *start*, *begin*, *finish*, *continue*, *quit,* and *give up*, can

[1] This definition excludes causatives, since in those constructions the finite verb does not agree with the first argument of the non-finite verb (cf. Olbertz 1996: 31). For example: *I make him go*, *He let her sleep*, *They got the car fixed.*

occur on their own, as full lexical, intransitive verbs[2]. They are excluded from this research.

A second reason to consider an expression lexical is if **part** of the construction can be modified by an adverb.[3] If this is possible, it indicates that the syntagmatic position of the separate elements is not completely fixed and that at least the element that is modified has meaning of its own. This holds for example for the modal idioms *(ha)d better* and *(woul)d rather*, and also for *be willing to* and *be able to*. Consider the examples of natural speech (3)-(6):

(3) Oh, you'd **much** better go alone. (CWO)
(4) You 'd **much** rather play with shared shared memory or shared memory programming. (CWO)
(5) The farmers were only **too** willing to go back to a price system. (CWO)
(6) How **well** will they be able to use this? (CWO)

The modal expressions in (3)-(6) can be modified partly. They are considered lexical and will therefore be excluded from this research.

Thirdly, a specific type of construction that looks like a periphrasis, but is not, is a raising construction. In a raising construction the subject of an embedded clause is raised to the subject position of a matrix clause (Dik 1997b: 344-46). An example is *Jack seems to work*, which is an instance of raising related to the construction *it seems that Jack is working. Jack,* the subject of the embedded clause with the main predicate *work*, is raised to the subject position of the matrix clause with the main predicate *seem*. The relation between the two predicates *seem* and *(to) work* is therefore a matter of subordination and not of periphrasis, in which the relation is one of modification. Because of this criterion, the constructions *seem*, *appear* and *turn out* are considered lexical and they are excluded from this research.

Fourthly, passive constructions must be distinguished from periphrases (cf. Olbertz 1996: 29). An active counterpart and the possibility to add a *by*-phrase are clear indicators of passive constructions. This holds for expressions like *be allowed to*, *be obliged to,* or *be expected to,* as shown in (7). These expressions are therefore considered lexical.

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[2] A verb that is mainly used intransitively is much less likely to grammaticalize than a verb that is mainly or only used transitively. Only a transitive construction in which a verbal phrase functions as a complement could be reanalyzed as a periphrastic construction.

[3] An expression is not necessarily lexical if the construction can be modified **as a whole**. For example, the construction *be about to* can only be modified in its entirety. In the sentence *He is just about to go* the adverb *just* does not modify *about*, but *be about to*.

(7) a. I'm allowed (by him) to go.
b. He allowed me to go.

An expression that looks like a passive, but is not, is *be supposed to*. It is impossible to combine it with a *by*-phrase (8a) or to make it active (8b).

(8) a. He's supposed (*by them) to go
b. *They supposed him to go.

Whether *be supposed to* should be considered grammatical is dependent on the final criterion, selection restrictions.

In addition to the formal criteria mentioned above, there is a fifth, semantic, criterion that is used here to distinguish lexical from grammatical constructions, i.e. selection restrictions. Since grammatical elements have general meanings, they will freely combine with different lexical elements, that is, they hardly impose selection restrictions on the elements with which they may co-occur, in contrast to lexical elements (Hengeveld 1992: 30f). However, since grammatical elements are not meaningless, they are also not compatible with every other lexeme of the language. For example, present tense inflection does not combine with a time adverb that indicates past time, an ingressive is rare with a punctual event and a modal marker expressing ability will in general not combine with an inanimate subject. On the basis of their general meaning, it is thus predictable for grammatical elements what kind of selection restrictions occur, again in contrast to the selection restrictions of lexical elements.

Which selection restrictions may be expected within the different domains? Firstly, aspect operators select part of the internal temporal structure of an event to focus on. Since the internal temporal structure of stative and punctual events is rather undefined compared to other event types, it may be expected that not all aspect operators combine freely with these types of events, or that, if they do, it results in a specific interpretation. On the contrary, it is not expected that an aspectual operator imposes selection restrictions on the first argument, since the first argument does not interfere with the aspectual semantics. The same holds for whether the predicate designates a controlled or a non-controlled event. In a controlled event the first argument has the power to determine whether or not the event will obtain, such as in *John opened the door* or *John was sitting in the garden*, versus the non-controlled events in *the substance was red* or *the tree fell down* (Dik 1997a: 112). There is no reason to assume that aspectual operators interfere with the semantic feature of control. In conclusion, only aspectual expressions that can combine with both animate and inanimate first arguments, and occur in controlled and non-controlled events are considered grammatical. The aspectual expressions that apply to this

criterion are *be –ing, be going to*, *keep –ing*, *be about to*, *have –ed* and *be –ed*. Not all of these expressions combine freely with every event type—**be knowing*, **be jumped*—but they do not show unexpected selection restrictions on the arguments or on the feature controlled /non-controlled events. Both with regard to their formal behavior and their semantic behavior, these expressions can be considered grammatical and they are included in this research. Most other aspectual verbs in English (*stop, start, finish, continue, begin*) were already excluded based on their independent main verb use, but moreover, it holds for most of these verbs (except for *begin*) that they also apply selection restrictions on their infinitival complement or first argument.

Secondly, expressions of event quantification may be expected to impose selection restrictions on the event type with which they occur as the event type has to be compatible with a notion of 'repetition', which is not the case for permanent states or for specific telic events (?*he died repeatedly*). Furthermore, the notion of habituality seems in principal to be restricted to animate arguments: only animate arguments can be involved in **habitually** repeated events. Other expressions of event quantification are not expected to impose selection restrictions on their arguments. In English, there are three expressions of habituality, *would, will,* and *used to*: these expressions have grammaticalized to such an extent that they are compatible with all kinds of event-types and with both animate and inanimate arguments (see 6.2.4.1 for examples and further discussion of the habitual in English). The construction *keep –ing*, which is later explained to be an expression for continuative aspect and for frequentative event quantification (see 6.2.2 and 6.2.4.2), cannot combine with every event-type (the event has to be repeatable), but it does not impose any selection restriction on the arguments. All these constructions can therefore be considered grammatical.

Tense operators and operators of irrealis (hypothetical and counterfactual) are not expected to impose any selection restrictions on the predicate or argument since their semantics are compatible with any type of event or argument. This is in fact the case for the past and present tense inflection and for the future tense markers *will/shall*. It also holds for the hypothetical constructions 'past modal + *V*' and 'past tense form' and the counterfactual constructions 'past modal + *have –ed*' and 'past perfect form'.

For expressions of modality, the matter of selection restrictions is more complicated. Event-oriented or proposition-oriented modality should neither impose selection restrictions on the predicate nor on the arguments. However, participant-oriented modality, in particular modality that ascribes the source of the modality to participant-internal characteristics, is expected to impose certain restrictions on the arguments. The notions of (weak) obligation, desirability, permission, ability, internal need (x is forced because of internal characteristics)

and volition (will) are restricted to animate beings and, except for the latter two, restricted to controlled events. Most modal expressions in English have event-oriented or proposition-oriented uses besides their participant-oriented uses and they are clearly grammaticalized. This holds for all the central modals—*must, will, would, shall, should, can, could, may, might*—and the constructions *have to, have got to, got to, need (to), ought (to)* and *be supposed to*. In their participant-oriented use, these constructions do impose selection restrictions, as is to be expected, but they have also much more general uses, characteristic for wider scope operators. All these expressions are therefore considered real grammatical markers. The so-called marginal modal *dare* is excluded as it has a questionable modal meaning. Moreover, it is very infrequent and its use is mainly limited to fixed expressions, which are both characteristics of lexical items.[4] Both the constructions *dare (to)* and *try to* can only combine with animate first arguments and controlled events: their meaning is still very specific.

A construction that needs some closer inspection is *want to*. The modal use of this construction is confined to expressing will or volition. It combines only with animate first arguments, although it can be combined with controlled and non-controlled events. The question is whether *want to* is a lexical predicate with a clausal argument or a modal operator (still) restricted to participant-oriented modality. Krug (2000) has carried out an in-depth analysis of the historical development of *want* and *want to* in English. He gives several arguments why *want to*, or at least the contracted construction *wanna V*, has grammatical status in (American) English. First, the frequency of the verb *want* has tremendously increased from Middle English to present day American English (Krug 2000: 119), in particular the string *want to* is much more frequently used (it makes up about 60% of all instances of *want* in present day written American English) (p.134). In spoken language the frequency will probably be even much higher, which is also the case in spoken British English compared to written British English (p.136). Second, the string *want to* is often phonologically reduced to *wanna*, particularly in American English and by younger speakers (up to 45%) (p.161). The phonological reduction indicates that speakers analyze the construction no longer as a two-verb phrase [*want*] + [*to V*], in which *want* is a lexical verb, but rather as a one-verb phrase [*wanna* [*V*]], in which *wanna* functions as an operator. An indication that speakers apply the latter analysis is that ellipsis of *to V*, as in *you can wait outside if you want* is less common than ellipsis of only the verb: …*if she wants to, she can get in touch with you*. (p.156). A third argument that *want to* is grammaticalizing is its syntactic behavior, which in certain respects resembles more the syntactic behavior of the central modals

[4] Martine Taeymans, personal communication.

Table 6-1. English TMA expressions included in this research

–ed /irregular	*be going to*	*might*	*will*
–ø / -s	*be supposed to*	*must*	*would*
be –ed	*can*	*need (to)*	*wanna*
be –ing	*could*	*ought (to)*	
have –ed	*have to*	*shall*	and possible
keep –ing	*(have) got to*	*should*	combinations
be about to	*may*	*used to*	thereof

(*can*, *could*, *may*, *must*, etcetera) than that of lexical verbs with a similar token frequency as *want to*. It appears that 'full verbs in general combine far more often with modals than the emerging modal *want to*, the difference being even more drastic when this occurs in its contracted form.' (p.158). Furthermore, *wanna* is sometimes used with third person, i.e., without a third person inflection *–s* (p.160). Finally, the past tense of *want to* can be used as a polite form, such as in *I wanted to ask you a question*, where it does not indicate the pastness of *want* (Bybee 1995). This is similar to the past forms of the central modals that also yield a polite reading, whereas past tenses of lexical verbs do not get this interpretation (Krug 2000: 155). To conclude, Krug suggests that we are possibly 'witnessing the very initial stages of a functional split between modal use and nonmodal use, very similar in type to historical changes leading to modalization.' (p.153). In this thesis, all instances of contracted *wanna* are analyzed as grammatical while all other instances of *want (to)* are considered lexical.

In sum, Table 6-1 presents all the TMA expressions in English that are considered grammatical and that are included in this research. In the next sections, the semantic functions of these expressions will be discussed. Corpus examples will illustrate the functions of each expression form. As the definitions of specific TMA categories were already discussed in Chapters 3 and 4, the discussion here will be limited to the characteristics specific for English. The final inventory of the TMA expressions in English and the functions for which they are used serves as the basis for testing the hypotheses.

6.2.2 Aspect

Which aspectual functions are grammatically encoded in English? The constructions *be —ing, keep –ing*, *be going to*, *be about to*, *have –ed* and *be –ed* are used

to express progressive, continuative, prospective, immediate prospective, perfect and resultative aspect (see 3.3.3).

The construction *be –ing* expresses progressive aspect. It limits the predicated property of the participant to the inner part of an event and can be used in contexts of past time reference (9), present time reference (10) or future time reference (11):

(9) That's why I was thinking I might hang on to the Volvo. (B460)
(10) What's she doing? (B470)
(11) But she's coming back tomorrow (B471)

A continuative selects the initial boundary and the internal part of the event, but not the terminal boundary. In English the construction *keep –ing* has continuative as one of its meanings. Especially in combination with atelic events, this construction is interpreted as a continuative. *Keep –ing* in combination with telic events may encode either a continuative or a frequentative meaning. The latter meaning will be discussed in 6.2.4.2. Clear examples with continuative interpretations are presented in (12) and (13):

(12) I don't want to keep living with my mum. (CWO)
(13) She kept thinking while she was smiling. (CWO)

The construction *be going to* marks prospective aspect. It limits the predicated property to the pre-state of an event. See (14)-(17):

(14) Well I was going to say just about the same as that. (CWO)
(15) I was going to be called Kate if I was a girl. (B456)
(16) And he's going to see it. (B456)
(17) When are you going to see your parents? (P145)

Be going to is by some authors considered a future tense marker in English, whereas I have classified it as aspect. This issue will be discussed below.

The expression *be about to* marks immediate prospective. Like *be going to* it selects the pre-state of an event, but it also indicates that the pre-state is very close in time to the initial boundary of the event. See (18) and (19):

(18) Now my colleagues were about to throw that one out as irrelevant. (CWO)
(19) This was about to melt. (CWO)

The expression *have –ed* limits the predicated property of the participant to the post-state of the event. This construction marks perfect aspect, see (20)-(23).

(20) We've been to a lot of seminars too. (B464)
(21) He's gone home. (B465)
(22) They've done so much. (B465)
(23) We've had it since last January. (B468)

The perfect is mainly restricted to present time reference, especially in conversations. Except for *had been*, past perfect forms are very rare in conversation (Biber et al. 1999: 468). The perfect in English selects a post-state, but does not indicate by itself whether the event and the post-state of this event are close in time (*I have just arrived*) or not (*I have been in Paris once*) and it also does not specify the length of the post-state or of the event leading up to the post-state (*I've lived here all my life*). This is a matter of contextual interpretation.

The final expression in English that marks aspect is *be –ed* for resultative aspect. Resultative indicates that an 'action in the past produces a state that persists into the present.' (Bybee et al. 1994: 318). Like a perfect, a resultative selects a post-state, though the focus on the post-state seems to be stronger and the implication of a preceding event that led up to the post-state seems to be much weaker. Examples are presented in (24)-(26):

(24) The door was closed.
(25) He is gone.
(26) The stick is broken.

The resultative construction and the passive are equal in form in English, but only the passive construction can be combined with a *by*-phrase. If there is no *by*-phrase, then the two constructions can be distinguished using an adverb of time: with a resultative construction, the time adverb refers to the time of the resultant state, whereas with a passive, the time adverb refers to the time of the event leading up to the result (Nedjalkov & Jaxontov 1988: 49). This can be shown by an example from Jespersen (1924: 247) in (27):

(27) When I came at five, the door *was shut*, but I do not know when it *was shut*:

The first *was shut* is a resultative construction; at five, the door was in the state of being shut. The second *was shut* on the other hand is a passive construction: *when* refers to the time of the action of shutting the door.

Notice that all aspectual forms in English are in fact combined tense-aspect markers. *Be*, *keep* and *have* bear the tense marking, whereas the non-finite verb form expresses the aspectual component. The auxiliaries *be* and *have* are in spoken English mostly contracted to, for example, *'m* or *'s* or to *'ve* or *'s*.

The classification of *be going to* as prospective aspect is not uncontroversial. Biber et al. (1999) consider *be going to* as one of the possible markers for future time in English. However, in using this expression, the focus is on a current activity or state or on a present decision or intention **leading to** a future event. According to Bohnemeyer (personal communication) prospectives crosslinguistically are associated frequently with the expression of intentions, since intention is one of the many possible pre-states of an event: intention is, however, not entailed by the prospective. Intentional readings in English admit the specification of the time of the event, so that the argument can be described as being in the pre-state of 'doing something at a specific time'. The temporal specification of the event is thus inside the scope of the aspectual operator and there is no entailment of realization of the event at that time, contrary to a real future tense. It is this possibility of specifying the event-time that is responsible for the tense-like appearance of *be going to*. Quirk et al. (1985: 214) show that *will* in the main clause of a conditional can in most cases not be replaced by *be going to*, which proves that the prospective is not a future tense marker:

(28) If you leave now, you'll never regret it.
(29) *If you leave now, you are never going to regret it.

The classification of *have –ed* as perfect aspect is not uncontroversial either. For example, Elsness (1997) claims that this construction marks indefinite past tense. In my view, however, the indefiniteness of the temporal location of the event is the result of the fact that it is not the event that is located in time, but the post-state of the event. It is an implicature that the event occurred prior to the post-state, but its temporal location is not specified and therefore indefinite.

In sum, both the prospective and the perfect in English have temporal sequentiality **as an implicature**, whereas future and past tense **encode** temporal sequentiality. When the notion of current relevance were in most cases not required for the use of *be going to* or *have -ed*, then the constructions would express the temporal sequentiality and they would have grammaticalized into tense-markers. But since in English the notion of current relevance is obligatory for both constructions, the encoded meaning is here considered aspectual and not temporal.

6.2.3 Tense

In most contexts, tense is obligatorily marked on the main verb in English. Only imperative and non-finite clauses are not marked for tense. The inflection on the finite verb and the auxiliary *will* distinguish between past, present and future tense. This will be further discussed below. The relation between tense and modality and between tense and irrealis will be discussed in 6.2.5 and 6.2.6.

6.2.3.1 Past

There are several expressions in English that mark past tense. The so-called simple past or preterit is the suffix *–ed* on the main verb or irregular verb forms. Examples are presented in (30)-(35):

(30) I saw him yesterday. (B467)
(31) She just shrugged her shoulders. (B460)
(32) Well I rang them up yesterday. (B453)
(33) Hey, did you read through this yet? (B463)
(34) We already gave him a down payment. (B463)
(35) Then they said: 'Well,' and then I realized that it was Fennite. (B467)

In non-verbal predicates the past form of the copula *be* marks past tense and in periphrastic constructions, the past forms of the auxiliaries *be*, *have* or *keep* or of modal auxiliaries mark past tense. Past tense indicates that the relevant part of the event occurred anterior to the moment of speech (ST). It is used to refer to events in the immediate and in the remote past. The simple past is also used in contexts when a past event has led to a present resultant state, especially in American English conversation (see (33)-(34)) (Biber et al. 1999: 463).

The simple past in English makes no explicit selection of the event structure, i.e., it is aspectually neutral and the exact interpretation depends on the event type with which it occurs. In combination with temporary events, past tense leads in general, but not necessarily, to a perfective interpretation: the entire temporal structure is ascribed to the argument(s) and located anterior to ST. In combination with permanent states, the past tense only locates the part that is relevant to the conversation in time with respect to ST (see 3.4.3).

6.2.3.2 Present

The morphologically unmarked (zero) verb form in English, except for the third person singular that has a suffix *–s*, indicates present tense[5]. The general

[5] Strictly, the present tense in English is a non-past tense as in certain contexts it may be used to refer to future events. However, since future reference of the present tense is very limited I will speak of present tense.

meaning of the present tense is that the relevant part of the event overlaps the moment of speech. It is claimed, among others by Comrie (1976: 66), that the present tense is essentially imperfective. But is this indeed the case? In the proposed account it is assumed that the simple present, like the simple past in English, does not make a selection of the temporal structure of the property or relation. In other words, the simple present is aspectually neutral. Which part of the event is located in time is dependent on the topic time and the event structure. As discussed in 3.4.2 topic time is the time interval to which an assertion is confined. It determines which part of the state of affairs is relevant to the discourse, and it is only this part of the event that is located in time. The interpretation of the simple present therefore depends on the relation between topic time, event type and speech time. What are the possible interpretations of the simple present in English?

First, present tense can describe a state existing at the speech time (Biber et al. 1999: 452-54), as in (36)-(38):

(36) I want a packet of crisps. (B453)
(37) I know her very well.
(38) I <u>think</u> you might be wrong. (B453)

In this interpretation, the topic time interval overlaps speech time and the interval of the event overlaps topic time. In Figure 6-1, the relation between topic time (TT), speech time (ST) and event structure (solid line on the time line) is depicted. As states are conceived of as having no temporal boundaries, the event is represented as a solid line without an initial or terminal boundary.

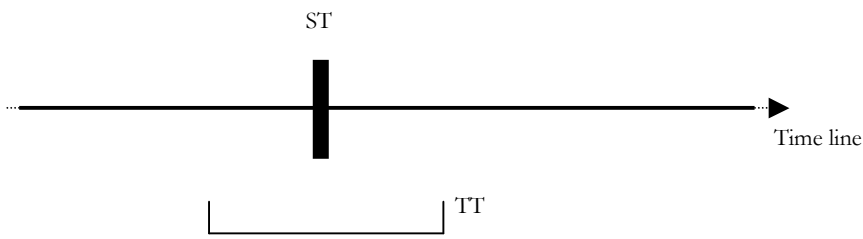

Figure 6-1. Representation of simple present in combination with a stative event in English

The present forms in (36)-(38) make no selection of the temporal structure, but language users know that only the part of the state that is relevant to the discourse is located in time. The topic time interval selects the relevant part of the state and as this part overlaps ST, the present tense is used. It is a matter of

pragmatic knowledge that not the complete state is located in time, for indicating the time location of an entire state would be virtually impossible or at least pragmatically very inconvenient. Logically, it holds before, at and after the moment of speaking, but to continuously encode this fact—*I knew, know and will know her very well*—is communicatively irrelevant. Language users infer that the state may extend past the boundaries of the speech time and even the topic time interval. There is no reason to assume that the present tense marks imperfective aspect in this use.

A second use of the present tense in English is to describe present habitual behavior (39) or generic statements (40)-(41):

(39) She's vegetarian but she eats chicken. (B453)
(40) When the prey is dead, the tiger drags it to a safe place and eats it.[6]
(41) Tigers eat deer, wild pigs and wild cattle.[7]

These readings generally arise with dynamic events. The time interval for which the speaker wants to assert something is in these cases much larger than ST. Since most events do not overlap the entire topic time the interpretation is that the state of affairs is repeated, such that it fills the topic time. The interpretation may be either habitual / frequentative or distributive which depends on the number and specificity of the argument(s). For example, (39) is interpreted as habitual, since a specific individual is involved; (40)-(41) are interpreted as distributive, since the first argument is generic. The state of affairs is 'repeated' because it holds for several individuals. Consider Figure 6-2 for a representation of the habitual or distributive[8] interpretation of the present tense:

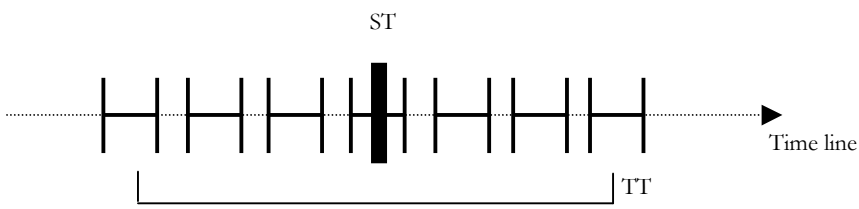

Figure 6-2. Representation of habitual or distributive interpretation of simple present in English

[6] www.kidcyber.com.au/topics/tigers.htm

[7] www.kidcyber.com.au/topics/tigers.htm

[8] For a proper representation of a distributive a three dimensional picture is necessary, since several events occur simultaneously or overlap partly.

In this interpretation the boundaries of the temporal structure of one event are included in topic time, but at the same time, the boundaries of the repeated event-sequence are not included in topic time. Note that it is not necessarily the case that one of the repeated events actually takes place at the same time interval as ST. The resulting interpretation is that the situation of the repeated events holds at an interval that overlaps the speech time interval. A habitual or distributive interpretation therefore resembles a permanent state. The relation between topic time and event structure is very similar to the one in Figure 6-2 and it does indeed yield a 'stative' interpretation: it is a general statement, a situation that holds at all times. The topic time determines that the sequence of events that overlaps ST is relevant to discourse, hence the present tense. The difference with a real state is that in a habitual or distributive reading there are time intervals at which the state of affairs is not actually taking place.

A third interpretation of the present is a report on an ongoing action. Examples are presented in (42)-(44):

(42) Here comes your mother. (B454)
(43) Situation: talking about a toddler.
Oh, my goodness. There he goes. Look at him walk. (B454)
(44) Spreads it wide. (football commentary, from Mackenzie (2005))

In this interpretation the topic time is more or less confined to ST. This interpretation is possible if the interval of the state of affairs indeed more or less coincides with ST and this is only the case for momentaneous events. The effect is a reportative interpretation, very common in sports reports. In Figure 6-3 the reportative interpretation is represented:

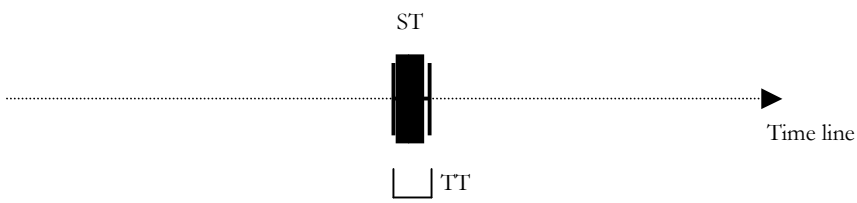

Figure 6-3. Representation of reportative interpretation of simple present in English

A fourth possible interpretation of the simple present in English is future reference in cases of scheduled events, such as in *the train leaves at five tomorrow* but also in temporal adverbial phrases such as *when he comes here, I'll tell him* (from Comrie (1976: 68)). In both structures the present tense cannot be interpreted as habitual. Why is the simple present used in these cases? I follow Klein's

(subm.) analysis that the topic time stretches from the present into the future and includes the time of the complete temporal structure. Apparently, the speaker wants to assert something about a time interval for which the state of affairs does not (yet) hold up to the interval for which the event holds in its entirety.[9] The complete temporal structure of the event including the preceding temporal span is relevant to discourse and located on the time axis. Since this interval overlaps speech time, it is possible to use a present tense. The resultant reading has a sense of a scheduled or planned event. See Figure 6-4 for a representation.

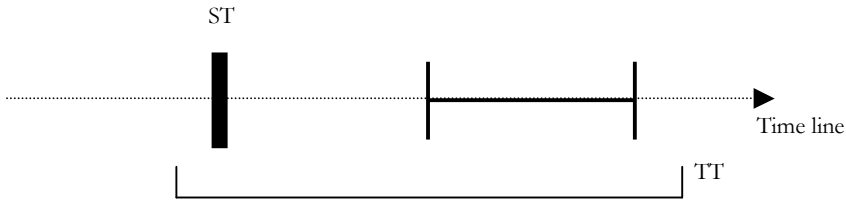

Figure 6-4. Representation of scheduled event interpretation of simple present in English

The counterpart of the scheduled event interpretation is that the topic time extends into the past. The speaker wants to assert something for a time span that stretches from some point in the past up till the moment of speech. This may account for the use of the simple present for narrating past events, the so-called historic present (also Klein's analysis, subm.). The simple present occurs in narratives to create a more vivid style. It is especially common with speech-act verbs. See (45):

(45) No. He <u>says</u>, are you going home tonight? He thought I was going home to my parents. (B455)

The possible interpretations of the present tense do not support the view that the present tense in English is imperfective. In combination with a punctual event, a reportative interpretation is most plausible, which is similar to a perfective view. The most common use, however, is that the topic time extends ST and that the state of affairs is either a state or a repeated dynamic event. In these uses the simple present has a sense of imperfective aspect, since only a part of the event is located in time. However, in the case of habitual and

[9] This is not identical to a pre-state, since the event is not in any way the consequence or purpose of the preceding time interval.

distributive, it also has a sense of perfective aspect, since the temporal structure is in its entirety ascribed to the argument(s). Note that the simple present does not **mark** one of the above interpretations: it only marks present tense. The different aspectual interpretations result from implicatures or inferences. I have shown that the relation between topic time, the event structure and speech time result in different interpretations of the simple present.

The difference between the possible interpretations of simple tenses in English and an imperfective and perfective marker is that the latter explicitly select a subinterval or the entire temporal structure, whereas with simple tenses, no selection is explicitly encoded. And exactly because there is no specific selection, different interpretations are possible, depending on the event type.

6.2.3.3 Future

English has a specific marker for future tense, which indicates that the relevant part of the event takes place posterior to the moment of speech. It is expressed by *will* or by *shall* for first person. In the case of indirect speech with the main clause marked for past tense, future tense is expressed by *would* or *should* (for first person). Consider (46)-(49):

(46) Well, I'll be back tomorrow. (C179)
(47) It will be lovely to see you. (C179)
(48) My babe-in-arms <u>will</u> be fifty-nine on my eighty-ninth birthday … the year two thousand and fifteen when I <u>shall</u> be ninety. (P137)
(49) The judge in the mail train robbery # eh trial # said today that it was unlikely that the jury <u>would</u> be able to retire to consider their verdict until late next Tuesday. (C210)

Will and *would* can also be used to indicate volition or prediction. These meanings will be discussed in 6.2.5.2.1 and 6.2.5.2.3. *Will* and *would* are furthermore used for the expression of habituality (6.2.4) and *would* for the expression of irrealis (6.2.6).

6.2.4 Event quantification

6.2.4.1 Habitual

English has three markers that specifically encode habituality: *used to* and *would* are past habitual markers and *will* is a present habitual marker, in one of its uses. Note that the present tense can yield a habitual interpretation, but it is not a specific marker of habituality. In 6.2.1 it was discussed that habituals are in principle expected to impose selection restrictions on their first argument and

the predicate, for a habit can only be ascribed to entities that can have habits (**Houses have the habit of being big*) and habits are only properties or relations that are controlled (**He has the habit of being tall*). Are there still selection restrictions of this kind to the expression of *used to*? See (50)-(53) for some possible uses of *used to*:

(50) I used to read a lot. (CWO)
(51) Everyone used to call her smelly. (CWO)
(52) The flags used to be in the colors of the "Home" Club.[10]
(53) There used to be a playground here.[11]

The examples show that there are no selection restrictions on the arguments or predicates with which *used to* can combine: it combines with animate and inanimate subjects and with controlled and uncontrolled properties. It may therefore be concluded that *used to* is highly grammaticalized. The specific 'habitual' sense of *used to* in English is marginalized and the expression has become closer to a more general frequentative. It is probably a matter of world knowledge or inference that if a specific animate entity is involved in a repeated and controlled event, the most likely interpretation is that the repetition of the event is due to the habit or propensity of this entity. The representation of a past habitual in combination with an event with boundaries is presented in Figure 6-5 (see also 3.5.3):

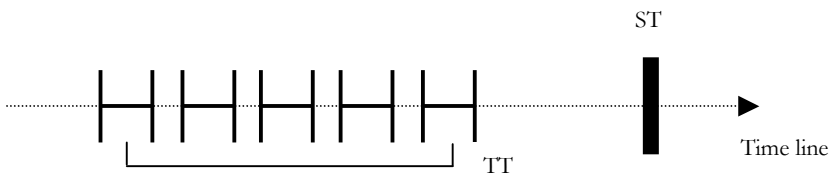

Figure 6-5. Representation of a past habitual in combination with an event with boundaries in English

The examples in (52) and (53), however, show that *used to* can also combine with permanent states, such as *be in the colors of the "Home Club"* and *be here*. In Klein's analysis (1994: 47) of a habitual a speaker chooses to speak about a series of topic times when using a habitual marker, and for all of these topic

[10] www.kenaston.org/KenAston/KenAston48.htm

[11] www.meliorism.com/coh/sucks/8.htm

times, the event holds. It is thus not necessarily the case that the state of affairs indeed recurs, but the time interval relevant to the discourse is a sequence of intervals in the past. When the event is a (semi-)permanent state, such as in (52) and (53), the state of affairs does not recur, but the state holds at all the topic time intervals. This is represented in Figure 6-6, in which the solid line indicates a state, that apparently ended before ST. Note that the event holds at all times in the past, but since the topic time intervals determine which parts of the state are relevant to the discourse, it creates a sense of repetition. I assume that this use of a habitual expression is later in diachronic development and inferred from the interpretation in Figure 6-5. Only a generalized habitual expression may combine with states.

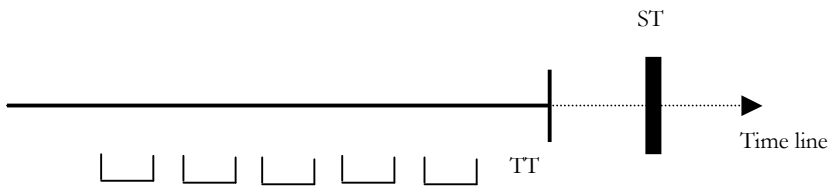

Figure 6-6. Representation of a past habitual in combination with a state with a terminal boundary in English

In English, it is not necessarily the case that the state of affairs is actually recurring when a habitual expression is used: in that case, the time interval relevant to the discourse is a sequence of intervals.

Would and *will* also freely combine with different types of predicates and arguments. These expressions are, however, less frequently used than *used to*. Examples of *would* for expressing habitual or frequentative are presented in (54)-(55):

(54) His blue eyes gazing seriously through a wisp of fair hair which would keep falling across his eyes. (C207)

(55) The thing was he would # he would concoct anecdotes and he'd tell them to me over and over again you know obviously not realising that he'd told them to me before. (C209)

Finally, *will* can be also used with a sense of habituality, or typical behavior (56):

(56) So one kid will say to another, one kid will make a suggestion to another, he'll say the moon's further away from the earth than the sun. (P136)

6.2.4.2 Frequentative

A second subcategory of quantification, the frequentative, is in English expressed by *keep –ing*. A certain event is repeated several times, not habitually and not necessarily on one occasion. The frequentative reading may arise when the auxiliary is combined with a telic event, as in (57)-(60):

(57) I keep saying to him Oh hang on a bit don't go to XXX. (CWO)
(58) Gizzmo keeps trying to persuade me to go with her. (B741)
(59) She kept running out of the room. (B364)
(60) He kept bringing it up so in the end I said … (CWO)

In section 6.2.2 it was already shown that *keep –ing* is used as a marker of continuative aspect (π1). This is the most common interpretation when the construction is combined with a state, compare the examples earlier given in (12)-(13). When the construction is combined with a dynamic event, however, it is often ambiguous as to which interpretation is intended. The two interpretations of *keep –ing* can be distinguished by adding an adverb of specified duration, such as *for an hour*, which is preferred with the continuative interpretation, but dubious with the frequentative reading. The frequentative, on the contrary, can be easily combined with an adverbial phrase of repetition, such as *over and over again*. Consider the following examples:

(61) He kept running for an hour /?over and over again.
(62) He kept bringing it up ?for an hour / over and over again.

Keep running in (61) cannot be interpreted as a frequentative, but only as a continuing action. *Kept bringing it up* in (62) is not completely impossible with *for an hour*, but then the repeated activity is continuous and uninterrupted. In particular momentaneous or punctual events in combination with *keep –ing* are ambiguous between a continuative or a frequentative reading. They allow both interpretations. Consider (63) and (64):

(63) His brake lights kept flashing on *for an hour / over and over again*. (modified example from B746, *keep* > *kept*)
(64) I kept doing garlic burps *for an hour / over and over again*. (modified example from B361, *keep* > *kept*)

The expression *keep –ing* can thus express a continuative aspect, in which case it selects part of the temporal structure to ascribe to the argument(s). It can also express a frequentative, in which case it indicates that the state of affairs was repeated, not necessarily on one occasion or with regular intervals. In that

case it indicates that the speaker does not refer to one event in the real or imaginary world, but to a range of events. The interpretation is dependent on the situation type: telic events may be interpreted as frequentative, if the intervals between the repetitions are quite long.

6.2.5 Modality

English has an elaborate modal system. As a consequence, this section is fairly long, even though the discussion is restricted to the most important aspects. This section is structured according to the subcategorization for modality discussed in 4.2. There, it was shown that the domain of modality can be described by the parameters of sense, scope and source. The different functions of the modal expressions in English are primarily discussed on the basis of their basic sense: potentiality, disposition, weak necessity or necessity. For each sense, it will be discussed which specific meanings arise according to the scope of the modal expression. If the scope is the predicate (participant-oriented modality, $\pi 1$), the modal marker specifies the relation between the predicate and the argument. If the scope is the predication (event-oriented modality, $\pi 2$), the actuality of the event is expressed. If the scope is the proposition (proposition-oriented modality, $\pi 3$), the commitment or attitude of the speaker to the propositional content is expressed. Within each scope type, examples of different sources of modality are presented. For participant-oriented modality, the source of the modality can lie in participant-internal characteristics or in external circumstances that are either non-deontic or deontic. For event-oriented modality, the source of the modality can lie in general or deontic external circumstances, or in general (objective) knowledge about events. For proposition-oriented modality, the source can lie in the (subjective) knowledge of the speaker or in the attitude of the speaker (the speaker as a deontic source). For each specific semantic function, examples will be presented. If the example contains different modal expressions, then the modal expression(s) that illustrates the semantic function is underlined. In general, English has a few expressions for the same functions, but the dominant contexts of use differ for each expression. Distributional properties of each expression are not discussed in detail.

A general point to discuss in advance is the relation between tense and modality. The past modal forms, *could, might, would* and *should*, started out as past tense forms of *can*, *may*, *will* and *shall*. In non-epistemic contexts, these forms can still express past tense, but it is also possible that they do not refer to past time anymore, but rather express a more tentative (and therefore more polite) sense than their present modal counterpart or indicate irrealis in combination with the semantics of their present modal counterpart. The same development is taking place in the past tense forms of the newer modals, *had to*, *wanted to*,

etcetera. They are still used to express past time reference beside their modal meaning, but they are also used to express irrealis or tentativeness. In epistemic and irrealis contexts, modal markers are tenseless. Past modal forms in general carry the meanings of the present forms, but they may have developed uses that the present form lacks. For example, *should* is used epistemically, whereas *shall* is not, and *could* is used freely as an uncertainty marker whereas *can* has a very restricted use as a marker of certainty (see 6.2.5.1.3).

6.2.5.1 Potentiality

The first sense to be discussed is potentiality, 'not precluded from'. The English forms used to express this sense are *can* / *could* and *may* / *might*. The combination of potentiality with the parameter scope, results in three subcategories, which will be discussed in the following sections. The application of the parameter of source leads up to a further refinement of these modal subcategories.

6.2.5.1.1 Participant-oriented potentiality

When the scope of the forms *can*, *could*, *may* and *might* is the predicate, the resultant meaning is that the argument x is not precluded from PREDing. The reason why x is not precluded from PREDing, may be because of participant-internal characteristics, which raises the specific meaning of ability. *Can* and *could* are used to express ability. Core examples concern animate subjects with dynamic verbs, (65) and (66), but inanimate subjects (67), and combinations with cognition (68) and perception verbs (69) can also be interpreted as expressing ability.

(65) I can only type very slowly as I am quite a beginner. (C92)
(66) They can't speak a word of English, of course, not a word, but, you know, they can say what they like. (P85)
(67) The plane has a built in stereo tape recorder which can play for the whole four hours it will take to fly to Majorca. (C92)
(68) They asked me and I just couldn't refuse. (B493)
(69) I couldn't feel my hand. (B493)

A second source for x not being precluded from PREDing may lie in participant-external non-deontic circumstances. This creates the meaning of root-possibility: x is not precluded from PREDing (mainly) because of external circumstances. *Can* and *could*, and less frequently *may* and *might* as more formal variants, encode root possibility. Consider (70)-(73):

(70) You can always say it's just not your style. (P85)

(71) Can you pick your own trousers up? (C94)
(72) I could have gone straight there but I just couldn't get there. (C121)
(73) I am afraid this is the bank's final word. I tell you this so that you may make arrangements elsewhere if you are able to. (C141)

The third possible source of participant-oriented potentiality are participant-external, deontic circumstances. This leads to the specific meaning of permission: x is not precluded from doing something because of a deontic source. Permission is expressed by all four potentiality markers, although *can* and *could* are most frequent. See (74)-(77):

(74) Can I pinch a ciggie? – Course you can. Would you like a menthol or a plain? (P71)
(75) Could I go just briefly to describe the other two areas? (C118)
(76) If you want to recall the doctor, you may do so. (P71)
(77) May one taste? You said I might. (C156)

6.2.5.1.2 Event-oriented potentiality

When the scope of potentiality markers is the predication, the potential occurrence of an event is expressed: the event e is not precluded from occurring. The first possible source for event-oriented potentiality are general external circumstances. This category is distinct from the participant-oriented counterpart ($\pi 1$) in that it concerns a non-specific or generic participant or the participant is not mentioned at all, such as in bare passives. The potentiality does not apply to a specific argument; it applies to the entire event, independently of the involved arguments. It is mainly expressed by *can*, but *may* and *might* can also express this meaning, as in (78)-(82). No examples were found of *could* in this interpretation.

(78) I mean, you can travel from Belgium to France with much less palaver than you can travel from the North to the South of Ireland. (Pl84)
(79) National pressure groups cannot exist without full time staffs and a regular income. (P91)
(80) Well, I'll see what can be done and give you a ring. (P84)
(81) … and will examine ways in which this may be more effectively safe guarded. (C144)
(82) In 1814 the completion of the Mons-Conde canal increased the ease with which Mons Coals might be sent to Nord. (C156)

The second possible source for event-oriented potentiality are external circumstances that are deontic. Deontic modality with scope over the

predication is distinct from deontic modality with scope over the predicate in that the deontic source is not an individual, but a general law or rule of conduct, that is independent of the participants involved. *Can*, *could*, *may* and *might* express that e is not precluded from occurring because of external circumstances, more specifically a general deontic source. Deontic event-oriented modality mainly combines with non-specific or generic participants, or the participants are not mentioned at all, as in bare passives. Consider (83)-(85):

(83) In the library you can take a book out and keep it out for a whole year unless it is recalled. (P103)
(84) Men cannot enter.
(85) No vehicle may be left in the University grounds during vacation. (C132)

The general law can also apply to specific participants, which was discussed in section 4.2.3.2.

The third possible source of event-oriented potentiality is general knowledge (objective epistemic modality). Within the domain of potentiality *can* or *could* and *may* or *might* express epistemic possibility: the occurrence of e is not precluded because it is logically not excluded. It is objectively possible that e occurs or that e is the case. Examples of epistemic possibility are presented in (86)-(90):

(86) …and this can mean, it doesn't always mean, it can mean, that the students are restructuring their learning … (P108)
(87) You can get quite lost in that, I think, you see. (P84)
(88) Everything they said *could* be quite true and yet it *could* still remain a good book. (P101)
(89) They may or may not come and connect the television on Saturday. (C134)
(90) On the other hand he may say 'My dear fellow, of course we understand this problem and we would arrange it this way'. (P52)

The difference between epistemic event-oriented possibility and root-possibility was discussed in 4.2.2.

6.2.5.1.3 Proposition-oriented potentiality

When the scope of potentiality markers is the proposition, the general meaning arises that the speaker S does not preclude the truth of the propositional content. The source may lie in the attitude of the speaker towards the propositional content (deontic modality) or in the knowledge of the speaker

(subjective epistemic modality). Proposition-oriented deontic modality expresses the attitude of the (reported) speaker towards the proposition. The distinction between proposition-oriented deontic modality and participant-oriented deontic modality was discussed in 4.2.3.2. The principal difference is that with proposition-oriented deontic modality the participants are not in fact influenced by the deontic source (mostly the speaker). No directive speech act is performed; no permission is actually applied, no rule of conduct is active. It is only the attitude of the (reported) speaker towards the propositional content that is expressed. This use is restricted to the potentiality marker *can* in negative contexts. It is used to express that S does not appreciate that p is true. S precludes the truth of p because of his values and opinions. See (91):

(91) You can't have just given up painting completely, not if you had that kind of talent. (C101)

A specific use of *might* and *could* can be considered proposition-oriented deontic modality. In particular with deontic modality, expressions can have a stronger or weaker basic sense than the same expressions in other uses (cf. Van der Auwera & Plungian 1998). In (92), *might* is used to express proposition-oriented deontic modality: no actual permission is applied and the speaker only expresses his attitude towards the proposition:

(92) I don't mind getting pin money for typing someone's thesis but they might tell me so beforehand. (C162)

The interpretation of (92) is, however, different from what is to be expected in that the speaker does not so much permit that the proposition would be true, but actually desires that it should be true. This use of a potentiality marker is ironic: it is an indirect speech-act to express obligation in a mitigated way. A similar use is possible with *could*.

When the source of the potentiality lies in the knowledge of the speaker, it expresses that S does not preclude p's truth on the basis of his or her personal knowledge, or, in other words, the speaker is uncertain about the truth. The distinction between proposition-oriented epistemic modality and event-oriented epistemic modality was discussed in 4.2.3.3. The potentiality markers *may*, *might* and *could* encode the speaker's uncertainty or doubt about the truth of the proposition. See (93)-(97) for some examples:

(93) As chairman of our court he may perhaps sometimes feel that… (C138)
(94) I may have put it there # out of the way. (C137)
(95) I think I might have walked out too, from all accounts. (P64)

(96) I'm not very good on mechanical language, but one of the cylinders might be just missing a bit from the sound of it. (C150)

(97) Mambo, from Peter Ashworth's Treadwell stables, could be the one to give King's Probity most trouble. (C165)

When epistemic potentiality is used with negation, it indicates that the S precludes p from being true, he or she is certain that p is not true. This can be expressed by *can't* (98) or *couldn't* (99):

(98) I almost phoned them up and said come a bit later – and then I thought oh they've probably left by now – so I didn't and – twelve thirty, now that …. can't be them, and it was. (Coates 1995: 63)

(99) Well, it couldn't have been in April, Milord. (Pl62)

The preclusion of the truth of the proposition is based on inference, so that it might be considered as the negative counterpart of the certainty marker *must* (Coates 1983: 101), that will be discussed in 6.2.5.4.3.

A specific use of *may* is the concessive "speech-act" use, as in (100):

(100) On the ferries I was always being told # you may have a degree but you're no better waiter than I am. (C137)

This use falls outside the scope of this thesis as *may* does not function as a π1-, π2- or π3-operator, but rather as a marker of illocution, which belongs to the interpersonal level in FG (see 2.4). Table 6-2 presents the different semantic functions with the sense of potentiality.

Table 6-2. Subtypes of POTENTIALITY, expressed by *can*, *could*, *may* or *might*

	SOURCE			
	Participant -internal	**Participant-external**		**Epistemic**
SCOPE		**Non-deontic**	**Deontic**	
Participant-oriented (π1)	ability	root-possibility	permission	
Event-oriented (π2)		root-possibility	permission	possibility
Proposition-oriented (π3)			permission	uncertainty

6.2.5.2 Disposition

The second general sense is disposition, 'disposed to'. Forms that express this sense are *wanna*, *will*, *shall* and *would*. In the next sections, the different subcategories are discussed along the lines of the parameters of scope and source.

6.2.5.2.1 Participant-oriented disposition

When the scope of disposition expressions is the predicate, the meaning is that the argument x is disposed to PRED. The source for this disposition in general lies in participant-internal characteristics, which results in the meaning of volition. It is primarily expressed by *wanna*, and sometimes by *will* or *would*. Especially *won't* can be combined with inanimate beings, by metaphor. See (101)-(105) for some examples:

(101) I wanna go home.[12]
(102) Psst, wanna have a better puppy?[13]
(103) I mean I don't think the bibliography should suffer because we can't find a publisher who <u>will</u> do the whole thing. (C170)
(104) The trouble is # oh for god's sakes # the key <u>won't</u> go in the lock. (C173)
(105) I rang up and said oh I've finished now# <u>would</u> you come and get the machine? (C213)

Disposition can also have its source in a deontic authority, expressed by *will*. However, in these uses, its sense is closer to obligation than to desirability. First, it may be used in questions as an indirect expression of deontic modality. Consider (106):

(106) Will you listen to me and stop interrupting? (C172)

In its literal meaning (106) questions the volition of the addressee. However, by convention, it functions as an indirect expression of obligation. Like *might* in (92) the basic sense of the form is indirectly used to express a stronger sense.

Furthermore, *will* can be used deontically in declarative sentences with second person. In this use, it also does not express a mild sense of desirability, but a strong sense of obligation. See (107):

(107) You will listen to me, do what I say, and keep quiet![14]

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[12] www.imc.org/atom-syntax/mail-archive/msg15517.html

[13] www.cyberpet.com/cyberdog/articles/general/rotq5.htm

In my view, deontic *will* might have originated from its use as a future tense marker. To describe an event in which the addressee is involved as (definitely) taking place in the future, implies that the addressee has no choice, hence a strong deontic sense of obligation. At the present time, though, I have no concrete evidence to support this idea.

6.2.5.2.2 Event-oriented disposition

Event-oriented disposition expresses that the event e is disposed to occur. As argued in 4.3.1 this is nearly similar to the meaning of future tense, expressed by *will* (or *shall* for first person). Examples of this use were discussed in 6.2.3.3.

A special use intermediate between volition (participant-oriented) and future tense (event-oriented) is intention. When the first person singular is used in combination with *will*, it may at the same time express that x is disposed to PRED and that e is disposed to occur. See (108)-(110):

(108) I'll keep an eye open for you (C174)
(109) But I will bring you more today I promise (C174)
(110) I'll take the old car and then you've got the other one (C175)

According to Coates (1983: 173), with intention uses, the focus is not on the 'subject's state of mind', but on the predication. Accordingly, intention uses are in this thesis analyzed as future tense, although, strictly, they may be considered in between modality and future tense. There are no event-oriented modal uses of *will* and *would*, except for its future tense use.

6.2.5.2.3 Proposition-oriented disposition

Finally, *will* and *would* can express proposition-oriented disposition. This indicates prediction: S is disposed to conclude p. Future tense can be distinguished from prediction in that future tense indicates that an event will take place in the future, whereas prediction indicates that a proposition will turn out to be true in the future, whereas the event itself can take place in the present or future, or even in the past, in which case it is marked for past by the perfect, (114) and (115). *Would* indicates a more tentative prediction than *will*. Consider (111)-(115):

(111) Tell him Professor Cressage is involved – he will know Professor Cressage. (P57)
(112) They'll probably be bored with me anyway. (C179)

[14] www.ojp.usdoj.gov/ovc/assist/educator/files/chapter4.pdf

(113) He wouldn't know exactly where it came down, but he might well have a rough idea. (P68)
(114) And my mother was not [drunk]. Several people in the house will have said that to you. (C179)
(115) Let me see # when would he have been born. (C217)

When the event itself takes place in the future, utterances can be ambiguous between a future and a prediction interpretation. See (116) and (117). This ambiguity is comparable to event-oriented and proposition-oriented modality: does the speaker present the information as an objective or subjective statement? The correct interpretation can only be given in the context.

(116) He'll burn himself out if he goes on at this rate. (C227)
(117) It is a fairly safe bet that one of the guests will want to take the empty flask home; they make delightful lamp bases. (C178)

Table 6-3 summarizes the different semantic functions with the basic sense disposition.

Table 6-3. Subtypes of DISPOSITION, expressed by *will*, *would*, or *wanna*

	SOURCE			
	Participant-internal	**Participant-external**		**Epistemic**
SCOPE		**Non-deontic**	**Deontic**	
Participant-oriented (π1)	volition	-	"desirability"	
Event-oriented (π2)		-	-	(future)
Proposition-oriented (π3)			-	prediction

6.2.5.3 Weak necessity

The third basic sense that is discussed is weak necessity. This sense could be paraphrased as 'expected to'. English has different forms to express this sense: *should*, *ought to*, and *be supposed to* are the most important ones. One use of *shall* may also be covered under the sense of weak necessity.

6.2.5.3.1 Participant-oriented weak necessity

When the scope of weak necessity is the predicate, it expresses that x is expected to PRED. The source for this expectation can only lie in participant-external circumstances. So English has no expressions for 'weak internal need'. The external circumstances can be deontic or non-deontic, but especially within weak necessity, this is not always clear. Examples (118)-(121) can be interpreted as non-deontic circumstances; x is expected to PRED because of general external circumstances:

(118) A: What you been doing? B: Well, I shouldn't be here. I ought to be on holiday today. (C82)
(119) We ought to return the cassette some time fairly soon you see. (C71)
(120) I left a note in my pigeon hole which should be in the student's pigeon hole, so I'd be grateful if you could move it …(C65)
(121) She's supposed to be coming in. (B500)

In particular for expressions of weak necessity it is not always clear whether the external circumstances should be considered a deontic source or not. In the above examples (118) and (120) the participants seem to be forced by a sort of organizational plan or schedule, which is closely related to a general deontic source, such as a rule of conduct or a law (which is analyzed as event-oriented deontic modality, see 6.2.5.3.2). However, the specific participants in (118) and (120) cannot be replaced by a non-specific participant, so that the modal expressions are analyzed as participant-oriented.

Examples (122)-(125) below can be interpreted as expressing weak obligation: x is expected to PRED because of a deontic source. This category is intermediate between permission and obligation. Dependent on the status difference between the deontic source and the participant—thus not on the expression chosen—the strength of the desirability runs from a mere advice or invitation to a weak or even rather strong obligation. Compared to the obligation markers in the necessity domain, this type of obligation is a mitigated form. When it is used with speaker-reference the speaker expresses self-exhortation.

(122) You should walk round the ramparts of the old city too. (C58)
(123) A: If I put a Marvel [tin] in his wastepaper basket will he think it unaesthetic.
B: I shouldn't worry. (C222)
(124) So perhaps I ought to ask you some further questions. (P123)
(125) You really ought to be buying something a bit more modern and a bit more expensive. (C72)

6.2.5.3.2 Event-oriented weak necessity

When the scope of weak necessity is the predication, it comes to mean that the event e is expected to occur. The source of the necessity may first of all lie in general non-deontic circumstances. This may apply to utterances with non-specific subjects or passives, such as *ought to* in (126) and *should* in (127), although both examples leave open the possibility of a deontic interpretation. *Be supposed to* can also be interpreted in the sense that e is expected to occur because of general, unspecified circumstances. It means something like 'it is meant to'. Consider (126)-(129):

(126) The job here ought to be finished in a matter of days. (C73)
(127) This should be done before the pollen is ripe. (P123)
(128) My class is supposed to start in fifteen minutes. (CWO)
(129) Are you supposed to be going with him on holiday? (B500)

The source of event-oriented weak necessity may also be a general deontic source, such as a rule of conduct or a law. Examples are presented in (130)-(133):

(130) I just insisted very firmly on calling her Miss Tillman but one <u>should</u> really call her President. (C59)
(131) I don't think you <u>ought to</u> … I've a sort of feeling you <u>shouldn't</u> ask. (C81)
(132) But they can't decide yet whether the new man <u>should</u> be appointed by Freeman (…) or whether the appointment <u>should</u> be made by whoever takes his place. (C59)
(133) As Americans, we believe that one is supposed to vote and participate in the democratic process.[15]

With first person subjects it is not always clear whether the speaker is the deontic source and the utterance is an instance of self-exhortation or whether the speaker cites a general rule of conduct, which also applies to him/herself. This is illustrated in (134) and (135):

(134) I <u>ought to</u> be ashamed to say so, but I can't. (P123)
(135) I think I <u>ought to</u> say something about my step father. (C71)

The final possible source of event-oriented weak necessity is general knowledge. *Should, ought to* and *supposed to* express probability: e is expected to

[15] foucault.info/Foucault-L/archive/msg08657.shtml

occur or to be the case because of general knowledge. Objectively, the occurrence of the event is probable. Consider (136)-(138):

(136) Lad says if it is on the delivery note it should have been delivered. (C226)
(137) It ought to be I suppose in those two # those double grey filling cabinets you remember. (P74)
(138) But medical supplies are supposed to be getting through. (CWO)

6.2.5.3.3 Proposition-oriented weak necessity

Finally, when weak necessity modifies the proposition, it expresses that S expects p's truth or expects p to be true. The first possible ground for expecting the truth of the proposition is that the speaker infers the propositional content on the basis of his or her personal knowledge (subjective epistemic modality). This is mainly expressed by *should*, as in (139)-(142):

(139) Have sent off my diary a couple of days ago – you should get it soon. (C58)
(140) So he should be around sort of between half past two and half past three. (P60)
(141) The trip should take about sixteen days. (C64)
(142) That shouldn't be difficult. What do you want to know? (P62)

A second ground for expecting the truth of the proposition are the speaker's own values and opinions about how the world should be. This is proposition-oriented deontic modality. The weak obligation is not actually applied to the participants; it is only the personal opinion of the speaker that the proposition should be true (4.2.3.3). Consider (143)-(144):

(143) The unemployed, they should be made to do some some work and not scrounge off the state. (C59)
(144) I think people ought to be better informed about what marriage entails. (P123)

A use of *should* which falls outside the scope of this thesis is its quasi-subjunctive reading, as in (145)-(146):

(145) It is most necessary that we should have the funeral bill. (P68)
(146) It was inevitable that Peter Ustinov should join the exclusive four-star club by writing, producing, directing and starring one film. (P68)

This use belongs to the interpersonal level in FG (see 2.4) and is further excluded.

To resume, the specific semantic functions with the basic sense of weak necessity are presented in Table 6-4.

Table 6-4. Subtypes of WEAK NECESSITY, expressed by *should*, *ought to*, or *be supposed to*

	SOURCE			
	Participant -internal	**Participant-external**		**Epistemic**
SCOPE		**Non-deontic**	**Deontic**	
Participant-oriented (π1)	-	weak necessity	weak obligation	
Event-oriented (π2)		weak necessity	weak obligation	probability
Proposition-oriented (π3)			weak obligation	weak certainty

6.2.5.4 Necessity

The final basic modal sense is necessity, expressing 'forced to'. There are several expressions in English with this basic sense: *need* (*to*), *have to*, (*have*) *got to*, *must* and *shall*.

6.2.5.4.1 *Participant-oriented necessity*

When the scope of necessity is the predicate, it expresses that the argument x is forced to PRED. The source of this force may be internal characteristics of the argument, which expresses the meaning of internal need: x is forced by internal/intrinsic factors to PRED. It is expressed by *need to*, *have to* and *have got to*. See (147)-(150):

(147) Boris needs to sleep ten hours every night for him to function properly. (Van der Auwera & Plungian 1998: 80)
(148) I need to be left in peace today. (Van der Auwera & Plungian 1998: 83)
(149) I've got to eat something, otherwise I'll just die.[16]
(150) I'm going to make this short since it's way past midnight and I really have to sleep.[17]

[16] www.sing365.com/music/lyric.nsf/EAT-THE-MENU-lyricsBjork/CD4835DE854764834825689C00295BE9

More commonly than purely by internal characteristics, it is expressed that x is forced to PRED (mainly) by external circumstances. These circumstances may be non-deontic. This use is illustrated by (151)-(153):

(151) I've got to be at London airport at fourish. (P114)
(152) We had to make a special trip down to Epsom to collect the bloody thing. (P120)
(153) I may need to stay a couple of nights at Minna before I can find transport for the last 60 miles or so. (P127)

It is also possible that the external circumstances are deontic: x is forced by a deontic source to PRED. The necessity markers *have to*, *have got to*, and sometimes *must* or *need* express obligation.[18] Consider (154)-(157):

(154) Me mum says I have to wait. (Krug 2000: 92)
(155) Have we got to go on this hike? (C52)
(156) You must tell me how to get to it. (C34)
(157) "I'm very grateful to you." "You needn't be. I told you. I'm glad to do it." (C50)

English makes a distinction in deontic expressions that indicate that the speaker is the deontic source or that it is some other deontic source. In *You must come and see me tomorrow* (Palmer 2001: 75), it is the speaker who is the deontic source, whereas with *you have to come and see me tomorrow* there is an obligation that is independent on the speaker. The same distinction holds for the opposition between *should* and *ought to* on the one hand, where the speaker is the responsible deontic source in contrast to *be supposed to*, where the speaker is not responsible for the weak obligation.

Finally, the expression *shall* can be used as a deontic expression of obligation. See the example in (158):

(158) You shall go, I insist on it. (Sweetser 1990: 55)

The notion of necessity or obligation is one of the oldest uses of *shall* and it grammaticalized to a future meaning (see 6.3.3). *Shall* can also be used deontically in questions such as (159), in which case the addressee is the deontic

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[17] www.infektia.net

[18] Contrary to Bybee et al. (1994: 320) I use the term obligation only if the external circumstances are identified as a deontic source and not for all types of external circumstances.

source. However, in these constructions its sense is much weaker, and closer to weak obligation or desirability than to strong obligation.

(159) What shall I choose for Ann if she wins the raffle? (CWO)

These uses are the only remnants of the modal uses of *shall*. Its past counterpart *should* developed to a marker of weak necessity that is fairly frequent.

6.2.5.4.2 Event-oriented necessity

When the scope of necessity is the predication, it means that the event e is forced to occur. It may be forced to occur because of general external circumstances. It occurs in contexts with non-specific participants or passives. Consider (160)-(163):

(160) Clay pots must have some protection from severe weather. (C35)
(161) A really healthy effective opposition which you've got to have if you're going to shake the government. (C53)
(162) He's going on the 7.40 tomorrow morning and everything must be packed tonight. (C35)
(163) He fully understands that the thing has to be reprogrammed every year. (C55)

It is also possible that e is forced to occur because of a deontic source, such as a general rule or law. This is in general expressed by *have to*, *have got to* or *must*: e is forced to occur because of a general deontic source. Examples are presented in (164)-(168):

(164) If you commit murder, Charlotte, you must be punished. (C34)
(165) In the whole of southern Africa one has to drive on the left side of the road.[19]
(166) You haven't got to park on double yellow lines – it's against the law. (Perkins 1983: 62)
(167) You have to listen carefully and look for clues from three sources.[20]
(168) There is already a great imbalance between what a student has to pay if he's in lodgings and what he has to pay if he is in a hall of residence. (C55)

Shall can also be used in this sense, although it is infrequent. See (169):

[19] www.namibia-travel.net/namibia/a_z.htm

[20] www.pinkmonkey.com/electricdesk/studysmart/ssmart5.asp

(169) (The law decrees that) all citizens shall constantly carry violet parasols from 3/9/83 on. (Sweetser 1990: 55)

The third possible source of event-oriented necessity can be knowledge, although this use is restricted to negated necessity: e is not forced to occur. It seems communicatively irrelevant to encode that the event is necessarily actual, since that is the unmarked communicative situation (see 4.2.3.3). Negated epistemic necessity is semantically the opposite of epistemic possibility: 'not necessarily e' is similar to 'possibly not e'. This meaning can be expressed by *need not* or *don't have to*. See (170)-(171):

(170) Oh gosh, getting married is an awfully complicated business. [other speakers argue] Actually it <u>needn't</u> be – it can be very straight forward. (C50)
(171) He <u>doesn't have to</u> be at home: he could have gone straight to Caroline.

6.2.5.4.3 Proposition-oriented necessity

Finally, when the scope of necessity is the proposition, it means that the speaker S is forced to conclude the propositional content p. This is most commonly expressed by *must*, but also by *have to* or *have got to*. S may be forced to conclude p because of the available premises. In that case it expresses certainty about the truth of the proposition. Consider (172) -(175):

(172) She must have been such a pain in the neck to her Mum and vice versa. (C44)
(173) This has to be the biggest ant-hill ever seen. (Perkins 1983: 61)
(174) You've got to be joking. (P56)
(175) It <u>had</u> to be there – there wasn't anywhere else it could have been. (P65)

Note that event-oriented epistemic necessity is always negated (see (170)-(171) and 4.2.3.3), whereas proposition-oriented epistemic necessity on the other hand is always positive. The speaker states that from the available premises, he is forced to conclude p. If the speaker wants to state that he is certain that p is not true, *can't* is used as in (98) above.

It is also possible that S may be forced to conclude p because of his personal opinions and values. In that case the speaker expresses that he is certain that p should be true. In this interpretation the modal expresses proposition-oriented deontic modality (4.2.3.3). There is no obligation actually laid on the

participants: it is only the speaker's attitude towards the proposition that is expressed. S states that p must be true in his opinion. See (176) and (177):

(176) The government must act. It must make up its mind about priorities – offices or houses, housing estates or luxury buildings. (P106)
(177) This I think is something on which universities have got to begin now to take a stand on. (C53)

Table 6-5 presents an overview of the different functions that can be expressed with the basic sense of necessity.

Table 6-5. Subtypes of NECESSITY, expressed by *must*, *need to*, *have to*, *have got to*, or *shall*

	SOURCE			
	Participant -internal	**Participant-external**		**Epistemic**
SCOPE		**Non-deontic**	**Deontic**	
Participant-oriented (π1)	internal need	root necessity	obligation	
Event-oriented (π2)		root necessity	obligation	(no) necessity
Proposition-oriented (π3)			obligation	certainty

6.2.6 Irrealis

English has no simple morpheme that marks irrealis. There are, however, specific syntactic constructions that indicate irrealis. The construction to mark hypothesis consists of a subordinate conditional clause (*if*-clause) and a main clause. The conditional clause contains the condition-marker *if* and a verb with past tense-morphology: the past form does however not mark past tense, but indicates irrealis in this construction. The condition is often explicated, but can also be left implicit. The main clause contains a secondary or 'past' modal, which also does not indicate past tense, but irrealis. The most neutral one is *would*: in most cases it only marks irrealis, but sometimes it also has a sense of volition. The other secondary modals—*could*, *should*, *might*—can also be used. Apart from marking irrealis, they bear the semantics of their primary modal

counterparts: *can*, *shall*[21] or *may*, discussed in the previous section. Examples of the hypothetical construction are presented in (178)-(181):

(178) If I acted like that in front of him I # I mean that would be # that would be inexcusable. (C213)
(179) If he came to live with us then she would have to give up work. (C229)
(180) Anybody could produce at least two test teams of English writers who would be much better worth celebrating than Burns. (C215)
(181) That would apply to Swift too # wouldn't it? (C217)

Counterfactual constructions in English consists of a conditional clause with a main verb with 'past perfect'-morphology, and of a matrix clause that contains a secondary modal plus a main verb with perfect-morphology. Once again, *would* is the most neutral modal, in most cases only indicating irrealis, whereas the other secondary modals—*should*, *might*, *could*—also add the semantics of their primary modal counterpart. Consider (182)-(184):

(182) In fact, I <u>would have said</u> that it looks as though London would be worth going through. (P173)
(183) I <u>would have been</u> very surprised really if you <u>had got</u> a British Academy award. (C214)
(184) If I <u>could have thought</u> of that quotation I <u>would have used</u> it. (C214)

6.2.7 Summary

In Chapters 3 and 4 the possible semantic functions within different TMA domains and their scopes were established. Here it was examined which English forms cover which semantic functions. It appeared that there are several expressions that are used for different functions and that similar functions are often expressed by different expressions. Although it is sometimes difficult to distinguish between semantic functions and although certain utterances may allow different interpretations, this is not an argument for rejecting the distinct semantic functions all together. On the contrary, it explains how the semantics of a specific linguistic item—as understood by language users—can change or differentiate and why processes of grammaticalization are possible. Only by virtue of implicatures and ambiguity

[21] The overlap of the semantics of *shall* and *should* is not so neat as the overlap of the semantics of *can* and *could* or of *may* and *might*. Both *shall* and *should* have uses that the other form cannot have. There already are considerable differences between *sceal/scealt* and *sceold-* in Old English (Goossens 1985).

between related meanings can language users change the use and meaning of a linguistic item.

This section provides a summary of the discussion by giving a list of the English operators that currently belong to the TMA system. In Table 6-6 all the TMA operators with narrow scope (π1-operators) are presented: the operators of aspect and operators of participant-oriented modality. Table 6-7 presents the TMA operators with medial scope (π2-operators): operators of tense, event quantification, event-oriented modality and irrealis. Finally,

Table 6-8 presents the operators with wide scope (π3-operators), expressing proposition-oriented modality. These tables serve as the basis for examining the research questions in the next sections.

Table 6-6. English TMA expressions with narrow scope (π1-operators)

Domain	Semantic function	Expression(s)
ASPECT	Progressive	*be –ing*
	Continuative	*keep –ing*
	Prospective	*be gonna / be going to*
	Immediate prospective	*be about to*
	Perfect	*have –ed*, *have* + irregular form
	Resultative	*be –ed*, *be* + irregular form
PARTICIPANT-ORIENTED MODALITY	Ability	*can, could*
	Root possibility	*can, could, may, might*
	Permission	*can, could, may, might*
	Volition	*wanna, will, would*
	Weak root necessity	*should, ought to, be supposed to*
	Weak obligation	*should, ought to, be supposed to*
	Internal need	*need (to), have to, have got to*
	Root Necessity	*must, have to, have got to*
	Obligation	*must, have to, have got to, need to, shall*

Table 6-7. English TMA expressions with medial scope (π2-operators)

Domain	Semantic function	Expression(s)
TENSE	Past	*–ed,* irregular form
	Present	*–ø, –s*
	Future	*will, shall, would*
EVENT-ORIENTED MODALITY	Root possibility	*can, could, may, might*
	Permission	*can, could, may, might*
	Weak Necessity	*should, ought to, be supposed to*
	Weak Obligation	*should, ought to, be supposed to*
	Necessity	*nust, have to, have got to*
	Obligation	*must, have to, have got to, shall*
	Epistemic possibility	*could, may, might*
	(negated) epistemic necessity	*need not, don't have to*
	Probability	*should, be supposed to*
IRREALIS	Hypothetical	*–ed,* irregular form, past modal
	Counterfactual	*had –ed,* past modal + *–ed*
EVENT QUANTIFICATION	Habitual	*used to, would, will*
	Frequentative	*keep –ing*

Table 6-8. English TMA expressions with wide scope (π3-operators)

Domain	Semantic function	Expression(s)
PROPOSITION-ORIENTED MODALITY	Uncertainty / certainty that not	*could, may, might / can't, couldn't*
	Prediction	*will, would*
	Weak certainty	*should*
	Certainty	*must, have to, have got to*
	"Permission" / no permission	*might / can't*
	Weak obligation	*should*
	Obligation	*must, have to, have got to*

6.3 DIACHRONY

This section will examine whether English shows the hypothesized pattern of diachronic development: on the basis of inference, speakers will widen the semantic scope of operators to more abstract functions. The expected diachronic development of TMA expressions is formulated in H1:

H1: Diachronically, operators show an increase in scope, and develop in the direction from π1-operator to π2-operator to π3-operator.

A brief discussion will be presented of the diachronic development of each TMA expression in English. Inevitably, this discussion involves strong simplifications and the reader is referred to more elaborate works on the history of modal auxiliaries and English syntax in general (Hogg 1992-2001; Lightfoot 1979; Plank 1984; Traugott 1972; Visser 1963-1973).

Reference will be made to the different stages of English that may not be familiar to all readers. The earliest stage recognized as 'English' is Old English, from approximately AD 450 till 1150. The Middle English period extends from about 1150 till 1500, Early Modern or New English from about 1500 till 1750 and Late Modern English or Present Day English from circa 1750 onwards. In this section, asterisks are used to indicate that a historical form is reconstructed.

6.3.1 Tense inflection

The tense inflection and irregular forms are the oldest TMA operators in English. The strong, irregular past forms in English stem from regular Proto-Indo-European ablaut formation (root vowel alternation). The origin of the past tense inflection *–ed* is not known (Bammesberger 1992: 59; P. Ramat 1998: 405; Shields 1992: 43). It has a long history, since all Germanic languages, in contrast to other Indo-European languages, have a dental preterit marker.

The present tense inflections, -ø and *–s*, are the remnants of a more elaborate system of present tense person/number inflection in Proto-Indo-European. In Old English it was a general non-past marker, being the default marker for present and future time reference, whereas in Present Day English reference to future time by the simple present tense is very limited. The history of both tense markers cannot be tested to the hypothesis, as there is not enough information available.

6.3.2 Aspectual constructions

The resultative *be –ed* and perfect *have –ed* have their origin in the Old English lexical constructions *wesan/beon* ('be') + adjectival participle of intransitive verbs and *habban* ('have') + adjectival participle of transitive verbs. The adjectival

participle agreed with the subject (intransitive) or object (transitive) and the verbs still had their lexical meaning of existence ('be') and possession ('have'). This raised meanings like 'they were in the state of having come' or 'I had him in a state of being bound.' More and more often, the inflection on the participle was dropped which made it possible to analyze the construction as an auxiliary with a past participle. Furthermore, a word order change took place so that formerly 'has the fish caught' gradually became 'has caught the fish.' Finally, *have* takes over more and more from *be* as perfect auxiliary and in the 19th century it has become the default perfect auxiliary (Fischer 1992; Traugott 1972: 91-94). In sum, the developmental paths are presented in Figure 6-7:

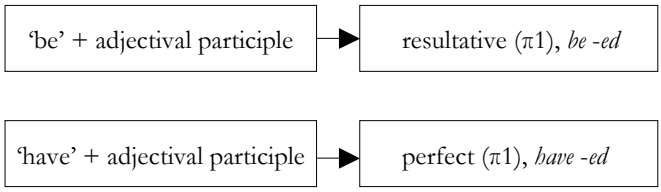

Figure 6-7. Developmental paths to resultative and perfect

The history of the resultative and perfect constructions is in accordance with the hypothesized order: lexical constructions have developed into aspect markers.

The origin of the progressive *be –ing* is not completely clear. According to Traugott (1992: 187-89) two separate constructions are underlying the later progressive. Old English had a construction *wesan/beon* + present participle –*ende*, as in *he wæs huntende* and a locative construction of a preposition *on / an* in combination with a nominal derived from a verb, ending in *-ung/-ing*, as in *he wæs on huntunge*. In several contexts, the constructions were equivalent in that they created the same meaning. Furthermore, the inflectional endings began to be confused in late Old English/Early Middle English and possible the two constructions became very similar in Middle English, i.e., **He wæs huntyng(e)* and *He wæs on/an/in/a huntyng(e)*. In the end they may have coalesced to what is the Present Day English progressive construction. Although this hypothesized development is plausible, the actual language data do not prove it (Fischer 1992). Nevertheless, what is important to this thesis is that the progressive construction *be –ing* has its immediate origin in a lexical construction. See Figure 6-8:

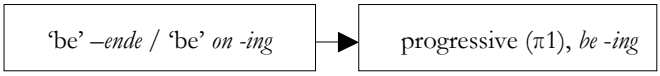

Figure 6-8. Developmental path to progressive

This path supports the hypothesis that narrow scope operators do not derive from wider scope operators, but rather from lexical constructions.

The prospective construction *be going to* started as the progressive construction of the directional lexical verb *go* and a purposive clause '*to V*', meaning *going in order to*. This led to the common inference that the subject intended to V at a later time. In the next stage, the directionality sense of *go* was demoted and the inference of intention of event realization at a later time was promoted. In the stage thereafter, the purposive sense was also demoted and *be going to* could refer to any pre-state of a coming event or state and no longer applied selection restrictions on the subject or the predicate with which it could combine (Hopper & Traugott 1993: 61, 81-83). In sum, the development is:

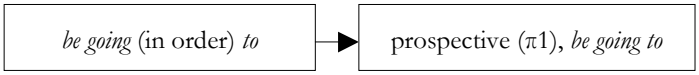

Figure 6-9. Developmental path to prospective

This path supports the hypothesis again: the aspect operator directly derives from a lexical construction.

There was hardly any information found about the history of the two other aspectual constructions, *keep –ing* and *be about to*. The latter construction occurs from Late Middle English (Fischer 1992), refers to planned action and has aspectual implications from the start (Rissanen 1999: 233). In all likelihood, both constructions derive from lexical constructions, not from other grammatical operators. This may be considered evidence in support of the hypothesis.

6.3.3 Central modals

For modal expressions, in most cases there is no indication in the literature whether a root- or deontic sense can be combined with specific and non-specific participants (the distinction between participant-oriented and event-oriented modality) and whether an epistemic meaning should be considered expressing an objective epistemic stance or the speaker's commitment. If there is not enough information available, the root- and deontic meanings will be

conceived of as π1- and π2-operators and the epistemic meanings as π2- and π3-operators.

The forms *will* and *would* go back to the Old English verb *willan* (present *wile*, past *wolde*), which was the lexical verb for 'want'. Late Old English *willan* developed into a grammatical marker of volition. It is occasionally used to express typical or general occurrences, close to a habitual or epistemic interpretation. Sometimes, *wile* is used to express senses of futurity, but this is restricted to contexts of generalizations, prophetic or inevitable future or relative future tense. These uses occur in impersonal or passive contexts. Gradually, during Middle English *will* (and *shall*) becomes a real future marker, and replaces the present tense in this use (Traugott 1989: 38-43; 1992: 195). The sense of desire is lost in the development of Early Modern English into Present Day English and the sense of volition has become much less frequent (Warner 1993: 181) The prediction use of *will* and *would*, in the sense of 'the speaker is disposed to conclude …', occurs only in the 19th century. (Traugott 1989: 43). In sum, the development is:

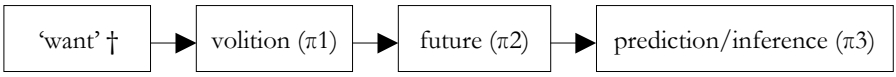

Figure 6-10. Developmental path of *will*

in which the symbol '†' indicates that this use has died out. The development in Figure 6-10 shows an increase in scope and is therefore in accordance with the predicted development.

The origin of *shall* and *should* lies in the Old English **sculan* (present *sceal*, past *sceolde*), a lexical verb meaning 'owe, be necessary', both in moral and financial respect (Traugott 1992: 195). In Old English, it developed into an auxiliary marking obligation and necessity of various kinds. At the end of Old English it acquired a sense of intention. According to Traugott (1992: 197) and Warner (1993: 170) *sceal* was used occasionally for future of arrangement or inevitable future, especially in impersonal constructions. During the Middle English stage, the forms *shal* and *wil* become the normal markers for future time reference. *Shal* is the predominant form, but *wil* is more typical in informal usage. *Will* as a future marker gradually replaces *shall* in Early Modern English with third and later second person subjects. In Present Day English *shall* is entirely restricted to use with first person and nowadays, *will* has even replaced *shall* in first person contexts in certain dialects or in informal speech (Warner 1993: 181). The development of *shall* supports the hypothesis. It is presented in Figure 6-11:

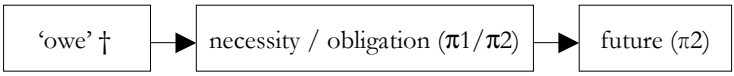

Figure 6-11. Developmental path of *shall*

Some specific developments took place in the use of the past form, *sceolde*. *Should* develops at first similar to *shall*, although it grammaticalizes a bit later as a future marker, in Early Modern English (Rissanen 1999: 235). In contrast to *shall*, *should* develops further into a marker of epistemic probability in Present Day English (Bybee et al. 1994: 200). There is no detailed information available about the scope of the epistemic modality. Consider Figure 6-12:

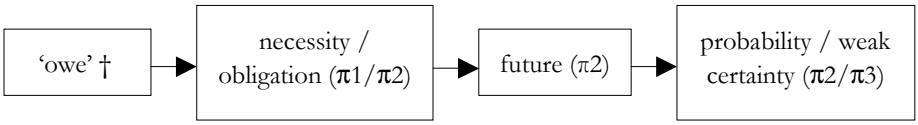

Figure 6-12. Developmental path of *should*

This development is consistent with the hypothesis. There is a developmental order from lexical to π1-operator, to π2-operator to π3-operator.

Should furthermore had a special use in Old English in indirect speech. It indicated hearsay (evidential use). This use existed into Modern English (Traugott 1989: 41-42; Warner 1993: 171, 78). It is not known how this use came into being. Therefore, it will not be used to test the hypothesis. It is however clear that this is an independent development from the one described in Figure 6-12.

The form *must* has its origin in the Old English verb **motan* (present *mōt*, past *mōste*). It was an auxiliarized expression marking permission and root-possibility. However, in late Old English, it developed a meaning of root-necessity and obligation, which quickly became the predominant use (13th century). The contradictory interpretations of *mōt* may have been caused by the basic sense of *mōt* 'to be allotted', which allows both interpretations. Another possibility is that the sense change took place in negative contexts, as 'not possible' means 'necessarily not' (Warner 1993: 160). The permission meaning gradually lost ground during the Middle English period and *may* took over the function of *mōt* in those contexts. During late Middle English the form *must* became the default form, which may have its origin in the subjunctive preterite of Old English, *moste,* and in the second person singular present form of Old English, *most*. The present form *mot* disappears in the 16th century.

In Middle English *moot* begins to be used in contexts of inevitable or expected future, with a sense of epistemic necessity. Strong epistemic interpretations are only possible if *moot* is accompanied by epistemic adverbs. From around the 17th century, *must* is established as a common marker of epistemic certainty (Traugott 1989: 42). Consider Figure 6-13:

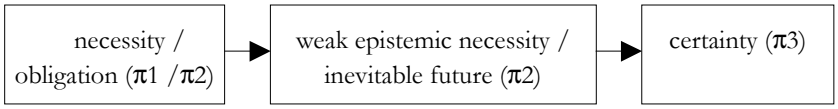

Figure 6-13. Developmental path of *must*

The development of *must* is clearly in accordance with the hypothesis: it follows the direction of the Scope Hierarchy.

May and *might* stem from the Old English verb *magan* (present *mæg*, past *meahte*), expressing physical ability or power. Toward the end of this stage it developed a general ability meaning. During Middle English *may* takes over from *mōt* in contexts of deontic uses of permission and root-possibility. The use of *may* for expressing physical power was lost in the 15th century. During the 17th century the sense of general ability is also lost (Rissanen 1999: 237; Warner 1993: 180-81).

The development of epistemic meaning is not very well documented. In Old English, *may* is occasionally used with marginal epistemic senses (Traugott 1992: 197). In Middle English this use becomes more firmly established but even in Early Modern English it is less commonly used epistemically than with a general root-possibility sense. (Rissanen 1999: 237). Epistemic uses of *may* seemed to have developed before the permission uses of *may*: however, the permission meaning did not derive from the epistemic meaning, but directly from the ability meaning (Bybee & Pagliuca 1985). It is not clear from which meaning the epistemic meaning has derived, the ability or root-possibility sense. It is furthermore not clear whether the first epistemic uses were event-oriented or proposition-oriented. I assume that they were event-oriented as Traugott states that pre-modals in Old English 'with possible epistemic meanings concern possibility in a world *independent of the speaker* and can be considered to be only weakly subjective.' (1989: 42, emphasis mine). As for today, *may* and especially *might* are losing their deontic and dynamic uses and become more and more restricted to epistemic use, especially in American English (Denison 1998: 165; Fischer 2003: 23-24). In sum, the two developmental paths are:

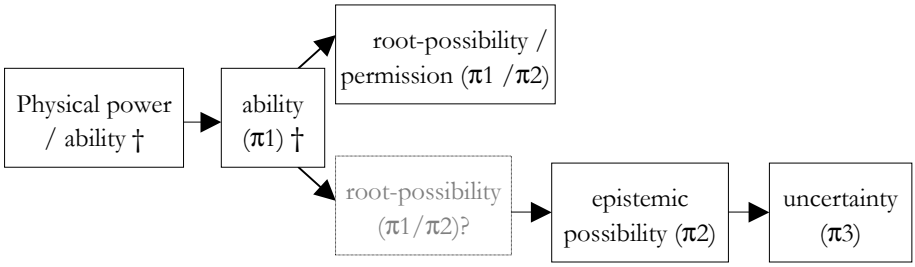

Figure 6-14. Developmental paths of *may* and *might*

Both paths agree with the predicted order: they develop from narrow scope operator to wide scope operator.

Can developed from an Old English lexical verb *cunnan* (present *cann*, past *cūde*) that expressed 'know'/ 'have the mental ability' (Warner 1993). In Middle English it has become an auxiliary expressing general ability and root-possibility and this is still the predominant use in Early Modern English. In the 16th and 17th century it ousts *may* in these functions. The meaning of permission is late, not before the 19th century (Rissanen 1999: 237; Warner 1993: 177). Epistemic meanings of *can* are very infrequent before the Modern English period and *can* and *could* are probably used epistemically from the 19th century, especially in negations (not possible). *Can* gradually loses the meaning of 'know' in the period from Early Modern English to Present Day English (Rissanen 1999: 237). As with *may*, epistemic uses of *can* seem to have developed before the permission uses of *can* and the permission meaning has directly derived from the ability meaning, not from the epistemic meaning. They are parallel, independent semantic changes (Bybee & Pagliuca 1985). The use of *can* as a marker of uncertainty is very restricted in Present Day English (see 6.2.5.1.3), which suggests that it developed later than objective epistemic possibility. See Figure 6-15:

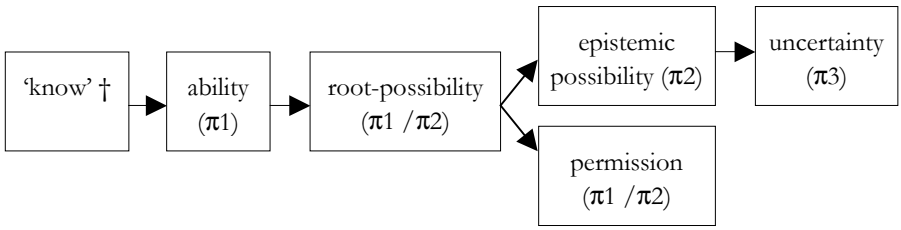

Figure 6-15. Developmental paths of *can* and *could*

Like the other modals, the semantic changes of *can* and *could* support the hypothesis.

6.3.4 Other modals

This section will discuss the diachronic development of all other modal markers. They have gained grammatical status much more recently. *Be supposed to* is the first expression to be discussed. The source of this construction is the French verb *supposer* meaning 'believe' or 'hypothesize' and from the 15th century also 'expect'. In the early stages in which the construction with *be* was used, it occurred in statements describing time-stable truths or generic situations, most frequently in the constructions *it's supposed to be X* or *it is supposed to have –ed*. Ziegeler (2003: 60) claims that these uses are evidentials of hearsay. In a later stage there has been a change from mainly expressing belief or hypothesis of an unnamed source to intention or expectation imposed on the subject (Ziegeler 2003).

If Ziegeler's reconstruction of the history of *be supposed to* is correct, then there has been an evidential use (π3) before a weak obligation or weak root-necessity use (π1). In fact, this development would semantically be plausible: If the general opinion is that something is the case, then it may be inferred that there are probably (external) circumstances that cause this something to be the case. What is however unclear from Ziegeler's description is whether the evidential reading should be considered a grammatical construction. It seems to have been the normal passive form of the active lexical verb, which is, according to my criteria (6.2.1) not a grammaticalized construction. In the weak obligation or necessity reading, however, the construction has no longer the resultant meaning of its components and this is probably the first real grammatical use. The development would then look like Figure 6-16, which is in line with the predicted order:

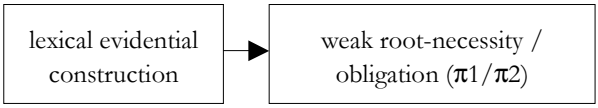

Figure 6-16. Assumed developmental path of *supposed to*

The construction *have to* stems from the lexical verb *habban* 'have'. In Old English this verb underwent the following generalization in meaning: 'to hold in hand' developed into 'to have in one's immediate personal possession (physically present)' which developed into 'to have or own as a possession (not physically present)' which in turn came to mean 'to have as an abstract

possession, such as time, an idea, an education, a debt' (Bybee & Pagliuca 1985: 72).

Additional steps in the grammaticalization process are described in Krug (2000: 55), based on Heine (1993: 41f): *I have a letter,* expressing possession became *I have a letter to mail*, expressing possession and purpose, which in turn developed into *I have a letter to write* in which the possessive meaning of *have to* has bleached out. This further developed into the meaning *I have to write a letter*, in which *have to* expresses obligation and this finally came to mean *I have to write*, in which the object can be omitted. The sense of obligation or necessity derives from the semantics of *have* itself. In particular the gradually more frequent construction *have to say/do* (something unpleasant) seemed to have given rise to the inference of obligation or necessity (Krug 2000: 97ff) In Middle English the first interpretations as obligation or necessity arise, although it remains rare until about 1850 when there is a dramatic frequency increase of *have to*. Epistemic senses only occurred from the 20th century, but these uses are still rare (Krug 2000: 74, 89). See Figure 6-17 for the complete developmental path:

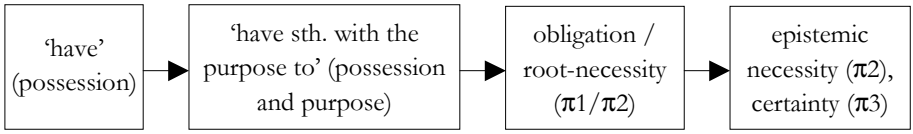

Figure 6-17. Developmental path of *have to*

Related to *have to* is *have got to*, originally the perfect construction of *get*, that combined only with a noun phrase. It entered the English language in the 16th century and expressed possession at first. The rise of the construction *have got to* could have been motivated by the fact that *have* was very often reduced to the contracted forms *'ve, 's* or *'d. Got* may have been inserted in cases where *have* was reduced to make the expression perceptually more salient. In the 19th century, the necessity and obligation reading emerged and came to be used very frequently in the 20th century. *Have got to* did not go through all the stages that *have to* did. It seems that *have got to* could become used with obligation and necessity meanings by analogy to the construction *have to* (Krug 2000: 61ff). In Present Day English *have got to*, often reduced to *got to*, can be used epistemically. This use must be very recent and is probably rather infrequent. The developmental path of *have got to* is presented in Figure 6-18.

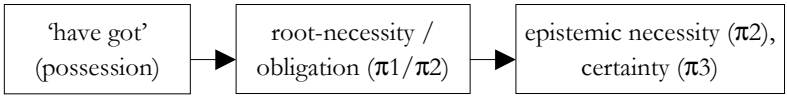

Figure 6-18. Developmental path of *have got to*

Both Figure 6-17 and Figure 6-18 correspond to the hypothesis.

In 6.2.1 it was argued that the contracted construction *wanna* is grammaticalized. The verb *want* (*wont*) is first attested in early Middle English, meaning 'lack'. This remains the core sense until the end of Early Modern English (Krug 2000: 127, 41). However, already in Middle English there are a few examples in which a sense of desire can be inferred in contexts of *want*, for a human being often desires what he lacks (p.129). This volitional sense gradually changed from an implicature to the basic sense of *want* (p.142). At the same time, it became possible to express the desired entity not only by a noun (*I want a car*) but also by an infinitive (*I want to go*) (p.144). Since Middle English there has been a general increase in infinitival complements. In the 19th and especially the 20th century the frequency of the verb *want* dramatically increases, both with a nominal and with a verbal complement (p.131). In Present Day English (American and British) examples are attested in which *wanna* is used with other senses than volition, even in epistemic uses. Consider (185) and (186), in which *wanna* indicates desirability, or (187) where it is used to express probability (from Krug 2000: 147ff):

(185) You've got tooth ache? You wanna see a dentist.
(186) You wanna turn right at the next corner.
(187) Customer: Do you have Coolers?
Assistant: Coolers? They wanna be on one of the topshelves somewhere. They only arrived this morning.

The development of *wanna* is summarized in Figure 6-19. It is in accordance with the hypothesis.

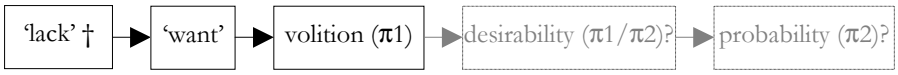

Figure 6-19. Developmental path of *wanna*

The final modal constructions to be discussed are *ought* (*to*) and *need* (*to*). *Ought to* comes from the Old English verb *agan* (present *āh*, past *āhte*), which meant 'have'. In Middle English the verb changed to *owe* and it developed a past

form *ought* (Traugott 1992; Warner 1993). In late Middle and Early Modern English it develops auxiliary properties and combines with an infinitive (with and without *to*). The past form has no longer past time reference and becomes the normal form (Rissanen 1999: 232). As well as *ought* (*to*), *need* (*to*) develops auxiliary properties in late Middle and Early Modern English. In the 17th century it often combines with an infinitive without *to* and the third person –*s* is often not realized (Rissanen 1999: 232). Neither construction can be used for testing the hypothesis, since there is not enough information available on their exact semantic development.

6.3.5 Habitual

As discussed in 6.3.3, the forms *will* and *would* go back to a lexical verb *willan* meaning 'want' that developed into an auxiliary expressing volition. Already in Old English, *will* and *would* are occasionally used to express characteristic or habitual behavior in the present and past, respectively. This use is closely related to the earlier meaning of these verbs, volition, as one can infer that 'what one wants to do, one is inclined or disposed to do' (Bybee et al. 1994: 157). The developmental path is presented in Figure 6-20. This path is independent of the development of *will* and *would* as irrealis and future marker.

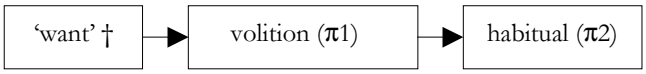

Figure 6-20. Developmental path of *will* and *would*

This development is in line with the expected order. There is increase in scope.

The habitual expression *used to* is semantically close to its origin, the lexical verb *use*, which had as one of its meanings 'to follow a usage or custom'. Around 1400 it became very frequent in a construction with a *to*-infinitive, which raised the meaning 'be accustomed to.' The construction was at first restricted to human subjects but from around 1600 it could also combine with inanimate subjects. It has furthermore extended to the combination with states (Bybee et al. 1994: 155-56). Still in early Present Day English, *use to V* could be used to express habituality in present and past. Probably in the 19th century the use as a present habitual marker died out (Denison 1998: 175). See Figure 6-21.

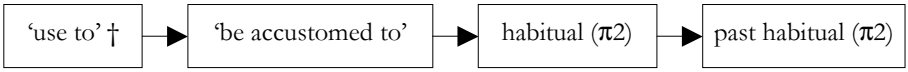

Figure 6-21. Developmental path of *used to*

This development is in accordance with the hypothesis regarding the direction of change. Its first grammatical use, however, is immediately with medial scope. This is possible probably because the lexical construction is so close in meaning to the grammatical operator and the change is more a change in formal status than in semantic status.

6.3.6 Irrealis

In Old English, conditional clauses have the same general structure as in Present Day English, a subordinate *if*(*gif*)-clause (protasis) and a main *then*(*þonne*)-clause (apodosis). In general, the verbs have indicative inflection. However, the past subjunctive may be used to express imaginary and unreal conditions, in both the main and the subordinate clause (Traugott 1992: 257). In Middle English, the subjunctive becomes more frequent in conditional clauses instead of the indicative and the past subjunctive becomes the rule when the condition is hypothetical. The subjunctive pluperfect is used to indicate a counterfactual event. In the main clause, the subjunctive is often substituted by a past modal auxiliary (Fischer 1992: 350). The same situation holds in Early Modern English (Rissanen 1999: 308). Because of the loss of inflection, the past subjunctive forms become identical to the past indicative forms, except for *be*. Subjunctive past and pluperfect are still fairly common in the apodosis to encode hypothetical and counterfactual but more frequently a periphrasis with the modal auxiliaries *should* or *would* in combination with the indicative past and pluperfect are used to indicate irrealis. The replacement of the past occurs earlier than of the pluperfect (Rissanen 1999: 228-30). In Present Day English the unreal conditional apodosis—the *then*-clause—requires a past modal verb. As a modal verb is followed by an infinitive, past tense can only be marked by a perfect construction (Denison 1998: 137, 300). In American English, modal verbs are also commonly used in the protasis, such as in (188):

(188) If he <u>would</u> have left him he wouldn't have gone through all that trouble.[22]

[22]http://www.storiestogrowby.com/stories/kids_say_elephpit.html, children's spelling and grammar is supposed to be revised.

The semantic changes of the components of the irrealis constructions, past tense forms, perfect forms and past modal forms, are not easy to describe, since they did not change their meaning in isolation, but within the construction of conditional clauses. The past and perfect forms replaced the subjunctive past and perfect that indicated irrealis, but to suggest that the meanings past tense or perfect aspect developed into the meanings of irrealis would be an oversimplification. The same holds for the irrealis senses of *would* and *should*, of which it cannot be claimed that they developed out of future senses: according to Bybee (1995) their irrealis sense can only arise because of the combination of past tense and modality, because this offers 'two areas of vagueness: (i) whether or not the predicate event was completed; and (ii) whether or not the modality remains in effect.' (p.506). A past modal may thus imply that certain conditions on carrying out the desired predicate were not met in the past and, as an inference, may not be met at all. This results in a hypothetical reading if the construction is used in a conditional context or in a polite reading if the conditions are implicit. As the genesis of the irrealis constructions is such a complex matter, in which several TMA expressions are involved, it will not be used as a test case for the hypothesis.

6.3.7 Discussion and conclusion

There is overwhelming support for the hypothesis. In as far as the diachronic developments of TMA expressions are known, they are in accordance with H1: Diachronically, operators show an increase in scope, and develop in the direction from π1-operator to π2-operator to π3-operator. The aspectual expressions all stem directly from lexical constructions, the habitual markers originate in a lexical source and from participant-oriented modality (volition), and modal and future markers have begun their grammatical career as participant-oriented modal markers, climbing up to event-oriented modality or future tense and finally to epistemic, proposition-oriented modality. The Scope Hierarchy has thus made the correct predictions for English. TMA expressions show an increase in scope. They become more abstract and complex in time.

With respect to modal constructions, the combination with impersonal constructions, passives or generic subjects appears to have been a crucial step in the development of wider scope. Warner (1993: 172-73) suggests that modal markers in these contexts impose no selection restrictions on its subject and can therefore act as sentence modifiers, i.e., with wider scope. In a similar vein, Bybee et al. (1994: 287) claim that the first epistemic inferences of *may* occurred in contexts where the participant is non-specific (general pronouns) or absent (passive and stative sentences) as 'in these cases, the agent is practically devoid of semantic content'. Finally, Ziegeler (2003: 42) claims that there is a clear relationship between generic statements and prediction: a generic statement

may form the evidential justification for a predictive statement. All these claims support the view presented in Chapter 4 that event-oriented root- and deontic modality, which combine with non-specific participants, are important links to epistemic interpretations in the conceptual space. Especially in impersonal or generic contexts, epistemic inferences can arise which make the 'metaphorical leap' from the sociophysical to the mental world much more comprehensible.

6.4 FREQUENCY

This section will investigate the frequency of TMA operators in American English, more specifically, the questions 2a: What is the token frequency of TMA expressions?, and 2b: What is the size of different operator classes?

6.4.1 Token-frequency

The expected token frequency of operators is formulated in H2a:

H2a: The token frequency of π1-operators is higher than or equal to the frequency of π2-operators and the frequency of π2-operators is higher than or equal to the frequency of π3-operators.

It is assumed that wider scope operators are less relevant to communication than narrower scope operators and therefore, there discourse frequency will be lower.

6.4.1.1 Data-selection

Question 2a is examined in spontaneous speech of adults addressed to other adults in normal day conversation. The data are collected from the *Santa Barbara Corpus of Spoken American English* (Dubois 2000). The speech of eight different speakers in everyday conversation was selected (see Table 6-9). I have used several criteria for the selection of speakers from the corpus. Only speakers were selected who took part in conversations that were characterized as face-to-face conversation, preferably recorded in private homes. Only Phil is recorded in an office, but it is an informal face-to-face conversation. Every speaker was a monolingual and a native speaker of Standard American-English. No more than five participants took part in a single conversation. I furthermore tried to make the sample as representative as possible for adult Standard American English. Therefore, an equal number of female and male speakers were selected with a more or less equal average age in both sex groups. As a result of these criteria, only those speakers are selected whose age was known.

Table 6-9. Selected data for the adult conversations sample (SBCSAE, Dubois 2000)

Speaker	Name	Sex	Age	File(s)	No. of utterances
0001	Lenore	f	30	Sbc0001 + Sbc0006	237
0003	Lynne	f	19	Sbc0001	585
0007	Pete	m	36	Sbc0002 + Sbc0003	370
0009	Marilyn	f	33	Sbc0003	475
0016	Darryl	m	33	Sbc0005	201
0028	Phil	m	30	Sbc0010	448
0044	Marci	f	50	Sbc0013	311
0046	Kevin	m	26	Sbc0013	268

Preferably only one speaker was selected from each conversation so that the topic of the conversations would not have too much influence, but this was not always possible because of the other criteria. The data of Lynn and Lenore and of Marci and Kevin were as a result taken from the same conversation. All speakers in the sample happen to be Caucasian, partly as a result of the distribution in the corpus, since the majority of monolingual speakers is Caucasian. The age of the few African American monolinguals was not available.

Table 6-9 presents the selected data from the corpus, specific information about the speakers and the number of utterances for each speaker. The complete sample consists of 2895 utterances but the number of utterances for each speaker is different.

6.4.1.2 Coding of utterances

The samples were coded for TMA expressions. Each TMA expression that was interpretable in the context was coded for its semantic function and scope, according to the classifications discussed in 6.2. Several utterances were coded for two or more TMA expressions. For example, aspectual periphrases also contain tense marking on the auxiliary *be*, *have* or *keep*, so that both aspect and tense are coded. The same holds for many (non-epistemic) modal expressions and the past habitual forms. Past modals that do not refer to past time but instead express politeness, irrealis or epistemic modality were not coded for tense. In non-verbal predicates (nominal, adjectival, adverbial or phrasal) the copula *be* was coded as a tense marker.

6.4.1.3 Results

The complete sample contains 2502 TMA expressions. As the samples of the different speakers are not equal in size, the number of TMA expressions for each speaker is also different (range: 167-630). In order to give each speaker an equal weight, the average percentages are not based on the overall absolute token frequency but rather on the relative frequencies within each speaker's sample. The data from each speaker contribute one-eighth to the average distribution.

It appears that in American English adult-adult conversations the proportion of π1-operators (16%) is much smaller than the proportion of π2-operators (83%). The proportion of π3-operators (1%) is smallest. This distribution is in contradiction to the prediction that π1-operators will be more frequently used within a specific language than π2-operators.

Which categories account for the percentages? In Table 6-10 the classes of operators are divided according to the broad TMA domains. From this table it appears that the frequency of π2-operators is for the greater part the result of the predominance of tense operators in English, whereas other π2-operators are far less common than π1-operators. As discussed in 6.2.3 tense is an obligatory category in English, and many non-tense markers in English obligatorily co-occur with a tense marker. For example, an aspectual expression cannot occur without tense, whereas a tense marker can occur without an aspect marker. The obligatory expression of tense, in contrast to most other categories (except perhaps for progressive and perfect aspect) is such a strong factor of influence on the frequency, that the possible influence of scope is obscured. A second analysis was therefore performed on categories that are more similar to each other. Modal markers were selected for this, since the occur with all scopes, are semantically related, have similar expression forms

Table 6-10. Distribution of TMA expressions in American English adult conversations (in %)

TMA domain	***N* = 2502**
Aspect (π1)	10.4
Participant-oriented modality (π1)	5.6
Tense (π2)	78.5
Event-oriented modality (π2)	1.6
Event quantification (π2)	0.4
Irrealis (π2)	2.4
Proposition-oriented modality (π3)	1.1

and are not obligatory. For this category the influence of scope on frequency should probably be more directly visible. It appears that for this restricted comparison, the hypothesis does hold: of all modal expressions (N = 228), participant-oriented modality accounts for 67%, event-oriented modality for 20% and proposition-oriented modality for 13%.

In sum, the hypothesis is too strong in that obligatory expression of a certain category has an enormous impact on the token frequency of such a category. However, when the comparison is restricted to expressions with related semantics, related expression form and related syntactic status (+/- obligatory), then the hypothesis does hold and the token frequency of operators with narrower scope is higher than of operators with wider scope.

6.4.2 Size of classes

The second question that relates to frequency of TMA markers is whether the size of operator classes correlates with scope. It is expected that:

H2b: The class of π1-operators has more members than or an equal number of members as the class of π2-operators and this class has more members than or an equal number of members as the class of π3-operators.

There are two reasons to expect that an increase in scope correlates with a decrease in the size of an operator class. During the process of grammaticalization (increase in scope), semantic paths tend to converge because their meanings generalize. This causes competition between different items with overlapping functions and probably leads to the use of expressions dying out. Secondly, it is expected that operators with narrower scope have more basic communicative functions. Because it is communicatively more important to make descriptive modifications (π1) than to make modifications in situating the event (π2) or modifications in the presentation of the content (π3) there should be more different devices for doing so.

Whether this correlation between size of operator class and scope indeed exists for English can easily be seen from Table 6-6, 6-7 and 6-8. There are two ways in which this question can be answered: it is possible either to compare the number of semantic functions within an operator class or to compare the number of different expressions within an operator class. Both counts were made. In the analysis of expression forms, contracted forms were not counted as separate expression forms, but past forms of the central modals were considered as separate forms, since the present and past forms have sometimes developed different uses. Different tense or irrealis forms (irregular, regular, *do-*

did, forms of *be*, etcetera) are considered as one expression form, as their use is not dependent on semantic grounds, but purely on morphosyntactic grounds. Expression forms that have different semantic functions within the same domain are counted as one expression form. For example, ability, root-possibility and permission *can* as narrow scope modality are counted as one expression form. Similar expression forms in different domains (*would* as habitual, future and hypothetical marker) are counted as different forms. Table 6-11 presents the number of expression forms and semantic functions for each operator class.

Table 6-11. Number of expression forms and semantic functions per operator class in English

	Operator		
	π1	**π2**	**π3**
Expression forms	20	23	10
Semantic functions	15	16	6

It appears that H2b is not completely supported by the data. The class of π2-operators is slightly larger than of π1-operators. The class of π3-operators is on the other hand smaller than the other two classes, which is in accordance with the hypothesis. This suggests that the communicative relevance and/or the cognitive complexity of the function of π2-operators—modifying the relation of the event to the real world—is about equal to the function of π1-operators—modifying the description of the event—whereas the function of π3-operators—modifying the presentation of the propositional content—is in fact communicatively less relevant and cognitively more complex. In Chapter 7 this idea will be further examined to see if it is crosslinguistically valid.

6.5 SYNCHRONIC CONFIGURATIONS

What are possible synchronic configurations for TMA expressions? H3a predicts that the presence of more marked operators implies the presence of less marked operators.

H3a: The presence of operators with wider scope depends on the presence of operators with narrower scope according to the hierarchy: π1-operator ⊂ π2-operator ⊂ π3-operator.

The Scope Hierarchy predicts that wider scope operators only occur in a language if there are also narrower scope operators. In other words, it is only possible to modify the presentation of the content by grammatical means (π3-operators) if it is also possible to modify the situating of the event by grammatical means (π2-operators), and this in turn is only possible if it is also possible to modify the description of the property or relation by grammatical means (π1-operators). As Tables 6-6 to 6-8 show, the configuration in English is clearly in accordance with this hypothesis, as there are operators of all three types.

The second hypothesis on the possible synchronic configurations of a TMA system concerns polysemous items. According to H3b polysemous expressions can only cover adjacent regions in semantic space.

H3b: A single expression can only cover adjacent regions in semantic space. As a result, a polysemous or portmanteau expression will only have semantic functions with similar or adjacent scopes.

The steps in the diachronic paths discussed in 6.3 are the presumed adjacent regions in semantic space. Along these paths it was indicated which meanings have become extinct, and in all cases, these extinct meanings were one or two at the beginning of the path. It was never the case that the meaning of an English TMA expression in the middle of the path became extinct with the earlier meanings being retained.

With respect to scope, the hypothesis implies that a particular item can only be used with similar or adjacent scopes, i.e., with scope over the predicate (π1) and over the predication (π2) or with scope over the predication and over the proposition (π3), but not with scope over the predicate and over the proposition, but not over the predication. All the TMA expressions in English that are used with different scope interpretations are presented in Table 6-12. Uses that are very infrequent are presented in between brackets.

The table shows that the predicted correlation between scope and polysemy holds. There is no grammatical TMA expression in English that may have scope over the predicate and the proposition, but not over the predication.

With respect to synchronic TMA systems, hypotheses H3a and H3b make correct predictions for English. Polysemous items cover adjacent meanings on a semantic path, which are assumed to be reflections of underlying universal conceptual relations. English has π1-operators for the least marked function of description, π2-operators for the more marked function of situating, and π3-operators for the most marked function of expressing the speaker's evaluation of the propositional content.

Table 6-12. Combinations of scopes of polysemous TMA expressions in English

	Operator		
Expression	**π1**	**π2**	**π3**
be supposed to	X	X	
can	X	X	(X)
could	X	X	X
have to	X	X	(X)
have got to	X	X	(X)
keep –ing	X	X	
may	(X)	X	X
might	(X)	X	X
must	(X)	(X)	X
need to	X	X	
ought to	X	X	X
shall	X	X	
should	X	X	X
will	X	X	X
would	X	X	X

6.6 EXPRESSION FORM

The fourth question—what is the expression form of TMA expressions?—will be examined in this section. The expected relation between form and scope is formulated in H4:

H4: Operators with wider scope show a higher or equal degree of formal grammaticalization than operators with narrower scope.

Roughly speaking, inflection is the most grammaticalized form, auxiliaries are less and periphrases the least grammaticalized (Bybee et al. 1994: 40). However, especially within the group of periphrases, finer distinctions are possible, such as the degree of reduction and of fusion of the component parts of the construction. In general, periphrases that contain bound elements are more grammaticalized than periphrases that only contain non-bound elements, and

periphrases of which the different components are phonologically reduced to one form are more grammaticalized than periphrases where this is not the case. As these finer grades of grammaticalization are hard to establish objectively, they will only be taken into account with great caution. Consequently, the question will only be examined in an exploratory way.

With respect to English, the TMA expressions with the highest degree of formal grammaticalization are the past and present tense inflection. The central modals have the second highest level of formal grammaticalization as they have become real auxiliaries. All other expressions are considered periphrases and are least grammaticalized. However, within this group, the aspectual constructions progressive, perfect and resultative are considered more grammaticalized than other constructions as they contain a suffix and their auxiliary is very often reduced. Furthermore, some of the periphrases are frequently contracted, such as *be going to* to *gonna*, *have got to* to *gotta*, *have to* to *hafta*, *used to* to *usta*, and *want to* to *wanna*. In the reduced forms, these constructions are closer to auxiliaries than to periphrases. However, as they are not in all contexts and not by all speakers reduced to such a high extent (see Krug 2000), they are still treated as (highly grammaticalized) periphrases and not as auxiliaries. Constructions with the lowest degree of formal grammaticalization are probably *be about to*, *keep –ing* and *be supposed to*.

Does scope indeed correlate with expression form? Table 6-13 shows the scope with which each expression is used, in relation to its degree of formal grammaticalization. For polysemous items, the least frequent use is put in between brackets. The table shows that in general, there is a tendency for wider scope operators to have a higher degree of grammaticalization, but there are quite some exceptions to this tendency. Most importantly, the items that are formally the most grammaticalized—tense inflection—function as operators with medial scope, whereas many auxiliaries or even periphrases function as operators with wide scope. Furthermore, two items that are formally the least grammaticalized can have medial scope (*be supposed to*, *keep –ing*), whereas some more grammaticalized items only have narrow scope.

A provisional conclusion may be that the hypothesis is too strong. When, however, only related meanings are compared, the picture becomes different. Within the related domains of tense, aspect and event quantification, the markers with the widest scope (tense inflection, habitual *used to*, *will* and *would*) have a higher or equal degree of formal grammaticalization than the markers with narrow scope (the aspectual periphrases). The only exception is *keep –ing*: it has the lowest degree of formal grammaticalization but can get a frequentative interpretation with scope over the predication ($\pi 2$). Within the domain of modality, it is in general the case that operators that can have wider scope are

Table 6-13. Relation between expression form and operator type in English

Degree of formal grammaticalization	Operator		
	π1	**π2**	**π3**
High (Inflection)			
Past		X	
Present		X	
Medium (Auxiliary)			
may	(X)	X	X
might	(X)	X	X
must	(X)	X	X
will	(X)	X	X
would	(X)	X	X
should	X	X	X
could	X	X	X
can	X	X	(X)
shall	(X)	(X)	
Medium-Low (Periphrasis)			
ought to	X	X	(X)
used to / usta		X	
have to / hafta	X	X	(X)
have got to / gotta	X	X	(X)
need to	X	X	
wanna	X		
be going to / gonna	X		
be –ing	X		
have –ed	X		
be –ed	X		
Low (Periphrasis)			
be supposed to	X	X	
keep –ing	X	X	
be about to	X		

more grammaticalized (auxiliaries). However, there are two counterexamples to this picture: the auxiliary *shall* is restricted to narrow scope (desirability /

obligation, π1) or to future tense (π2), whereas some of the less grammaticalized periphrastic constructions (*have to*, *ought to*, *have got to*) can have wide scope. However, *shall* is very infrequent and probably on its way to become extinct. With the exception of *shall*, all modal expressions with wide scope are formally grammaticalized to an equal or higher degree than modal expressions with medial or narrow scope. So, if only semantically related expressions are compared, there is indeed a strong correlation between scope and level of formal grammaticalization, although even then, there is one counterexample.

Although the domain restricted analysis supports the hypothesis, an alternative explanation might be possible, namely, the age of the grams. As was discussed in 5.4.4 there is probably a relation between age of grams and level of formal grammaticalization. Since it was also hypothesized that operators increase in scope, hypothesis 4 was stated in terms of scope and not in terms of age. However, the relation between scope and age of a gram is not straightforward. If grams change their scope, they will increase in scope, but it is not necessarily the case that grams keep changing their scope. Although the hypothesis abstracted away from this feature, for English, it may be worthwhile to investigate whether it is in fact age rather than scope, that is the prime predictor for formal grammaticalization. Scope may have only indirect influence, as it correlates to a certain extent with age.

What is the English situation? The oldest grams are the past and present tense. However, the meanings of these inflections have not drastically changed for centuries. The scope is the predication (π2) from the earliest records on English. The next oldest expressions are the central modals, which have grammaticalized in Old English, with the exception of *can/could* that grammaticalized in Middle English. Aspectual expressions are younger, especially the prospective and immediate prospective *be about to*. In Table 6-14 the relation between age and expression form is presented. The first period in which a particular construction clearly came to be used grammatically is taken as the age of the gram.

Table 6-14 shows that there is a very strong relation between age and expression form. For a few expressions, however, there is not enough information available on their diachronic development: from which period should they be considered grammatical? *Be about to* is said to occur from late Middle English, but it is unknown whether it was a grammatical construction at that time. The earliest lexical uses of the active verb *suppose* are from the 15th century, but it is unknown when the passive construction with this verb became grammatical. According to Ziegeler (2003), the passive construction occurs late, but she gives no exact dates. Furthermore, there is not enough information

Table 6-14. Relation between age and expression form in English

First Important Period of Grammaticalization	Degree of Formal Grammaticalization			
	High	**Medium**	**M-Low**	**Low**
Before Old English				
Past	X			
Present	X			
Old English				
must		X		
may / might		X		
will/ would		X		
shall / should		X		
Middle English				
could		X		
can		X		
Early Modern English				
have –ed			X	
be –ed			X	
be –ing			X	
ought to			X	
need to			X	
used to			X	
Present Day English				
be going to			X	
have to			X	
have got to			X	
wanna			X	
Unknown				
be supposed to				X
be about to				X
keep –ing				X

available on *keep –ing*. So for the formally least grammaticalized constructions the information on age is lacking. This makes it impossible to test the relation between age and expression form thoroughly. Interestingly, the fact that the history of these constructions is not studied in much detail and the fact that

they are not highly grammaticalized may have the same cause: they are not frequently used. Probably, the level of formal grammaticalization is not only dependent on age, but also on the frequency of use during its history (cf. Bybee & Hopper 2001b).

In conclusion, there is a correlation between scope and expression form, but it does not account for all the facts. A different analysis, whereby the age of the expressions is related to the expression form, reveals a very strong relation for the expressions of which the age is known with certainty. The apparent relation between scope and expression form may therefore be a tertiary relation resulting from a relationship between age and scope and between age and expression form. As was already discussed in 5.4.4 there is no straightforward relation between scope and age of a gram: younger grams are earlier at the grammaticalization paths but not every step on a path leads to widening of scope.

6.7 EXPRESSION ORDER

The final question to be examined in this chapter is: what is the expression order of TMA expressions? H5 predicts that:

H5: The expression order of TMA expressions iconically reflects the scope relations as follows: π3 π2 π1 Predicate π1 π2 π3

As it is impossible to consider all the possible combinations of TMA markers in English, the discussion will be restricted to a few core examples.

In aspectual periphrases, the auxiliaries that carry tense, *be* and *have*, are farther away from the predicate than the part that signals aspect, *-ing*, *-ed*, *going to/gonna* and *about to*, consider (189)- (191):

(189) He was about to read. > past π2 [immediate prospective π1[Pred]]
(190) He's gonna read. > present π2 [prospective π1 [Pred]]
(191) He will be reading. > future π2 [[Pred]-progressive π1]

Foley & Van Valin (1984: 213) present some examples that combine different modal expressions. One is presented in (192):

(192) John may have to leave.

In (192), *may* can only be interpreted as a marker of objective (π2) or subjective (π3) epistemic modality and *have to* as a marker of participant-oriented necessity (π1). It could be paraphrased as *it is possible that John is forced to leave*, or *I doubt that*

John is forced to leave. This meaning cannot be expressed by the opposite order: **John has to may leave*. In the dialect of the southern United States, central modals can be combined, such as in the following examples taken from Foley & Van Valin (1984: 231):

(193) John might could do it.
(194) Don't get so far ahead - I may not could make it.

The only possible meaning of (193) is: 'it is possible that John is able to do it.' The only possible meaning of (194) is 'it is possible that I will not be able to make it.' *Might* and *may* express epistemic modality (π2 or π3) and *could* expresses ability (π1). This reflects the predicted order π3 π1 Pred or π2 π1 Pred. When modal expressions are combined, then, the expressions closer to the predicate have narrower scope than the expressions farther away from the predicate.

A further example is provided by Hengeveld (fc.: ex.13), in which a tense marker is combined with a π3 modal and a lexical aspect marker:

(195) The tree must have begun to grow.

The order in (195) is the only possible order of 'certainty' *must* (π3), past tense *have* (π2) and ingressive aspect *begin* (lexical) and it iconically reflects the scope: π3 π2 Pred. All other combinations are impossible, such as *must begin to have grown*, *has begun to must grow*, *begins to have must grow*, etcetera.

Finally, when the habitual (π2) and progressive (π1) are combined, again the predicted order arises. See (196)-(197):

(196) Drug using prostitutes now complain about so-called low-life prostitutes who used to be bumming cigarettes who are now bumming condoms. (CWO)
(197) He used to be talking about whether he should run for president. (CWO)

The opposite order, *he is being used to talk about* … raises a completely different reading, in which *he* is literally used for the purpose of talking about ….

The only cases in which the expression order is not a clear reflection of scope relations seem to be when tense is expressed on modal markers or on the verb *keep* in *keep –ing*, because then, tense occurs in the middle of the expression. Consider (198):

(198) [about a dog] In his younger days, he could out bluff and move a herd of cattle very well.[23]

Both the ability and the past tense meaning are expressed by the one full form *could*, therefore, no order can be established between the two. In forms like *needed to*, *had to* or *kept -ing*, the tense marker belongs to the inner part of the periphrastic expression and there is no reflection of the Scope Hierarchy. In a strict interpretation of the hypothesis, they might be considered counterexamples. However, a real counterexample would be the opposite order, where π1-operators would be farther away from the predicate than π2-operators. In sum, the general picture is that H5 holds for English. The expression order of TMA operators indeed reflects the scope relations.

6.8 CONCLUSION

Scope is clearly reflected in the English TMA system. The Scope Hierarchy makes correct predictions for the diachrony of grams, for the synchronic system, and for expression order. First, the developmental paths of TMA expressions only show an increase in scope. Second, polysemous expressions currently reflect the semantic relatedness of the steps in their developmental path and have only adjacent scopes. Third, the synchronic set of TMA expressions adheres to the implicational hierarchy between the operators. Finally, the expression order of operators reflects scope relations: operators with scope over the predicate are expressed closest to the predicate, operators with medial scope are expressed farther away and operators with scope over the proposition are expressed farthest away.

With respect to frequency and expression form, the hypotheses need some adjustments. Firstly, wider scope correlates with lower token frequency, but this only holds for TMA operators with related semantics and grammatical status. Obligatoriness of expression has more influence on frequency than scope. Secondly, the class of π2-operators is slightly larger than of π1-operators, whereas the opposite pattern was predicted. This suggests that operators that modify the description of the set of possible events and operators that modify the situating of the event are equally relevant categories in English. In contrast, π3-operators seem to be less relevant, as was predicted, since there are far less expression forms and semantic functions with wide scope. Thirdly, with respect to the expression form of operators, there seems to be only an indirect relation between expression form and scope, in that scope correlates to a certain extent with age of grams and the age of a gram, probably in combination with

[23] ultimatehorsesites.com/temp/brokenbackranch/puppypage.html

frequency, seems to be a primary determining factor in the degree of formal grammaticalization.

This chapter has presented an overview of the English TMA system. The TMA system was continuously illuminated from the viewpoint of scope. Although some studies on English TMA have mentioned the role of scope, especially the work of Traugott (1982; 1989; 1995; 1996), it has not been taken into account systematically. Furthermore, the scope distinctions have only been broadly specified, for example a distinction between sentence or proposition scope versus scope over the verb or predicate. The definition of scope in FG is exceptional in that it makes a more fine-grained analysis of possible scopes than is done in other frameworks and specifies a clear link to cognitive and communicative factors. This approach has been shown to be fruitful in that it accounts for different characteristics of the TMA system. Needless to say that scope is not the only factor involved; it is only part of the TMA story.

One of the requirements of a functional theoretical model of language is that it can provide accurate descriptions of a specific language. For English, as shown in this chapter, the Scope Hierarchy has proved to be a rather reliable predictor. However, a further requirement is that a theoretical model is typologically adequate. It has to define the boundaries on possible language systems. Implicational hierarchies, such as the Scope Hierarchy, in general describe statistical tendencies, not necessarily absolute universals. The predictional power of the Scope Hierarchy therefore needs to be tested in a large sample of languages. The next chapter examines whether the assumed correlations between scope and properties of TMA systems have crosslinguistic validity.

Chapter 7

TMA in Languages of the World

7.1 INTRODUCTION

As argued in 1.5 a functional theoretical model of language should be able to describe any possible language and it should predict crosslinguistic patterns of morphosyntax, distribution and diachrony. The Scope Hierarchy, based on the layered structure of the clause in the FG model (2.3.1), should account for typological variation and diachronic development within the domain of TMA. In this chapter the crosslinguistic variation in TMA systems will be discussed with respect to the Scope Hierarchy. The hypotheses 1-5 (see 5.4) will be tested in this chapter in a crosslinguistic perspective. The first hypothesis on diachrony will be tested in 7.2. In the previous chapter, the diachronic paths of the specific TMA expressions in English were examined but here the focus lies on universal paths of development. For testing hypotheses 2-5, an inventory has been made of the TMA systems in a representative sample of 76 languages. In 7.3 the methodology used is outlined. Section 7.4 examines the frequency of operators in the language sample. Section 7.5 considers the possible and impossible synchronic configurations of TMA systems. Finally, the expression form (7.6) and expression order (7.7) of TMA expressions are examined.

7.2 DIACHRONY

7.2.1 Introduction

It has been argued in 5.4.1 that TMA expressions will probably show an increase in scope in diachronic development. In the process of grammaticalization, expressions develop from specific to general, from concrete to abstract and from referential to subjective meanings. Grammaticalization paths are in general unidirectional. In the theory of FG wider scope implies a more abstract and subjective meaning, so that diachronic development coincides with an increase in scope. Operators may acquire wider scope in time and not narrower scope. In sum, the research question and hypothesis of this section are:

Q1: *What is the diachronic development of TMA expressions?*

H1: Diachronically, operators show an increase in scope, and develop in the direction from π1-operator to π2-operator to π3-operator.

7.2.2 Method

The diachronic development hypothesis is tested in particular on the basis of the results of the seminal study of Bybee et al. (1994); this study focused on the evolution of grams . The present study examines the sources of TMA expressions in a sample of 76 languages, the GRAMCATS sample, which will also be the basis for testing hypothesis 2-5. The languages in the GRAMCATS sample are presented in Appendix A. The languages were chosen from the genetic classification of more than four thousand languages in Voegelin & Voegelin (1978). The languages were evenly selected from this list with the aim to avoid genetic bias. Of the 55 minimal language groups in the classification, i.e. isolates and groups up to 8 members, two were selected (Basque and Inuit). Of the pidgins and creoles, one language was picked (Tok Pisin). Of the 24 other phyla[1] languages were randomly selected. On the condition that grammars were available, a phylum with less than forty members contributed one language to the sample. Larger phyla contributed more than one language, the number depending on the size and stratification of the subgroups within the phylum, for details, see Bybee et al. (1994: 27-32, 303-10). The same GRAMCATS sample also served as the basis for the study of Bybee et al. (1991) on grams expressing future tense and related senses.

The studies based on the GRAMCATS sample are supplemented with the results of the pioneering studies of Bybee (1985) and Dahl (1985). These studies were independently undertaken and based on different language samples. Bybee's study on morphology is based on a sample of 50 languages, not related genetically or areally.[2] The data were collected using reference grammars. Dahl's study on tense and aspect is based on a 64-language sample, which, unfortunately, shows a strong bias to Indo-European languages (21 of the 64). The data were obtained by the use of a questionnaire, filled out by native informants. The results of Bybee (1985) and Dahl (1985) are remarkably similar: 'not only are the mechanisms by which grammaticization is implemented the same across languages, but also the actual semantic material that is molded by this process appears to be very similar across languages' (Bybee & Dahl 1989: 96). The studies conveyed that there is a restricted set of lexical sources for each gram. For the most frequent tense and aspect categories, there appear to be three major paths of development:

---

[1] A phylum is the maximal group of languages that does not belong to any larger linguistic group.

[2] There is hardly any overlap between the sample in Bybee (1985) and the GRAMCATS sample.

a. expressions with a copula or possession verb plus a past participle, or verbs meaning 'finish', 'come from' or 'throw away', develop into grams marking anterior or perfect, which in turn develop into perfectives or pasts;
b. expressions with a copula, locative or movement verb develop into progressives which in turn develop into imperfectives;
c. expressions with a verb meaning 'desire', 'movement towards a goal' or 'obligation' develop into grams expressing intention and future. (Bybee & Dahl 1989: 57)

In Bybee et al. (1994) these diachronic paths are investigated in more detail. By comparing the original lexical sources of grams and the synchronic uses, common grammaticalization paths were established. The semantic paths within the domain of modality were investigated in more detail by Van der Auwera & Plungian (1998). In this section the results from Bybee et al. and Van der Auwera & Plungian will be discussed and compared to the hypothesis. Do the semantic paths indeed show an increase in scope?

7.2.3 Results

The first major developmental path that was found by Bybee et al. (1994) involves the semantic notions of resultative, completive, perfect, perfective and past. This path is represented in Figure 7-1, in which the FG-classification according to scope is added.

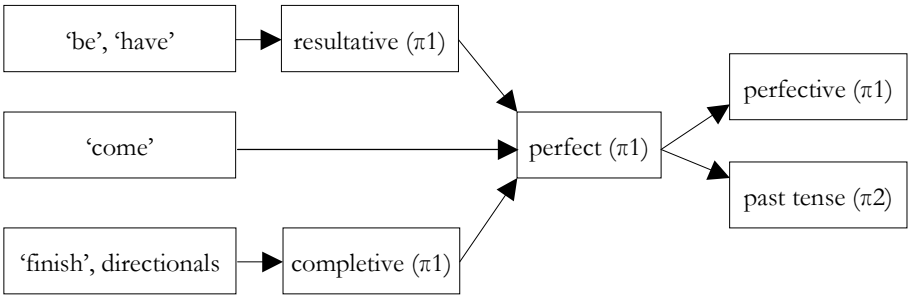

Figure 7-1. Developmental paths leading to perfective aspect and past tense (adapted from Bybee et al. 1994: 105)

In Figure 7-1 lexical elements meaning 'be', 'have', 'come', 'finish' and (other) directional items develop into specific aspectual expressions with narrow scope (π1), such as resultative, perfect or completive. A completive and resultative may further develop into perfect aspect, which in turn may develop into a more general perfective aspect (same scope) or a past tense marker (increase in scope). Bybee & Dahl (1989) state that the semantic change from a perfect to a

past tense implies that a perfect must restrict its point of reference to the moment of speech and 'the part of its meaning that specifies that the past event is especially relevant to the current moment must be lost' (1989: 74). All developmental steps towards perfective aspect or past tense are in accordance with the predicted direction. If the scope of a marker changes, there is increase in scope.

A further path for the meanings related to perfective aspect is a resultative or perfect that develops a sense of inference from results, and later on becomes a marker that really indicates evidentiality. See Figure 7-2:

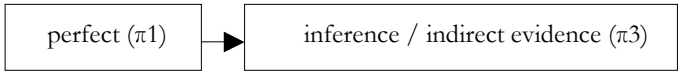

Figure 7-2. Developmental path leading to evidentiality
(Bybee & Dahl 1989: 73; Bybee et al. 1994: 95ff)

This development is attested in languages in the Balkan and neighboring areas of the Middle East (Turkish, Kurdish, Bulgarian), in the Tibeto-Burman language Newari, in Udmurt (west-central Russia), Inuit (Greenland) and Tucano (Colombia) (Bybee et al. 1994). An explanation for this development is given in Bybee & Dahl (1989):

> Perfect is used to describe past actions or events with present results. If the focus of meaning is on the idea that the present results are connected to and perhaps attest to past actions or events, then the notion of an action known by its results can be extended to actions known by other indirect means, such as by inference (from reasoning in addition to inference from results) and by reports form other parties. (p.73-74)

This development, that is, from an operator with scope over the predicate immediately into an operator with scope over the proposition, is not directly expected from the hypothesis, although it is also not in conflict with the hypothesis. The developmental direction is from narrow to wide scope. The inferential relation between the two meanings of the perfect can explain why this large extension in scope is a possible development.

A second major developmental path concerns the semantic notions of progressive, imperfective and present tense. The developmental path is from progressive into imperfective or present tense (see Figure 7-3). According to Bybee & Dahl (1989: 82-83) a progressive can become an imperfective if it loses some of its original specific semantics, such as specifying a limit on the period of time in which an activity is ongoing, and implying involvement of the subject. An imperfective signals that a situation is simply ongoing at reference time.

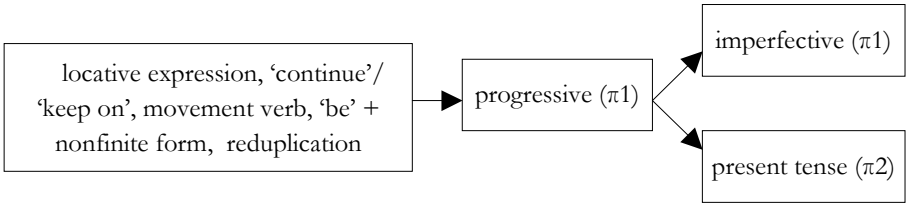

Figure 7-3. Developmental paths leading to imperfective aspect and present tense (Bybee et al. 1994: 127ff)

As a criterion for the development from a progressive into an imperfective or present tense marker, Bybee et al. (1994) take the expression of habitual meaning. Once a progressive starts to mark habituality, they consider it an imperfective or present tense marker. In my view this is not the correct approach: an habitual sense may arise as an implicature for progressive, imperfective or present tense markers in certain contexts, but then, they do not by itself mark habituality. Only when there is clear evidence that the implication of habituality is conventionalized and has become the basic meaning of the expression, it should be analyzed as such. Consequently, in the current analysis of the languages, there may be fewer habituals recognized than in Bybee et al.'s analysis.

The developmental path in Figure 7-3 is consistent with the predicted development: a lexical verb or construction can begin to express progressive aspect and the progressive gram may generalize towards an imperfective marker (same scope) or to a present tense marker (increase in scope). There is only increase in scope, no decrease.

A third common developmental path found by Bybee et al. (1994: 165-66) is on the boundary of quantification and aspect (See Figure 7-4). There is evidence that continuatives and frequentatives can both develop from lexical meanings, 'keep on' and 'often', respectively, but probably also from an earlier iterative marker. An iterative marker is often restricted to telic, punctual verbs, whereas a continuative sense may arise when an iterative marker is combined with atelic verbs. A further generalization is that the continuative marker develops into a progressive. When an iterative develops frequentative use, it extends from expressing repetition on one occasion to repetition on different occasions. A frequentative may further develop into a habitual. Finally, it is possible that a habitual marker derives directly from a lexical source (like in English, Figure 6-21). All the proposed developments are in accordance with the predicted order. Increase in scope is possible (iterative to frequentative), but no decrease in scope.

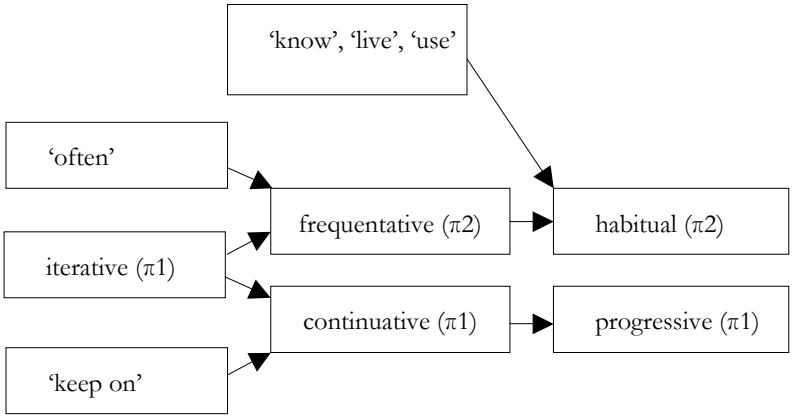

Figure 7-4. Developmental paths of aspect and quantification (Bybee et al. 1994: 151ff)

Bybee et al. (1994: 172) tentatively suggest that in particular reduplication may develop from a habitual sense into an imperfective. Note that this would conflict with the predicted diachronic order in H1. However, this apparent counterexample is the result of the definition of the imperfective marker used by Bybee et al. (1994) that also covers the sense of habituality, whereas, according to my analysis, an imperfective and habitual are distinct semantic functions. The only example in the GRAMCATS sample that would support the step from a habitual marker to an imperfective is from Nakanai (46):

(46) ***Nakanai*** (R. L. Johnston 1980: 131)

a. *Eia o-io sa-sapa*
3S at-there REDUP-sweep
'She is there sweeping.'

b. *Eia sa-sapa te la kavikoki.*
3S REDUP-sweep PREP NCL morning
'She sweeps in the mornings.'

However, (46a) and (46b) are different constructions: in (46a) the reduplicated verb is at the clause-final position and combines with a locative expression whereas in (46b) the reduplicated verb is at the second position and co-occurs with a temporal expression. This suggests that it is incorrect to consider the two uses of the reduplicated verb as one polysemous expression to mark imperfective and habituality. Furthermore, the possibility to combine a specific

form—here, reduplication—with a phrase indicating habituality—here 'in the mornings'—does not mean that this form expresses habituality by itself. Therefore, I assume that there is no evidence for a developmental path for reduplication from habitual to imperfective aspect.

Bybee et al. (1994) thus found evidence for four common diachronic paths within the domains of aspect, tense and quantification. These paths all support the hypothesis: there are changes from lexical elements to π1- or π2-operators and changes from π1-operator within the category to another, more general π1-operator or to a π2- or even π3-operator. There is no evidence for development in the opposite direction. The only development that is not directly expected from the hypothesis is the change from a perfect aspect marker (π1) by way of pragmatic inference to an evidential marker of inference (π3). This involves an increase in scope in the predicted direction, but the extension in scope skips an intermediate step.

With respect to the development from perfect and progressive into either perfective and imperfective aspect or into past and present tense, Bhat (1999: 182) suggests that this is determined by the language type. In his view there are aspect-prominent languages, in which aspectual distinctions are very important and frequent. In those languages, a perfect and progressive will develop into the general aspectual markers perfective and imperfective. There are also tense-prominent languages, in which tense oppositions are obligatorily marked, and in those languages the perfect and progressive will develop into a past and present tense marker.

Besides the above discussed semantic paths, Bybee et al. (1994) found developmental paths for modal and future markers. The first major development occurs within the field of possibility, again with the classification according to scope in FG added. See Figure 7-5:

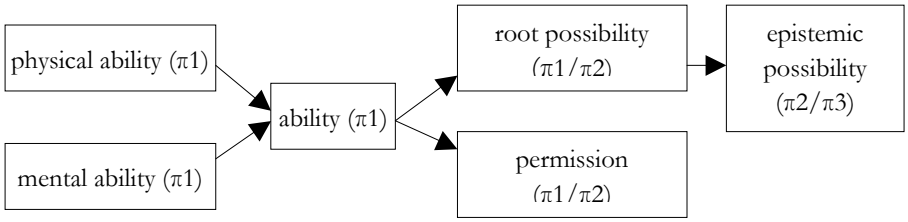

Figure 7-5. Developmental paths of items with a basic sense of potentiality (adapted from Bybee et al. 1994: 240, 66)

Although this point was not investigated by Bybee et al., I assume that a root-possibility marker and a permission marker will first express participant-

oriented meanings (π1) and only later event-oriented meanings (π2). An epistemic possibility marker probably expresses first objective epistemic modality (π2) and later on notions of uncertainty (subjective modality, π3). Both developments were supported for English (6.3.3), but there should of course be a more thorough investigation to find out whether this is a universal development. The steps in the developmental path in Figure 7-5 are in accordance with the predicted order: there is only increase in scope, from π1 to π1/π2 to π2/π3.

A second major development within the domain of modality and related senses is of modal markers and lexical sources into future grams, which turn into epistemic modal markers. Consider Figure 7-6:

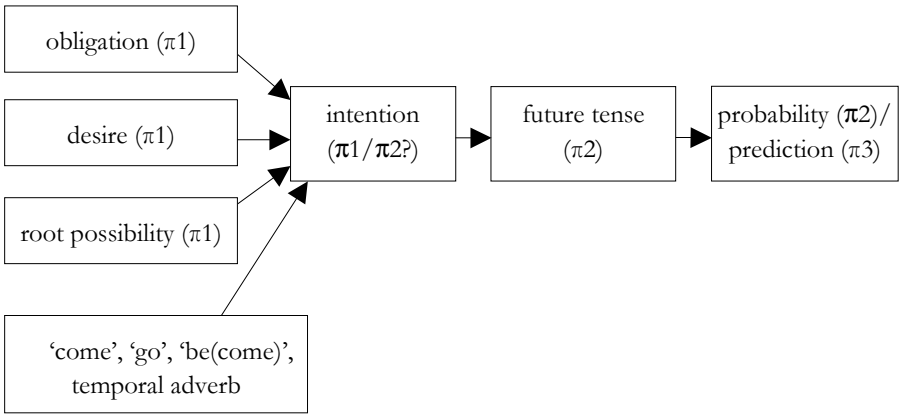

Figure 7-6. Developmental paths leading to future tense and prediction (adapted from Bybee et al. 1994: 240, 53ff)

Different types of participant-oriented modality markers—obligation, desire, ability—may go through a stage in which they can signal intention[3] and eventually, they may turn into future tense markers. Future tense markers may again turn into epistemic markers of probability or prediction. Why future tense clusters with modal meanings was already discussed in 4.3.1. According to Bybee et al., the 'central functions in future grams are intention and prediction. It follows from this that future is less a temporal category and more a category resembling agent-oriented and epistemic modality, with important temporal implications.' (1994: 280). In my view, however, this statement is too strong:

[3] Intention is not considered a specific semantic function in FG but rather represents a stage in which intention occurs as a strong implicature for modal markers in combination with first person subjects. It may lead to a future tense interpretation.

intention is an important precursor and prediction an important implication of future tense expressions, but there is also a rather objective future time reference, rather similar to objective epistemic meanings. In my view, the expression of intention may lead to the implicature that the event will take place in the future and this may lead to the conventionalization of future time reference. At that stage, the core function of a future gram is indicating future tense, not intention. The sense of prediction is also not the core function of a future gram but only a matter of mutual knowledge about future events. By implicature and conventionalization, this notion of prediction may develop into a separate meaning. The development from a participant-oriented modal marker or a movement verb towards a future gram involves the loss of an obligatory animate agent and an active predicate (Bybee & Dahl 1989: 90). A further development into an epistemic probability or prediction marker involves the loss of the restriction that the event occurs in the future. Bybee & Dahl (1989: 93) state that it is 'typically used when verification of present prediction lies in future.'

The developmental paths in Figure 7-6 support the hypothesis that grammatical expressions only show an increase in scope, and never a decrease in scope. They develop from concrete meanings to more abstract and subjective meanings.

The developmental paths for potentiality and for future and related senses are in line with the predictions that follow from FG. Participant-internal modality (π1) may develop into participant-external modality (root- and deontic meanings, π1 or π2), which may develop into epistemic modality (π2 or π3) or future tense (π2). Future may develop into epistemic modality (π2/π3). These developments can all be described as an increase in scope, in the direction from π1-operator to π2-operator to π3-operator.

7.2.4 Conclusion

Of the semantic functions included in this research (Table 4-6), many are part of one of the attested developmental paths, presented in Figures 7-1 to 7-6. If these paths are analyzed according to their scope, it appears that there are only changes from narrow to medial scope, or from medial to wide scope and not the other way around. The hypothesis that TMA expressions only change in the direction from π1- to π2- to π3-operator is clearly supported. The only sequence that is not really expected from the layered model, but also not in conflict with it, is a resultative or perfect (π1) directly developing into an inferential / evidential marker (π3). Apparently, descriptive categories (perfect aspect) may in certain contexts give rise to pragmatic inferences relating to the evaluation of the content (evidentiality), skipping the layer of situating. The assumption that semantic relatedness always involves meanings with adjacent or

similar scopes is thus not absolutely true. Finally, for a few TMA categories the possible origins have not yet been established. For example, more investigation is needed of possible universal developments of irrealis expressions.

7.3 METHODOLOGY FOR H2-H5

The Scope Hierarchy is clearly reflected in universal developmental paths of TMA operators. However, it was predicted in Chapter 5 that the Scope Hierarchy is also reflected in the frequency, synchronic configurations, expression form and expression order of TMA. The research questions and hypotheses relevant to this chapter are repeated here:

Q2b: *What is the size of operator classes?*
H2b: The class of π1-operators has more members than or an equal number of members as the class of π2-operators and this class has more members than or an equal number of members as the class of π3-operators.

Q2c: *What is the crosslinguistic incidence of operator types?*
H2c: The crosslinguistic incidence of π1-operators is larger than or equal to the incidence of π2-operators, which in turn is larger than or equal to the incidence of π3-operators.

Q3: *What are possible synchronic configurations for TMA expressions?*
H3a: The presence of operators with wider scope depends on the presence of operators with narrower scope according to the hierarchy: π1-operator ⊂ π2-operator ⊂ π3-operator.
H3b: A single expression can only cover adjacent regions in semantic space. As a result, a polysemous or portmanteau expression will only have semantic functions with similar or adjacent scopes.

Q4: *What is the expression form of TMA expressions?*
H4: Operators with wider scope show a higher or equal degree of formal grammaticalization than operators with narrower scope.

Q5: *What is the expression order of TMA expressions?*
H5: The expression order of TMA expressions iconically reflects the scope relations as follows: π3 π2 π1 Predicate π1 π2 π3

In order to test H2-H5, many different TMA systems have to be compared. As a starting point, I have used the study on TMA by Bybee et al. (1994) that

presents an extensive inventory of TMA expressions in the languages of the GRAMCATS sample discussed in 7.2.2 (see Appendix A). Furthermore, more specific data on future tense and related meanings in this sample are presented in Bybee et al. (1991). The resulting inventory of TMA expressions is completely checked, adjusted if necessary, and reanalyzed according to the FG-based classification presented in Chapters 3 and 4. This means that for each TMA expression the scope is determined and its semantic function is reconsidered.

For this purpose reference grammars were used. A shortcoming of the use of secondary sources in linguistic research is that the information presented in the grammar is sometimes not specific enough for the research question and that one has to rely on the information presented by the author. Nevertheless, it is a quick way to compare a large number of languages without the time-consuming task of having to consult native speakers. If the grammars are consulted with care, the objections mentioned above can be overcome to a large extent.

In order to make this study as comparable as possible to the studies of Bybee et al. I have consulted the same reference grammars for each language in the sample that were used as the main sources of information in Bybee et al. (1994: 325-55), if they were accessible. For a few languages, however, the reference grammars were not the same. For Basque, I used Hualde & Urbina (2003), in addition to the reference grammar by Saltarelli et al. (1988) that was used by Bybee et al. For Cocama, I used Faust Wille (1972) as well as (Faust 1971) that was used in Bybee et al. An additional grammar was also used for the language !Kung or !Xũ, namely Köhler (1981), as it contained more specific information on the TMA system than Snyman (1970), used in Bybee et al. For nine languages the reference grammar used in Bybee et al. was not available in the Netherlands. For five of these languages I used another reference grammar instead: this was the case for Tucano (Ramirez 1997)[4], Gugu-Yalanji (Patz 2002), Dakota (Riggs 1893), Udmurt (Winkler 2001), and Latin (Pinkster 1990). For four languages—Jivaro, Tem, Abipon and Haka—I had no access to any reference grammar of the language and I had to rely on the analysis presented in Bybee et al.. For Jivaro, Tem and Abipon, Bybee et al.'s analysis could easily be adapted to the FG-analysis. However, Bybee et al.'s analysis of the Tibeto-Burman language Haka raised too many questions and could not be reanalyzed according to my own criteria. Therefore, it was replaced by another language of this family, Meithei (Chelliah 1997).

[4] The reference grammar used in Bybee et al. (1994), Sorensen (1969), apparently mentions a polysemous marker of resultative and evidentiality, whereas the alternative reference grammar (Ramirez 1997) does not.

7.3.1 Selection of forms

For each language an inventory is drawn up of all the grammatical TMA expressions. Both formal and semantic criteria are used for the selection of grammatical expressions. I follow the formal criteria of Bybee et al. (1994: 37-39) and have added a fifth criterion:

i) The gram must belong to a closed class,
ii) The gram must have a fixed position in relation to the verb,
iii) The gram must be lexically general, i.e. combine with all verbs or with all members of a large semantic class of verbs,
iv) The gram must have a predictable meaning in most contexts.
v) The use of the gram is not restricted to subordinate clauses.

Because of the last criterion, purposive and subjunctive markers included in Bybee et al. are excluded here.

The analysis is furthermore restricted in a semantic way in that the gram has to have scope over the predicate, the predication or the proposition. Such operators belong to the first, second or third layer in FG at the representational level. Recall that the conceptions of scope in FG (2.4) and of relevance in Bybee (1985) do not coincide. Bybee (1985: 166) defines mood as 'a marker on the verb that signals how the speaker chooses to put the proposition into the discourse context.' Both markers of sentence type or illocution (indicative, imperative, hortative) and markers of the degree of commitment of the speaker to the truth of the proposition (like dubitative) come under her class of mood. 'What all these markers of the mood category have in common is that they signal what the speaker is doing with the proposition, and they have the **whole proposition** in their scope' (p.166). In FG, however, operators that indicate sentence type or illocution do not belong to the representational level but rather to the interpersonal level, since they are concerned with the level of performing a speech act, not with the constitution of the content of a clause. This leads to a further difference between the Bybee-studies and the current study.

Although the criteria for selecting forms to code do not differ fundamentally, a considerable number of forms are included in my study that are not documented in the inventories in Bybee et al. (1991; 1994) and vice versa. This may be explained partly by the fact that Bybee et al. (1994: 47) have concentrated on the meaning labels that occur more than twenty times in the sample whereas I do not make this restriction. However, it does not explain all the differences. For Slave for example there are many modal markers that are not documented in Bybee et al. and, to give another example, for Margi, Bybee et al. do not mention *cítú* as an ability and root-possibility marker, reduplication

as a marker of iterative (π1) or frequentative (π2) and *bə́rá* as a marker of repetition. Compared to the overview in Bybee et al., I often added expressions of modality, sometimes of hypothetical or counterfactual, evidential markers and zero-expressions.[5]

7.3.2 General coding

The selected grams are coded for form and function, again in a similar way as in the Bybee-studies. The first coding involved the expression form. The prime mode of expression, the prime allomorph, was coded for its expression form. A major distinction was made between bound and non-bound expression, according to the following criteria:

> If a morpheme is inseparable from the stem, and/or occurs in a fixed order contiguous to the stem, or with only closed class items intervening between it and the stem, it is considered bound. If in the language descriptions this information is not given explicitly, then the author's decision to write the morphemes as separate or bound is taken as an adequate indication of their status. (Bybee 1985: 27)

Bound expression is coded as inflection (prefix, suffix, infix), reduplication, stem-, stress- or tone-change or zero expression. Derivational expression is excluded, since in FG it does not have operator status. The criteria to distinguish derivational from inflectional markers are again based on Bybee (1985: 27):

i) an inflectional category is obligatorily marked every time a stem category to which it applies appears in a finite clause. It must be combinable with every stem;
ii) the meaning of the category must be predictable with every verb (be the same with all classes of verbs);
iii) in inflectional expression, the lack of a marker is meaningful.

In spite of the clear formulation of criteria, the distinction between derivation and inflection is not always clear in practice. If there is any doubt and if the gram expresses any of the notions summed up in Table 4-6, it is included in this study.

Non-bound grams are coded as an auxiliary or particle, according to the following criterion:

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[5] The term zero expression is used when the absence of a marker is meaningful and used in opposition with one or more non-zero expressions. This occurs when concepts are obligatorily expressed, such as e.g. past tense, and the non-use of this marker implies that this meaning is absent, e.g. non-past tense.

> Inflected auxiliaries are easy enough to identify, since their inflection is indicative of verb-like behavior. Uninflected non-bound grams were coded as auxiliaries if they exhibited any verb-like behavior at all or if they appeared to bear an etymological relationship to a verb. Other uninflected forms were coded as particles. (Bybee et al. 1994: 42)

Finally, if an expression form consists of more than one element it is coded as a periphrastic expression. If it consists of only bound forms, for example a prefix and a suffix, it is considered a bound expression. If it consists of only non-bound forms, for example an auxiliary and a particle, or two auxiliaries, it is considered an unbound expression and if it consists of a bound and a non-bound form, for example an auxiliary and a non-finite form of the verb or a stem change, it is considered a combined expression.

In addition to coding the expression form, the gram is coded for its semantic function. The work of Bybee (1985), Dahl (1985), and Bybee et al. (1991; 1994) established the most prevailing TMA notions expressed in languages of the world. I have described the different gram types according to scope and used this list for assigning meaning labels to language-specific grams. This approach is based on the idea that language-specific grams cover parts of a more universal semantic space. And although the exact part of the semantic space covered may differ in detail from language to language, it is possible to define gram types that are frequently expressed with crosslinguistically comparable functions (Bybee et al. 1994: 48). Only grams are included that come under the general semantic domains of aspect, tense, quantification, irrealis, modality or evidentiality. This criterion excludes notions as negation and negative polarity. The list of meaning labels is presented in Table 7-1.

The semantic classification of morphemes is based on the definitions and descriptions presented by the author of the grammar, and on the examples and translations that are presented throughout the grammars. My classification is not necessarily the same as the author's, since the labels used by different authors do not always cover the same semantic domain.

In general, the classification in Table 7-1 covers most semantic notions found in the grammars. In a few cases, the description in a grammar of a specific gram is too vague to label the gram with a specific semantic function; in those cases the gram is assigned a more general label such as aspect, property quantification or participant-oriented entailment. A few notions had to be added, for unusual semantic functions, such as **in**ability and **im**possibility and tense markers that indicate distinctions in temporal distance without specifying whether the location in time is in the past or in the future.

Table 7-1. **TMA domains and semantic functions included in the study**

TMA Domain + *specific semantic functions*	**Scope over**
Aspect *prospective, ingressive (inchoative), continuative, progressive, egressive / completive, imperfective, perfective, perfect*	
Property quantification *iterative, intensity, semelfactive*	Predicate (π1)
Participant-oriented modality potentiality: *ability, root-possibility, permission* disposition: *volition, desirability* weak necessity: *weak root-necessity, weak obligation* necessity: *internal need, root-necessity, obligation*	
Tense *past, present, future, non-past, non-future,* (± *specification of temporal distance*)	
Event quantification *habitual, frequentative, repetitive, distributive*	
Event-oriented modality potentiality: *root-possibility, permission, epistemic possibility* disposition: *desirability, (future)* weak necessity: *weak root-necessity, weak obligation, probability* necessity: *root-necessity, obligation*, *epistemic necessity (negative)*	Predication (π2)
Irrealis *hypothetical, counterfactual*	
Proposition-oriented modality potentiality: *uncertainty, permission* disposition: *prediction, desirability* weak necessity: *weak certainty, weak obligation* necessity: *certainty, obligation*	Proposition (π3)
Evidentiality *sensory evidence, inference, hearsay, etc.*	

In particular in the domain of quantification, definitions are very inconsistently used across grammars. However, the translations and glosses are often similar and these were the main basis for classification in this domain. A translation as 'V again' is analyzed as a repetitive; 'V again and again' or 'V over and over' is analyzed as an iterative if the examples describe repetition on one occasion and/or as frequentative if the examples describe repetition on different occasions. In cases of doubt, it was analyzed as both. The glosses 'Vs continuously' or 'Vs intensely' are encoded as an iterative; 'continues/keeps –

ing' as a continuative; 'Vs habitually'/ 'uses to V'/ 'Vs by custom/customarily' as a habitual. If the gram indicates that the action is performed by different participants and/or at different places, it is coded as a distributive. In cases of doubt, the expression may be coded for more than one use or as a general marker of quantification.

Even though the bulk of grams could be classified without much trouble, a serious problem arose with the coding of modality in terms of FG. Remember that FG distinguishes modality types according to scope: root-modality, which indicates that the source of the modality lies in general external circumstances, can have scope over the predicate or over the predication (see 4.2.3.1); the same holds for deontic modality, which indicates that the source of the modality lies in a deontic authority (see 4.2.3.2). When the scope is the predicate (π1), the modal marker specifies the relation between the argument and the predicate: X is not precluded from / is disposed to / is forced to ... When the scope is the predication (π2), the modal marker specifies characteristics of the event that are independent of the participants: the event is not precluded from occurring / is disposed to occur / is forced to occur. An event-oriented interpretation in general arises when the modal marker is used in a passive or impersonal construction or with a non-specific participant. See the examples in (47)-(49):

(47) I know the place. You <u>can</u> get all sorts of things here. (P84)
(48) National pressure groups cannot exist without full time staffs and a regular income. (P91)
(49) Well, I'll see what <u>can</u> be done and give you a ring. (P84)

These utterances all express that the event is not precluded from occurring independently of the participants involved in the event. Compare these to (50), in which *can* describes the root-possibility of the specific participant *you*:

(50) Can you pick your own trousers up? (C94)

However, since scope is not a notion generally applied in linguistics, most reference grammars lack the information that is necessary to determine whether a modal marker may be combined with non-specific participants. It is therefore questionable whether a marker of root-necessity or obligation and of root-possibility or permission in a specific language should be coded either as π1- and π2-operator or only as π1-operator. Nevertheless, I have assumed that in many languages it will be possible to use participant-oriented markers in an event-oriented way, although this is not explicitly stated in the grammar used. In the sample, there are 65 markers of deontic and root modality that might be polysemous in having narrow scope (π1) and medial (π2) scope: there are 36

expressions for obligation, 23 for potentiality, 2 for disposition and 4 for more general modal markers. I have arbitrarily assumed that 50% of these potential event-oriented markers in each language can indeed be used as such and therefore of all the uncertain modal π2-operators 50% is included in the count. With this procedure the analysis should not result in the overclassification of one particular type. The tables in the following sections that include information about frequency, the figures for event-oriented modality (π2) always include half of the number of operators potentially used with medial scope, unless it is stated otherwise. Although deontic modality can also be used with scope over the proposition (π3), this use is probably much more restricted and marginal. I have only encoded a marker for this use if there was clear evidence in the grammar that it could be used this way.

A comparable, but slightly different, problem arose with epistemic modality: FG makes a distinction between event-oriented (π2) and proposition-oriented (π3) epistemic modality. Event-oriented epistemic modality expresses a general, objective fact about the actuality of the event. Proposition-oriented epistemic modality is a personal, subjective evaluation of the speaker about the reliability or truth of the propositional content. Since it is in general the context that forces the one or the other interpretation (see 4.2.3.3), it is often difficult on the basis of the isolated examples in the grammars to establish whether a marker should be considered as event-oriented, proposition-oriented, or both. When translations and definitions by the author allowed both interpretations, it was coded for both interpretations. This held for 41 expressions. They are all encoded as polysemous markers of event-oriented (π2) and proposition-oriented (π3) modality. As a result, there could be too many modality markers in my corpus, but this does not favor the hypotheses in any way.

Finally, some more refined modal distinctions in FG could not be applied to the grammars, because the examples were too scarce and not detailed enough. The distinction between the root-modal and deontic meanings of volition and desirability and of necessity and obligation had to be abandoned because grammars in general do not describe this distinction systematically.

7.3.3 Details of the analysis

Although most reference grammars used for the inventory of TMA expressions in each language were the same as in Bybee et al. (1994), and, in general, the gram types are defined similarly, there are many differences between the analyses of TMA systems in Bybee et al. (1991; 1994) and in this study. As an illustration, consider Table 7-2 in which the two analyses of the TMA system in Chacobo are compared:

Table 7-2. Comparison of analyses in Bybee et al. (1994) and in this study of the TMA system in Chacobo (Prost 1962)

Bybee et al. (1994)			This study (Boland)	
No.*	**Form**	**Meaning**	**Form**	**Meaning**
41	*ki*	perfective	*kï*	perfective (π1)
41	*ki*	completive		
42	*ki*	present	*ki*	imperfective (π1)
35	*ya*	past hodiernal	*ya*	past hodiernal (π2)
36	*ʔita*	past hesternal	*ʔita*	past hesternal (π2)
37	*yami*	past immediate	*yami*	past immediate (π2)
38	*ni*	past remote	*ni*	past remote (π2)
			ZERO	non-past (π2)
			šari	future (tomorrow) (π2)
			pari	prospective (π1)
			kas	volition (π1)
19	*ca*	progressive	*ca* / *ci*	progressive (tr./intr.) (π1)
20	*ci*	progressive		
34	*pao*	past habitual	*pao*	past habitual (π2)
9	*rabi*	iterative	*rabi*	iterative (π1)
			rabi	frequentative (π2)
			ria	iterative / intensive (π1)
			tikï	repetitive ("again") (π2)
48	*mica*	epistemic possibility	*mica*	epistemic possibility (π2)
23	*tiari*	potential	*tiari*	probability (π2)
			kara	evidential (π3)

Note. *Every separate linguistic form in a language was given a number in Bybee et al. (1994).

A first difference is that *kï* is analyzed as a perfective and a completive in Bybee et al. and only as a perfective in this study. *Ca* and *ci* are analyzed as two different markers of progressive aspect in Bybee et al. and as two variants for the progressive in this study, one for transitive verbs, one for intransitive verbs. The marker *ki* is analyzed as a present tense marker by Bybee et al., but here as

an imperfective , whereas zero marking is coded as a non-past tense. *Rabi* is not only used as a marker of iterative (repetition at one occasion, π1) but also as a frequentative (repetition at different occasions, π2). Several forms are not documented by Bybee et al.: a marker for the prospective, the future tense, a second iterative or intensity expression, a marker of repetition, volition and an evidential (Prost 1962: 116-18).

As Table 7-2 shows, there are several points on which I did not agree with the analyses in Bybee et al. (1991, 1994). This section discusses some details of the analysis carried out in this study. It concentrates on those aspects of the methodology here used that deviate from Bybee et al. (1991, 1994). For the definitions of the specific semantic functions, I refer to Chapters 3 and 4.

When making an inventory of TMA expressions, a first point on which one has to decide is the number of different uses or functions that are separately coded. In Bybee et al. (1994) the number of uses coded is determined by the following criteria:

> (1) Two uses of a single morpheme are distinguished if these uses would be expressed by different grams in another language. (...)
> (2) Two distinct uses of a gram will have two different paraphrases. (...)
> (3) A gram might take on a different sense when it occurs with other grammatical morphemes or with verbs of a specific semantic class. (p.44-45)

Criteria 2 and 3 are taken as a guideline here, but I consider criterion 1 very problematic. It would imply that first the language with most grams for a certain semantic domain has to be discovered before it can be objectively established how many uses a marker in other languages has. If for example, a language were to be discovered that makes eight or even ten remoteness distinctions in the past tense, it would imply that in every other language the expression for the past tense would in fact have to have these same eight or ten different uses. However, within the specific language, the remoteness distinctions might be completely irrelevant to the grammatical system, and it would be very undesirable to treat this language as if this distinction was relevant.

The approach taken here is the opposite: if one expression covers different senses within the same domain (e.g. aspect) and with the same scope, only the most general semantic function is coded. This is in accordance with the analysis advocated in an earlier work of Bybee (1985):

> If a morpheme appeared in a variety of functions that are usually associated with the imperfective (i.e. continuous, habitual, durative), then the morpheme was labeled an imperfective. If it appeared to be restricted to one of these functions, it was given a more specific label (not necessarily the label used by the author). (p.141)

This difference in approach explains why Bybee et al. listed a completive and a perfective for *kï* in Chacobo (Table 7-2), whereas I only listed the most general aspectual meaning for this marker, the perfective (which may also be used with a completive sense). If, however, different uses of a single expression correlate with a distinction in scope, I considered them as separate uses. If the scope of an expression may vary this means that the communicative functions of the expression vary and that was considered an important criterion to speak of different uses. As a matter of fact, a difference in scope has not been a criterion in Bybee et al. It explains why *rabi* is listed only as an iterative in Bybee et al., whereas I analyzed it as an iterative with scope over the predicate and as a frequentative with scope over the predication.

As well as there being a principal difference in the number of encoded uses, differences in the definitions of specific gram types sometimes lead to deviating analyses. In what follows, the details are presented of the analyses of specific gram types.

Perfective and perfect. One of the possible uses of a general perfective or a perfect is the combination with a stative verb, which yields an inceptive or ingressive meaning (Comrie 1976). Contrary to the analysis in Bybee et al. (1994), this was not distinguished here as a separate use. Only if a gram could **only** express an ingressive, was it coded as an ingressive. The same holds for a perfect, which can be used in some languages to indicate a resultant state or an immediate past ('hot news') (Dahl 1985: 132-33). Only when a specific morpheme could **only** express a resultant state or an immediate past, was it coded as such. For Palantla, for example, Bybee et al. (1994: 79, T.3.7) coded the marker *ma*^{2}- (Merrifield 1968: 25) as an anterior (= perfect) together with another use, 'state exists'. I, however, coded it only as a perfective. For Inuit, Bybee et al. (1994: 53, T 3.1) coded *sima* (Fortescue 1984: 265-66) as a marker of perfect, resultative and past tense. In this thesis, it was only coded as a perfect, since a perfect also covers the sense of a resultative and since the sense of past tense is only an implicature, not a basic meaning of the verb.

Non-past and non-future. In Bybee et al. (1994) the semantic functions non-past and non-future are not recognized. An expression that indicates both present and future tense or both past and present tense is listed two times for both uses. In contrast to this, I coded these markers only once, with a broader semantic sense of non-past or non-future.

Pluperfect. If the combination of markers results in a predictable meaning, this combination is not considered in my analysis as a separate expression or semantic category, so if a pluperfect meaning is expressed by a combination of a perfect marker and a past tense marker—like in English—the pluperfect is not considered a separate expression or semantic category in this language. See for a discussion of separate versus non-separate gram types Dahl (1985: 67).

Portmanteau expressions of tense and aspect. Quite often, a perfective-imperfective distinction is only relevant for reference to past situations. It is questionable whether this phenomenon should be interpreted as basically a temporal distinction between present and past tense with a subdivision of the past in perfective and imperfective aspect (the "traditional" view), or else, as basically an aspectual distinction between perfective and imperfective with a subdivision of the imperfective in past and present tense. See Figure 7-7:

Possible subdivisions of tense and aspect

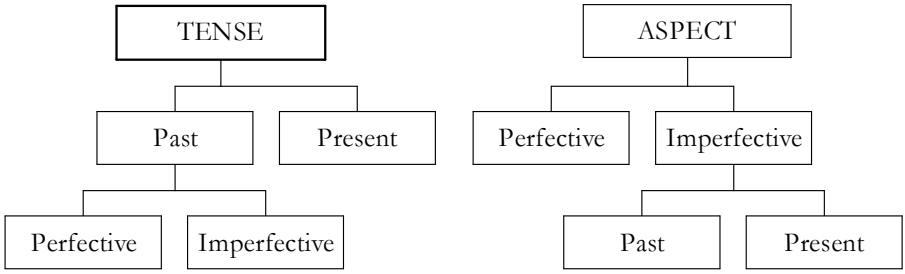

Figure 7-7. Left: primary tense distinction. Right: Primary aspect distinction

Dahl (1985: 78-83) argues for a classification that is primarily based on aspect, which is also the analysis adopted in Bybee et al. (1994). Dahl argues that the traditional distinction of a past perfective and past imperfective on the one hand and a present tense on the other hand is incorrect, since there is no common expression form for the past perfective and the past imperfective, but rather a common expression form for the present and the past imperfective, as for example in many Indo-European systems. The prototypical use of a perfective should be to refer to single, completed events, located in the past. This makes further past time reference redundant and the basic distinction then, would be between perfective and imperfective aspect, whereas the imperfective aspect is divided for tense. However, Dahl also observes that there is crosslinguistic variation in the extent to which perfectives can refer to non-past situations and that a perfective is not necessarily restricted to past time reference (cf. the analysis of the present tense in English presented in 6.2.3.2):

> It is said that a Perfective verb form must refer to a 'total' event and that what happens at the moment of speech is necessarily on-going rather than completed. A Perfective Present would therefore be a contradiction in terms. However, there are candidates for 'total' events at the moment of speech: notably the so-called reportive present and performatives. In fact, PFV is used in such cases in several

> languages (…). These languages have a very loose time reference restriction on PFV, if any at all. (Dahl 1985: 80-81)

Dahl's main argument is that the formal expression in many languages is used for both a present tense and a past imperfective. However, my sample shows that crosslinguistically, this is hardly ever the case. Still, if it would have been the case, it is no argument for the 'primary aspect' analysis, on the right in Figure 7-7. The developmental paths of grams account for the expression forms used, but what matters most to the analysis, is what is the contrastive use of the expression forms from a synchronic perspective. Since a perfective is not in principle restricted to past tense, I maintain the traditional tripartite analysis of a basically temporal distinction and a secondary aspectual distinction in languages where the perfective is indeed restricted to past tense reference.

Future, prospective and prediction. The conception of the future in Bybee et al. (1991, 1994) is not similar to the one in FG. Bybee et al. (1994: 244) regard 'the focal use of future as equivalent to a prediction on the part of the speaker that the situation in the proposition, which refers to an event taking place after the moment of speech, will hold.' Admittedly, the use of a future tense marker implies prediction by the speaker because intervening events may lead to a change, but signaling prediction by the speaker is not the essential function of the future tense marker. The essential function of a future marker is indicating that an event will take place in the future, whereas the uncertainty of future events belongs to mutual common knowledge of language users. This is not something that has to be marked linguistically. Future tense markers can undergo further subjectification, so that real epistemic senses develop (also recognized in Bybee et al. (1991)). The function of such a marker can develop into a true marker of prediction on the part of the speaker, as discussed in 6.2.5.2.3, see example (51):

(51) A commotion in the hall: "That will be Celia," said Janet. (C177)

Contrary to a marker that indicates future tense, the situation in (51) holds at the present time: Celia is already present and makes noises at that time, but it is only heard and not seen. *Will* does not indicate that the event will take place in the future, but that the proposition will turn out to be true in the future.

A further difference in the approach of the future tense is in the stages before a marker expresses a future meaning. I agree with Bybee et al. (1994: 254) that each marker that develops into a future tense marker goes through a stage in which it expresses the intention of the speaker, and later of the animate agent of the main verb. The stage of intention seems to lie somewhere in between participant-oriented modality like volition or obligation and future tense. On the way to becoming a future tense marker, the gram loses the

restriction to an animate agent or a controlled situation. A possible precursor of a future tense marker not recognized in the study of Bybee et al. (1991, 1994), is a prospective aspect marker (*be going to* in English). This is a category distinct from a future tense: it does not just express immediate future, which is also recognized in Bybee & Dahl (1989):

> In each case where *be going to* is used, the entity involved is interpreted as already on the path leading to the goal expressed by the main verb (…) whereas the statements with *will* make predictions for some unspecified future with no implication of connection to present states. (p.92)

Just as a perfect can develop into a past tense marker, a prospective can develop into a future tense marker, when it loosens its connection with the present moment.

Quantification. The definitions here used to (sub)categorize the domain of quantification are not entirely the same as the definitions used in Bybee et al. (1994). The major difference is that I make a distinction between quantification of the predicate and quantification of the predication, the event. Quantification of the predicate may be iteration or intensity of a certain action at one moment by the same participant(s), which expresses differences like *jump one jump* versus *jump a lot of jumps*, or *think* versus *think over*. According to Bybee (1985: 100) iterative markers are usually derivational because 'they are applicable primarily to semelfactive verbs (although they may apply to activity verbs as well) but not to stative verbs.' The meaning of iteration or repetition is in her view only applicable to 'active verbs, and then only to certain types of active verbs, i.e. those which describe telic events, events that have identifiable endings.' (1985: 150) However, the restriction to a certain class of verbs is not in itself a criterion to classify an expression form as derivational: the use of a progressive or a continuative is also often restricted to non-stative verbs and a perfective may be primarily used with telic, punctual verbs. These categories are, however, not considered as derivational. I furthermore doubt the restrictive applicability of iterative markers. In several languages, the same marker can express iteration and intensity depending on the types of verb with which it combines. I therefore include iterative markers in my research: they potentially develop into more general markers of quantification, a habitual or frequentative marker.

A further difference within the quantificational domain lies in the approach of the habitual. Bybee et al. (1994) consider the habitual a subcategory of imperfective aspect, similar to Comrie (1976: 25). Bybee (1985: 143) claims that a progressive gram may loose its selection restrictions and develop habitual uses. When that happens, the gram has become an imperfective or present tense marker. In FG, however, an imperfective is considered an aspectual marker in the sense described in 3.3.3, covering progressive and continuative uses, without selection restrictions; a habitual marker on the other hand is

considered a marker with medial scope, that indicates the quantification of the event. An imperfective marker may indeed develop habitual inferences, which may conventionalize into the real meaning of this marker. If that happens, the gram is coded for both uses in my analysis: imperfective aspect (π1) and habitual (π2). A habitual use is thus not considered a subcategory of an imperfective, but a separate semantic function, that may also arise directly from lexical sources (like *used to* in English).

Modality. Although the subcategories within the domain of modality used here clearly differ from the study of Bybee et al. (1994), there are also many similarities. The participant-oriented notions used in this study are practically similar to the agent-oriented uses in Bybee et al. (1994), such as ability, root-possibility, permission, volition, (weak and strong) obligation/necessity. The same holds for epistemic modal markers: uncertainty, certainty, epistemic possibility and probability. The main difference is due to the analysis according to scope, which results in a more fine-grained distinction within the different modal senses and sources. As discussed in 7.3.2, the reference grammars of the languages in the sample do not always provide enough information to determine the possible scopes of an expression, in particular in the case of deontic and root-modal meanings. This problem was overcome by including potential event-oriented expressions for 50% in the counts (see 7.3.2).

Although many of the differences between the analyses in Bybee et al. (1991, 1994) and the analysis here result from the distinctions set out above in the method of approach, some are a matter of different insights and interpretations of the examples and definitions of the authors. In some cases my interpretation of the reference grammar deviates quite fundamentally from the analysis in Bybee et al., as, for example, in the case of the tense/aspect system in Chacobo (see Table 7-2).

A final remark on the analysis is necessary with respect to the language Abipon. This is one of the three languages for which the analysis of Bybee et al. (1994) is adopted because there was no reference grammar available. However, a crucial gram appears to be missing in the list of all the TMA expressions in the sample (their Appendix C). This list mentions only two TMA expressions for Abipon—a habitual and a future marker. No aspectual markers are presented. However, the written text does mention the existence of a progressive marker in Abipon, expressed by a suffix (1994: 119). I added this progressive marker to my inventory of TMA expressions in the GRAMCATS sample.

A complete overview of all the morphemes in the languages according to my analysis is presented in Appendix G. It served as the basis for testing the hypotheses on frequency, synchronic configurations, expression form and expression order.

7.4 FREQUENCY

As stated in 5.4.2 the Scope Hierarchy predicts a relation between the scope of TMA markers and their frequency. It is to be expected that at the start of a grammaticalization cline (narrow scope) there is a wider variety of expressions and semantic notions, because i) during grammaticalization, developmental paths tend to converge and ii) the function of narrow scope operators (modifying the description of a state of affairs) seems to be communicatively more motivated than of medial scope operators (modifying reference to the real world) or of wide scope operators (modifying the presentation of the content) (see 5.4.2). With respect to crosslinguistic frequency, this leads to two specific hypotheses on the size of different operator classes (H2b) and on the crosslinguistic incidence of operators (H2c).

H2b: The class of π1-operators has more members than or an equal number of members as the class of π2-operators and this class has more members than or an equal number of members as the class of π3-operators.

H2c: The crosslinguistic incidence of π1-operators is larger than or equal to the incidence of π2-operators, which in turn is larger than or equal to the incidence of π3-operators.

In this section the hypotheses will be tested in the GRAMCATS sample. The crosslinguistic frequency (H2c) will be discussed first (7.4.1).

7.4.1 Crosslinguistic frequency

The crosslinguistic frequency of operator types (H2c) is determined on the basis of the inventory of TMA expressions in the GRAMCATS sample. Table 7-3 presents the number of languages that have at least one expression that functions as a certain type of operator. Nearly all languages in the sample have

Table 7-3. Number of languages in the sample (*N* = 76) that have certain types of operators

	Type of Operator		
	π1	**π2**	**π3**
N	76	73	37
%	100 %	96 %	49 %

expressions that function as π1-operators and expressions that function as π2-operators. Only half of the languages have expressions that function as π3-operators. Whether there is an implicational relation between the presence of the different operators in single languages will be examined in 7.5.

The crosslinguistic frequency of operators supports the hypothesis that narrow and medial scope operators are much more frequent than wide scope operators. The frequency of medial scope operators is about equal to the frequency of narrow scope operators, which is in accordance with H2c. The distribution suggests that medial and narrow scope operators are equally relevant to communication.

7.4.2 Size of operator classes

7.4.2.1 Method

The size of operator classes (H2b) is tested in different ways: the number of different operators is compared within and across languages and the number of TMA markers for a specific class are counted in two different ways. The size of an operator class may be determined by the number of different expression forms within that class or by the number of different semantic functions within that class. The numbers of different expression forms and of different semantic functions are of course not always identical; different forms may express the same semantic notion or one form may express different semantic notions (for example in polysemous or portmanteau expressions).

How the expression forms and the semantic functions are counted needs some further discussion. The number of different expression forms is based on what the author of the grammar considers different forms. If different forms are presented as allomorphs, they all count as one expression form. Furthermore, the different expression forms are counted within one semantic domain, such as tense, event quantification or irrealis. If the same expression is used as a marker of tense, of quantification and of irrealis, it is counted three times. Determining the number of different semantic functions within a language is a more difficult issue. Again, the description in the reference grammar is decisive. If the author describes the meaning of two or more forms in identical terms, then the forms are considered as expressing the same semantic function. For example, the expressions *malila*, *wandicila* and *pinga* in Mwera are all described as markers of prospective, without any further semantic distinction mentioned for the three expressions (Harries 1950: 109-10). These three forms are thus counted as three separate expression forms and as one separate semantic function. Remoteness distinctions in temporal or

aspectual categories are considered as indicating different semantic functions. Mwera, for example, has a marker for immediate perfective, *ci*, and for remote perfective, *ile* (Harries 1950: 79ff, 94ff). Since the use of *ci* and *ile* is mutually exclusive, they are counted as two different semantic functions (and of course also as two different expressions).

A complex category is formed by portmanteau expressions. A portmanteau expression denotes two or more semantic functions by only one morpheme, such as the –s suffix in English, which expresses present tense, third person and singular. A certain semantic function may only occur in a portmanteau expression or both in a separate expression and as part of a portmanteau expression. For example, Agau has a general past marker (-γʷà) and a past marker that occurs in the portmanteau expression *šiŋ* that indicates past habitual and past imperfective (Hetzron 1969: 13ff, 28ff). This is counted as two expression forms for past (-γʷà and *šiŋ*), but only one semantic function 'past tense'. The portmanteau expression *šiŋ* is furthermore counted as an expression form for the habitual and an expression form for the imperfective and as the semantic functions 'habitual' and 'imperfective'.

Another example may be taken from Guaymi that expresses most tense and aspect oppositions by eight portmanteau expressions (see Table 7-4). The suffix –*ri* for example indicates perfective immediate non-future while the suffix –*e* or –*a* indicates imperfective immediate non-future (Kopesec 1975: 22). This results in eight expressions indicating aspect as part of their semantics, and eight as indicating tense as part of their semantics. There are, however, only two different aspectual functions—perfective versus imperfective—while there are four different temporal functions: immediate future, remote future, immediate non-future and remote non-future.

Table 7-4. Eight portmanteau expressions in Guaymi (Kopesec 1975: 22)

	Immediate		**Remote**	
Future	perfective	imperfective	perfective	imperfective
Non-future	perfective	imperfective	perfective	imperfective

In the domain of modality, the most general semantic function of an expression is counted per operator type. So, if an expression with narrow scope can be used to indicate ability (π1), root-possibility (π1) and permission (π1), it is only counted as one (general) marker of potentiality (π1). Secondly, if there are two different grams with that for example both express ability (π1) and root-possibility (π1), then this is counted as one semantic function "potentiality". If, however, different expressions cover different subcategories

of the same sense, then they are considered separate semantic functions. For example, in Cantonese, *nàng gāu* expresses only root-possibility, *dak* expresses ability and root-possibility and *hó yǐ* expresses root-possibility and permission (Kwok 1971: 73, 77-78). Since these forms all cover different categories of the general sense potentiality, they are counted as three different semantic functions. Thirdly, if there are two expressions for obligation and the author indicates that one expresses weak obligation and the other one strong obligation, then they are considered two distinct semantic functions. Fourthly, if negation is part of the modal meaning (scope of negation is modal sense), for instance, **im**possibility or **in**ability, it is counted as a category separate from the marker expressing the positive counterpart. Finally, every evidential expression is considered a separate semantic function.

As for the domain of irrealis, expressions that indicate hypothetical or counterfactual, or a more general notion of irrealis, I tried to include only those expressions that can be used in main clauses. Negative and affirmative forms of an irrealis are not considered as different semantic notions, contrary to negative and affirmative forms of modal markers, since here the scope of the negation is not the irrealis marker, but the predication. This holds for Zuni, in which *–ʔanna* and *–šukʷa* both express hypothetical, the latter including negation (S. Newman 1965: 37-38). If there is one form that expresses both hypothetical and counterfactual meaning, then it is counted as one broad semantic function irrealis. This is the case for Bongu, in which the suffix *–dun* can be used to express hypothetical and counterfactual meaning (Hanke 1909: 45, 87).

7.4.2.2 Results

In Table 7-5 the number of expression forms and semantic functions for the complete sample are presented. The numbers are the cumulative numbers of the different expressions forms and the different semantic functions within each specific language. Table 7-5 clearly shows that in the whole sample, there are more expression forms and semantic functions with narrow scope than with medial scope. Forms and semantic functions with wide scope are by far the

Table 7-5. Number of expression forms and semantic functions per type of operator

	Type of Operator		
	π1	**π2**	**π3**
Expression forms	451	413	89
Semantic functions	387	352	79

smallest group. The distinction between the classes of π1- and π2-operators is, however, very small. This suggests again that, contrary to the expectation expressed in 5.4.2, π1- and π2-operators may be about equal in communicative relevance.

As well as a comparison across languages, the hypothesis can be tested by investigating the number of languages in which the class of π1-operators is larger than or equal to the class of π2- and π3-operators and the number of languages in which the class of π2-operators is larger than or equal to the class of π3-operators. This analysis is presented in Table 7-6. If a language lacked expressions of both scope types that were necessary for the comparison, then the language was excluded from analysis.

Table 7-6. Percentage of languages (*N* = 76) that are in accordance with H2b

	π1 ≥ π2	**π1 ≥ π3**	**π2 ≥ π3***
Expression forms	59 %	96 %	99 %
Semantic distinctions	61 %	97 %	99 %

Note. *Three languages lacked both π2- and π3-operators: for 72 out of the remaining 73 languages, π2 ≥ π3.

Whether the languages are compared on the basis of their semantic functions or on the basis of their expression forms, makes hardly any difference. If the expression forms are compared, the number of languages that have more π1- than π2-operators or an equal number is 59%. In 34 of the languages the group of π1-operators is larger than of π2-operators, in 10 languages both classes have equal size and in 32 languages the group of π2-operators is larger than of π1-operators. This shows again that the classes of π1-operators and of π2-operators are not significantly different in size. This is not in conflict with the hypothesis—the frequency of π1-operators is not lower than that of π2-operators—but it also does not support the idea that π1-operators are communicatively more motivated than π2-operators and therefore show more variation. However, H2b is strongly supported by the fact that in the vast majority of languages the group of π1- and π2-operators is larger than of π3-operators. This is completely in accordance with the predicted distribution.

7.4.2.3 Summary

H2b on the size of operator classes has been examined in different ways. The different analyses show that the class of π1-operators is slightly larger than of π2-operators and the class of π3-operators is much smaller. In general, this supports the hypothesis. The Scope Hierarchy makes the correct predictions.

However, although the class of π1-operators is larger than of π2-operators, the difference is very small. This suggests that the communicative relevance of both groups is about equal, whereas it was assumed initially that π1-operators are more relevant for communication than π2-operators. The results clearly confirm the assumption that π3-operators are communicatively less relevant: there are not as many semantic distinctions within this class as in the other two classes and the number of expression forms is also very small compared to the other classes of operators.

7.4.3 Reconsidering H2b and H2c

Although the figures in 7.4.1 and 7.4.2 support H2b and H2c to a certain extent, it is questionable whether scope is indeed the decisive factor. The figures might be the result of the relatively high or low frequency of specific semantic functions and it is possible that the effects are not directly the result of scope differences, but rather of purely semantic factors. The hypotheses are both reconsidered in this section by examining the role of semantic functions.

Which semantic functions are the most or the least widespread in the sample? First, a general overview is presented of the occurrence of larger semantic domains in Table 7-7. This table shows that there may indeed be a large influence of specific semantic categories. The vast majority of languages have one or more expressions of aspect and tense. Event quantification is also present in nearly two-thirds of the languages. The influence of these functions on the frequency of operator classes is thus very large. Different types of modality are present in about one half of the languages. The grammatical

Table 7-7. Number of languages in the sample that grammatically express TMA domains

	Aspect (π1)	**Tense (π2)**	**Property quantification (π1)**	**Event quantification (π2)**	**Irrealis (π2)**
N	76	68	26	46	21
%	100	89	34	61	28

	Participant-oriented modality (π1)	**Event-oriented modality (π2)**	**Proposition-oriented modality (π3)**	**Evidentiality (π3)**
N	42	41	36	13
%	55	54	47	17

Table 7-8. Number of expressions and semantic functions for each TMA domain

	Aspect (π1)	**Tense (π2)**	**Predicate-qnt (π1)**	**Event-qnt (π2)**	**Irrealis (π2)**
Expression forms	306	228	33	67	33
Semantic functions	259	188	29	65	27

	Participant-oriented modality (π1)	**Event-oriented modality (π2)**	**Proposition-oriented modality (π3)**	**Evid. (π3)**
Expression forms	112	86	64	25
Semantic functions	99	72	54	25

Notes. qnt = quantification ; evid. = evidentiality

expression of property quantification, irrealis and evidentiality is the least frequent.

In Table 7-8 the exact numbers of expression forms and different semantic functions are presented for each semantic domain. It appears that there are by far the most expressions and semantic notions for aspect and tense[6] and fewest for quantification, irrealis and evidentiality. The groups of π1- and π2-operators are indeed for the majority made up of expression forms for aspect and tense. This makes it more difficult to see the influence of scope on frequency clearly.

The study on English in Chapter 6 showed that a more precise way of testing the hypotheses on frequency is to eliminate the possible influence of specific semantic functions. The distribution of scope within a single semantic domain will therefore be examined. If the frequencies of the related domains of aspect and tense in Table 7-8 are compared, the hypothesis is supported: aspect markers are more frequent than tense markers, both within and across languages. However, the opposite result is yielded when property quantification is compared to event quantification, as here, operators with narrower scope occur less frequently. Modality expressions are the only ones that occur with all types of scope. Hence, they are the best category to examine the influence of scope. See Table 7-9, which only includes modal expressions.

[6] Bhat (1999: 98-99) warns against a temporal bias in most reference grammars: 'because English is the language of description in most reference grammars and in English tense is—in contrast to aspect and modality—obligatorily marked, researchers are biased to defining and translating other languages in temporal terms. 'It is something like trying to understand the colour of various objects around us while looking at them through a red-coloured glass.' This warning is probably not an exaggeration and it thus has to be taken into account that especially the number of tense markers might be lower if languages were reanalyzed with the present-day understanding of modality and aspect.

Table 7-9. Number of MODAL expression forms and semantic functions per type of operator

	Type of Operators		
	π1	**π2**	**π3**
Expression forms	112	85	64
Semantic functions	99	72	54

When only modality is taken into consideration, the hypothesis that there are more operators with narrow scope than with medial scope, and more operators with medial than with wide scope is borne out: the group of π1-operators is larger than of π2-operators and the group of π2-operators is larger than of π3-operators. The distinctions in size between the three classes are similar. This conclusion also holds within languages: the average size of the π1-class (2.6 expression forms) is larger than the average size of the π2-class (2.1 expression forms), which is again larger than the average size of the π3-class (1.8 expression forms).

7.4.4 Conclusion

The analyses demonstrate that operators with wide scope are far less frequent than the other two categories, whatever analysis is applied. Their crosslinguistic incidence is lower than of the other two categories and the class of π3-operators is smallest, both across and within languages. Operators with narrow and medial scope are about equally represented, both across and within languages, and their classes have about equal size. Narrow scope operators are slightly more frequent, but the difference with π2-operators is small. However, when the specific semantic domains are compared, it appears the frequency of operator classes is largely affected by a few semantic categories, aspect and tense, which are overwhelmingly present in the GRAMCATS sample. In order to investigate the role of scope more clearly, the analysis was restricted to the domain of modality. When only modality is taken into consideration, there does seem to be a difference in frequency that is dependent on scope: the number of participant-oriented modal markers is larger than of event-oriented modal markers and the number of proposition-oriented modal markers is smallest. This distribution holds both across and within languages.

The figures support the view that scope plays a role in the frequency of operators, both in crosslinguistic incidence and in the size of operator classes. However, there is also a large effect of semantic functions on frequency . The hypotheses were based on the assumption that the function of π1-operators,

modifying the descriptive function of an utterance, is communicatively more important than the function of π2-operators, modifying the situating function of an utterance. The function of π3-operators, modifying the presentation of the content, was assumed to be communicatively least relevant.

The figures support the view that description is in fact a very important communicative function. Every language in the sample has at least one expression to modify the description of the event. These modifications concern for the major part aspectual specifications, but participant-oriented modality also occurs in 55% of the languages. It is however questionable whether the function of relating the description of the event to the concrete event the speaker has in mind (π2-operators) is indeed less relevant to communication, since most languages (except two) also have grammatical expressions to modify the situating function of an utterance. For the majority, this concerns tense markers, but 61% of the languages also have an expression for event quantification and 54% for event-oriented modality.

To conclude, the Scope Hierarchy makes correct predictions for the frequency of operators, but the difference between π1-operators and π2-operators is much smaller than the difference between these two categories as opposed to π3-operators. The frequency of π1- and π2-operators is about equal, whereas the frequency of π3-operators is considerably lower.

7.5 SYNCHRONIC CONFIGURATIONS

This section will examine the hypotheses regarding synchronic configurations of TMA expressions. The first hypothesis, H3a, is based on the markedness of different operators and concerns the limits on possible synchronic configurations of all TMA expressions. The second hypothesis, H3b, concerns the limits on possible meanings that can be expressed by a single item. This concerns polysemous and portmanteau expressions.

7.5.1 Implicational presence

As already set out in 5.4.3 the Scope Hierarchy, which reflects a distinction in markedness, predicts that if a language has grammatical means to make modifications with wide scope (π3-operators), it also has grammatical means to make modifications with medial scope (π2-operators) and if it has grammatical means to make modifications with medial scope, it also has grammatical means to make modifications with narrow scope (π1-operators). The motivation for this implicational relation is that a language supposedly does not allow more abstract modifications by grammatical means without the possibility of more

concrete modifications by grammatical means. The more marked functions can only evolve if the less marked functions are present. This is formulated in H3a:

H3a: The presence of operators with wider scope depends on the presence of operators with narrower scope according to the hierarchy: π1-operator ⊂ π2-operator ⊂ π3-operator.

H3a is tested in two ways. First, it will be examined which configurations occur in the GRAMCATS sample. Second, a more detailed discussion will follow on TMA systems in creole languages, in 7.5.1.1.

For each language in the GRAMCATS sample the types of operators that co-occur are examined on the basis of the inventory of TMA expressions. Table 7-10 presents the configurations that occur and the number of languages that show this configuration. Although there are eight possible configurations, only three are attested. Of the four configurations that the Scope Hierarchy precludes, none is in fact attested. There are no languages in the sample in which π1-operators are absent, but π2-operators or π3-operators are present, and there are no languages in which π2-operators are absent, but π3-operators are present. The hypothesis is evidently borne out by the distribution. More marked operators are only present if there are also less marked operators. It is remarkable that there are no languages in the sample that have no grammatical TMA expressions at all and there are only three languages, !Kung, Car and

Table 7-10. Frequency of different synchronic configurations

	Configurations			**Frequency**	
	π1	**π2**	**π3**	**N**	**%**
Predicted	-	-	-	0	0
	+	-	-	3	4 %
	+	+	-	36	47 %
	+	+	+	37	49 %
Not predicted	-	+	+	0	0
	-	+	-	0	0
	-	-	+	0	0
	+	-	+	0	0

Tojolabal, that have only π1-operators. This stresses the fact that TMA expressions are quite an important linguistic category.

As well as possible implicational relations between operator types, there could be implicational relations between broad semantic domains or more specific semantic functions within a specific language. No such relationships were found in my study or in the studies of Bybee (1985) and Dahl (1985) (Bybee & Dahl 1989: 95). Grams develop, at least in part, independently of other grams.

7.5.1.1 Creole languages

The GRAMCATS sample contains only one creole language. However, H3a is very interesting to inspect in pidgins and creoles because these languages may shed some light on the question which linguistic elements evolve first in language systems. It is assumed that creole speakers seek expressions first for notions that are communicatively most needed so that the operators in creole languages may be considered as highly communicatively motivated. In this section, I will discuss in more detail the configurations of creole languages.

A well-known viewpoint on TMA in Creole languages is the one of Bickerton (1981): he studied the TMA systems in Sranan, Guyanese, Haitian Creole French and Hawaiian Creole English and arrived at the conclusion that a creole TMA system consists of three preverbal markers: anterior (relative) tense, irrealis mood and non-punctual aspect. With respect to these three markers, Givón (1982) suggests that they are natural to be found as the core of TMA systems, both in creoles and in non-contact languages:

> The special marking for *out-of-sequence* [= anterior, AB], *non-punctual* and *irrealis* merely underscores the fact that in discourse-at least in the *narrative* style-they are conceptually and in frequency the *marked* case. That is, we do tend to talk about events *in-sequence*, events as *actions* and events that *did happen*. (Givón 1982: 155, italics his)

According to Bickerton creole languages do not have an absolute tense-marking system. Labov (1990) notes in this respect that although a system without tense marking may seem primitive, it is not inadequate.

> If time is expressed with optional adverbs, then it is only necessary to signal the time once at the beginning of a narrative or for as long as we are in the same sequence of events. But with a tense system, we have to use the tense marker over and over again. […] It is the tense system of the standard languages that is normally redundant. The pidgin system can be cumbersome, but in most discourse situations it proves to be quite efficient to designate time relations: specifically when called for, otherwise not. (1990: 18)

A point of critique on Bickerton's prototypical system is that it is based solely on creoles with Indo-European superstrate languages[7] (cf. Singler 1990b). In Singler (1990c) aspect and tense systems in eight Pidgin and Creole languages are discussed. The lexifying languages are English, French, Dutch, Portuguese, Spanish and the Bantu language Kikongo and geographically, the creoles are spoken in West and Central Africa, the Caribbean, and the Pacific. One of these languages is usually unmarked for tense and aspect (18th Century Nigerian Pidgin English, Fayer 1990); four languages have markers for aspect but no systematic tense marking (Papiamentu, Andersen 1990; Hawaiian Creole, Labov 1990; Berbice Dutch, Robertson 1990; Kru Pidgin English, Singler 1990a); the language Kituba has aspect and relative tense markers (Mufwene 1990); the language Haitian Creole has markers for aspect and for future tense (Spears 1990); and finally, Capeverdean Crioulo has both aspect and several tense markers (Silva 1990). There are thus no languages in the sample with tense markers but without aspect markers, whereas there are languages with aspect markers and without tense markers. From the TMA systems of these languages it seems that absolute tense is diachronically not among the first semantic notions to be systematically marked by grammatical expression, whereas aspect is. This strongly supports the idea that modification of the predicate (narrow scope) is more relevant and basic to communication than modification of the predication or the proposition.

7.5.1.2 Conclusion

There are no languages in the GRAMCATS sample in which π3-operators are present without π2- or π1-operators or in which π2-operators are present without π1-operators. However, whether the presence of wider scope operators is indeed dependent on the presence of narrow and medial scope operators could not be established, since narrow and medial scope operators are nearly always present. The configurations of TMA expressions in creoles, however, support the idea that narrow scope operators evolve earlier than medial scope operators and that wide scope operators appear last. The Scope Hierarchy is indeed reflected in synchronic configurations of TMA expressions.

7.5.2 Polysemous expressions

As explained in 5.4.3, grammaticalization paths are universal. For the domain of TMA, several paths were discussed in 7.2.3. It is assumed that the semantic changes of linguistic items in these paths reflect underlying universal semantic or conceptual space. This leads to the prediction that synchronically, a single

[7] The major language on which the creole is based.

gram can only express different semantic notions that are related: they will be adjacent on a grammaticalization path, or, in other words, in semantic space. With respect to scope, it is to be expected that these notions are either of the same scope or of adjacent scope levels. Consider H3b:

H3b: A single expression can only cover adjacent regions in semantic space. As a result, a polysemous or portmanteau expression will only have semantic functions with similar or adjacent scopes.

This prediction is first tested for the polysemous grams (7.5.2.1) and then for the portmanteau expressions in the sample (7.5.2.2).

7.5.2.1 Polysemous grams

The 76 languages in the GRAMCATS sample contain 159 expressions that cover more than one semantic function. This includes all the modal expressions that are potentially polysemous between denoting participant-oriented modality and event-oriented modality. As discussed in 7.3.2, it is not always clear on the basis of the reference grammars whether a modal expression with narrow scope may also have scope over the predication to express event-oriented modality (π2). Counting only half of the potential event-oriented modal operators solved this problem. In contrast to the figures in the previous sections, this section includes **all** and not half of the expressions that potentially express event-oriented modality. In the tables, they are given in between brackets with question marks.

In this section, the combinations of semantic functions attested for single items are first discussed. According to H3b these semantic functions should be adjacent on a semantic path, and whether this is indeed the case, will be established on the basis of the semantic paths presented in 7.2.3. The focus is, however, on the question whether the Scope Hierarchy applies to polysemous grams. Is it indeed the case that single items only have semantic functions with similar or adjacent scope?

Which semantic functions are expressed by single items? Although numerous combinations of semantic functions are logically possible, the majority of combinations falls within a restricted set. There are about six large sets of combinations to which the majority of polysemous expressions belong.

A domain in which there are many polysemous grams is the domain of modality. This is partially a consequence of the analysis. Grams that express participant-oriented modality, with a source in external circumstances, such as root-possibility, permission and obligation, were encoded also as possible event-oriented modality, even when the grammars do not provide explicit information about the possibility to use the gram with non-specific participants.

In the tables, event-oriented modality is presented between brackets, to indicate that this use is not always warranted by the information in the grammars. Furthermore, grams that express epistemic modality were encoded as both event-oriented and proposition-oriented if the examples or definitions in the grammar allowed both interpretations. Grams that express both root (π1 or π2) and epistemic modality (π2 or π3) were only encoded this way on the basis of explicit description in the grammars.

The first set of semantic functions often covered by a single expression are various modal categories with a basic sense of potentiality. Table 7-11 presents the combinations that occur and the frequencies thereof. Below the dotted line are the number of expressions that combine notions of potentiality with another semantic notion; these expressions are primarily assigned to another group of polysemous markers and return in one of the other tables.

Table 7-11. Polysemous expressions with potentiality senses (*N* = 49)

N	**Root-possibility / ability / permission (π1)**	**Root-possibility / permission (π2)**	**Epistemic possibility (π2)**	**Uncertainty (π3)**	**+ Other senses**
24	X	(X?)			
2	X	(X?)	X		
7	X	(X?)	X	X	
16			X	X	
2			X	X	+ future
1			X	X	+ hypothetical

Basque is one of the seven languages that have a single marker for all types of potentiality, the suffix *–ke*. Consider (52), in which *–ke* has a root-possibility interpretation and (53), in which it has an epistemic possibility interpretation:

Basque (Saltarelli et al. 1988: 235-36)

(52) *hamarr-eta.ko* *pelikula-ra* *joa-n*
ten-LOC-REL film-s.all go-PRF
g-a-ite-z-ke
1P.ABS-PRS-AUX2(SUBJ)-ABS.PL-POTN
'we can go to the ten o'clock film'

(53) *hemen ego-n* *d-a-ite-ke*
here be-PRF 3ABS-PRS-AUX1(SUBJ)-POTN
'S/he can be here.'

The combinations of meanings in Table 7-11 are all in accordance with the developmental paths in Figure 7-5. Furthermore, it is evident that there are only combinations of semantic functions with adjacent scope levels. For example, there are no occurrences of markers that express ability (π1) and uncertainty (π3), without also expressing epistemic possibility (π2).

Just as there are polysemous items with a basic sense of potentiality, there are also polysemous items that express different semantic functions with a basic sense of (weak) necessity. Table 7-12 presents which combinations of meanings were attested and their frequency of occurrence. Note that for one language, Cantonese, there is a marker *ying goi* that expresses obligation with all types of scope (Kwok 1971: 77). Recall that probability (π2) is the epistemic function with the basic sense of weak necessity.

Table 7-12. Polysemous expressions with (weak) necessity senses (*N* = 40)

N	**Root-nec / obl (π1)**	**Root-nec / obl (π2)**	**Obligation (π3)**	**Probability (π2)**	**Certainty (π3)**	**+ Other senses**
27	X	(X?)				
1	X	X	X			
1	X	(X?)		X		
1	X	(X?)		X	X	
3	X	(X?)			X	
7				X	X	
3	X	(X?)				Prospective
2	X	(X?)				Future /Volition
1	X	(X?)				Irrealis
1	X	(X?)			X	Future
1				X	X	Future
1				X	X	Hypothetical

Notes. nec = necessity ; obl = obligation.

Most combinations in Table 7-12 are in line with the prediction. They only combine functions that have similar or adjacent scope. However, there are three markers that express participant-oriented necessity (π1) and certainty (π3) (see row 5) while it is uncertain whether these markers can also express event-oriented necessity or obligation (π2). The study of Bybee et al. (1994) did not reveal a universal diachronic path for the different semantic functions with the general sense of necessity. It is unsure how meanings of certainty (π3) exactly develop. I claimed in 4.2.3.3 that objective epistemic necessity is not marked in languages, since it is the default status of events. It may be the case that the subjective meaning of certainty develops directly from root-necessity or obligation, or, another possible development, by way of negative objective epistemic necessity: not necessary. It is thus not completely clear whether all polysemous items that express necessity meanings support the hypothesis. For most of the items, however, there is enough evidence that they do.

Other combinations of modal meanings occur less often. These are presented in Table 7-13.

Table 7-13. Polysemous expressions with sense of disposition (*N* = 2) and polysemous expressions with general basic senses (*N* = 4)

N	**Volition/ desirability (π1)**	**Desirability (π2)**	**'General' modality (π1)**	**'General' modality (π2)**	**'General' modality (π3)**
2	X	(X?)			
3			X	(X?)	
1				X	X

There are two polysemous markers that express semantic functions with the basic sense of disposition, in Pangasinan and Meithei. The Pangasinan marker *makaka-* expresses disposition with narrow (54) and medial scope (55), as the translations in Benton (1971) show:

Pangasinan (Benton 1971: 133)

(54) *makakaáral*
'likes to learn, is inclined to learn'

(55) *Makakaorán ni met*
'it's threatening rain.'

Furthermore, there are a few modal markers that do not express one of the four basic senses, such as defined in 4.2.1 but rather cover a larger part of the modal scale. In three languages there is a more general root-modal marker: In Kanuri *gè* + TONE expresses volition/desirability and obligation (Lukas 1937: 35, 42); in Danish *mätte* expresses permission and strong obligation (Koefoed 1958: 185, 92); in Baluchi, V-*əg-i bu-əg* expresses senses from potentiality to weak entailment (Barker & Mengal 1969: 239). In Nakanai the particle *ge* expresses epistemic modality from potentiality to weak entailment (R. L. Johnston 1980: 63-65).

All the expressions in Table 7-13 comply with H3b: they only express semantic functions that have similar or adjacent scope levels.

A fourth group of polysemous expressions combines the categories of prospective or future tense with some category of root-modality. In Slave, for example, the particle *góʔǫ* can express necessity and future tense. See (56)-(57):

Slave (Rice 1989: 416)

(56) *kee* *ráyehdí* *góʔǫ*
shoe 1SG.buy NEC

(57) *wohję* *góʔǫ*
1SG.OPT.sing FUT

There are 13 polysemous expressions in the sample that combine these categories. Table 7-14 presents which meanings co-occur in single expressions.

Table 7-14. Polysemous expressions that combine participant-oriented modality and prospective or future (*N* = 13)

N	**Obligation (π1)**	**Volition (π1)**	**Ability (π1)**	**Prospective (π1)**	**Future (π2)**
4	X			X	
1	X				X
1	X	X			X
3		X		X	
1		X		X	X
2		X			X
1			X		X

With respect to the expressions in Table 7-14, the semantic paths in Figure 7-6 are relevant. Expressions for obligation (π1), desire / volition (π1) and root possibility / ability (π1) may develop into expressions for intention (or prospective) and for future tense. The combinations of meanings for the polysemous items in the sample support the idea that the semantic functions expressed by a single item are adjacent on a developmental path. Furthermore, these markers are all in line with the hypothesis that only semantic functions with the same or adjacent scope can be expressed by single items.

A fifth combination of meanings that often occurs in polysemous expressions are epistemic modality, future tense and irrealis. There are 13 items that express two or more of these categories. The exact combinations and the frequencies thereof are presented in Table 7-15. The function of irrealis (10th column) is a general marker of irrealis, expressing both hypothetical and counterfactual.

Table 7-15. Polysemous expressions that combine epistemic modality, future tense and irrealis (*N* = 13)

N	**Ep.psb (π2)**	**Uncert (π3)**	**Prob (π2)**	**Wk cert (π3)**	**Obl (π1/2)**	**Cert (π3)**	**Fut (π2)**	**Hyp (π2)**	**Irr (π2)**	**Predc (π3)**
2	X	X					X			
1	X	X						X		
2		X							X	
1			X	X			X			
1			X	X				X		
1				X					X	
1					X	X	X			
2							X	X		
1							X		X	X
1							X			X

Notes. Ep.psb = Epistemic possibility ; Uncert = Uncertainty ; Prob = Epistemic probability ; Wk cert= Weak certainty ; Obl = Obligation ; Cert = Certainty ; Fut = Future ; Hyp = Hypothetical ; Irr = Irrealis ; Predc = Prediction

The diachronic paths towards irrealis meanings are not described in Bybee et al. (1994). It is also not documented whether future tense and epistemic meanings, other than prediction, can develop into one another. Whether these meanings are adjacent on diachronic paths can therefore not be tested. However, with respect to the expectation that a single expression only covers functions with adjacent scope, the data in Table 7-15 are supportive.

A sixth group of meanings often expressed by polysemous items are quantification and continuative or imperfective aspect. There are 25 items that cover one or more of these categories. They are presented in Table 7-16.

Table 7-16. Polysemous expressions for quantification and aspect (*N* = 25)

N	**Iterative (π1)**	**Continuative (π1)**	**Imperf (π1)**	**Freq (π1)**	**Habitual (π2)**	**Repetitive (π2)**	**Other**
3	X	X					
1	X	X		X			
6	X			X			
4		X		X			
6			X		X		
1	X		X		X		
2	X				X		
1	X					X	
1							X*

Notes. *Gugu-Yalanji has one marker that covers several aspectual and quantificational senses. Imperf = Imperfective ; Freq = Frequentative

Most common combinations are an imperfective and a habitual (six times, in Margi, Kanakuru, Agau, Tucano, Nakanai and Shuswap) and an iterative and a habitual or a frequentative (ten times, in Alyawarra, Yessan-Mayo, Inuit, Margi, Chacobo, Worora, Krongo, Temne, Dakota, Rukai). Consider the examples (58) and (59) from Alyawarra, in which *–iyn* can express iterative and frequentative meaning:

Alyawarra (Yallop 1977: 61-62)

(58) *utnth-iyn-ika* *ayinga*
search-ITR-PAST I
I went around searching; I kept searching.

(59) *arula* *aytn-iyn-iyla*
tree-NOM fall-ITR-PRS.CONT
the trees keep falling down; the trees fall down one after the other (in a bush fire)

A single item can also express the continuative and frequentative. In Baluchi, for instance, the periphrastic construction *V-an buəg* is translated with 'keep (on) –ing'. It may combine with all kinds of verbs, like 'weave', 'bake bread', 'sing', 'work', 'bring wood', or 'fall' as in 'snow will keep falling'. This may result in either a continuative or a frequentative reading. Finally, in Gugu-Yalanji (rightmost column) verbal reduplication 'serves to indicate an ongoing, repeated or habitual action and/or a certain intensity in action' (Patz 2002: 39-43). This is encoded as expressing general aspect (π1), predicate- and event quantification (π1 and π2).

Many of the combinations in Table 7-16 occur as adjacent meanings in the diachronic paths presented earlier in 7.2.3 in Figure 7-4: an iterative may develop into a continuative or a frequentative. However, the continuative and frequentative are on separate paths and the iterative and habitual or repetitive are not adjacent in Figure 7-4. However, the diachronic paths in 7.2.3 are not exhaustive: it is very well possible that a continuative may become a frequentative as well (consider for example English) and that an iterative may develop immediately into a habitual (see also Bybee et al. 1994: 159). The combinations in Table 7-16 are all in accordance with the predictions that follow from the Scope Hierarchy: they only combine functions that have similar or adjacent scope.

Finally, there are a few more, seemingly incidental combinations of semantic functions. First, there are four markers that combine aspect and tense: in Tigre (Leslau 1945: 8) and Karok (Bright 1957: 124) a single marker expresses prospective aspect and future tense; in Chepang, a single marker expresses perfective aspect and past tense and another marker expresses imperfective aspect and present tense, dependent on the order of expression (Caughley 1982: 49, 104-11). Second, the sample contains three expressions that combine irrealis with past/perfect/perfective: Abkhaz has a marker that can express counterfactual (π2) and past tense (π2) and a marker that can express perfect aspect (π1) and general irrealis (π2) (Hewitt 1979: 173, 75, 80-81); in Mano, the function of perfective (π1) is combined with the function of irrealis (π2) (Becker-Donner 1965: 38ff). Third, there are seven combinations of semantic functions that only occur in one language: Inuit has a marker *sima* that expresses perfect aspect (π1) and evidentiality (π3) (Fortescue 1984: 265-66, 72-73); Baluchi combines remote past (π2) and certainty (π3) in one expression (Barker & Mengal 1969: 340-41); Udmurt has a single expression for future

tense (π2) and frequentative (π2) (Winkler 2001: 48); Tok Pisin combines habitual and ability (Mühlhäusler 1985: 339, 81); Nung has one marker for root possibility (π1/2) and perfect aspect (π1) (Barnard 1934: 20-22, 27-28); and Gugu-Yalanji for obligation (π1/2) (Patz 2002: 37) and irrealis (π2) (Hershberger 1964: 37). Of all these combinations of meanings, only the combination of perfect aspect and evidentiality in Inuit is in conflict with the hypothesis. It functions both as a π1- and as a π3-operator, but not as a π2-operator. It is, however, in accordance with the idea that a single item can only express senses that are adjacent on a single diachronic path since a perfect can develop directly into an evidential marker, as was shown in Figure 7-2 in 7.2.3.

From the Scope Hierarchy it is predicted that different semantic functions of a single item can only have similar or adjacent scope. The combination that is thus impossible is an item that functions as a π1-operator and as a π3-operator, but not as a π2-operator. Table 7-17 presents an overview of all the polysemous expressions in the sample according to their scope.

If the three necessity markers in Table 7-12, for which it is uncertain whether they can express π2-modality, are ignored, there remains one counterexample to the predicted configurations. In Inuit, *sima* can express perfect (π1) and evidentiality (π3) (Fortescue 1984: 265-66, 72-73). As was shown in Figure 7-2, there is a universal diachronic path from perfect aspect to evidentiality. The meanings of *sima* do cover adjacent semantic notions in the diachronic path, but the diachronic path skips a scope level.

In sum, the polysemous markers in the GRAMCATS sample corroborate the adjacency hypothesis. For the semantic functions of which the diachronic paths are known, in most cases single items indeed express semantic functions that

Table 7-17. Combinations of scopes in polysemous expressions (*N* = 159)

		Frequency	
	Configurations	**N**	**%**
Predicted	π1 + π1	8	5
	π1 + π2	98	62
	π2 + π2	4	2.5
	π2 + π3	35	22
	π1 + π2 + π3	13	8
Not predicted	π1 + π3	1	0.5

are adjacent on a path. Of all the polysemous items, only one is not in accordance with the hypothesis that a single item can express only semantic notions with adjacent scope.

7.5.2.2 Portmanteau expressions

For portmanteau expressions, grams that at the same time express two or more different meanings, from different semantic domains, a comparable prediction holds as for polysemous items. There is no restriction expected on the specific semantic functions that may be expressed by one morpheme, but it is expected that operators only merge if they have the same or adjacent scope. What are the combinations of semantic functions in the portmanteau expressions of the sample?

There are 46 portmanteau expressions in the sample. Table 7-18 shows which combinations of semantic functions occur and how often.

Table 7-18. Frequency of combinations of meanings of portmanteau expressions (*N* = 46)

N	Aspect (π1)	Tense (π2)	Quant. (π2)	Irrealis (π2)	Modality/Evid.
9	Imperfective	Past			
6		Past	Habitual		
6	Perfective	Past			
4	Perfect	Past			
3	Perfect	Present			
2	Perfect	Non-future			
1	Imperfective	Present			
2	Imperfective	Non-future			
3	Perfective	Future			
3	Imperfective	Future			
1	Continuative	Present			
1	Continuative	Past			
1		Past	Repetitive		
1		Past			Inference (π3)
1		Past			Certainty (π3)
1				Counterf.	Obl. (π1/π2)
1					Weak obl. (π1/π2)

Notes. Quant. = Quantificiation ; Evid. = evidentiality ; Counterf. = Counterfactual ; obl. = obligation

Most expressions combine notions of aspect and tense, in particular imperfective, perfective or perfect aspect often combine with tense (π2). The most common combination is past tense and imperfective aspect, for example the suffix *-šiŋ* in Agau (Hetzron 1969: 28ff) or *-ina* in Alyawarra (Yallop 1977: 50-53). The complex portmanteau tense-aspect system in Guaymi (Kopesec 1975: 22) was already presented in Table 7-4. A second combination that occurs quite often is event quantification (π2) with past tense. Kanakuru, Agau, Chacobo, Kui, Tem and Temne all have a habitual past marker; Temne also has a repetitive past (see Appendix G). Moreover, Slave has two expressions that combine modality and irrealis: there is an expression for counterfactual obligation and for counterfactual weak obligation (Rice 1989: 418-19). Finally, Uigur combines past tense with subjective epistemic modality: it makes an opposition between certain past and inferential past (Nadzhip 1971: 117-18).

As well as for polysemous grams, H3b predicts for portmanteau expressions that the fusion of two or more semantic functions into one single expression is restricted to operators that have equal or adjacent scope. In other words, the only combination that is not expected to occur in a portmanteau expression is the combination of a π1- and a π3-operator, since these scopes are not adjacent. The combinations of portmanteau expressions in Table 7-18 are presented again in Table 7-19, but now with respect to the scopes they combine. The table shows that most portmanteau expressions combine a π1- and a π2-operator. The only combination that is not predicted, π1 + π3, is in fact not attested. Two other combinations that were expected to be possible do not occur either, π1 + π1 and π1 + π2 + π3. This makes sense if one realizes that portmanteau expressions can only evolve if they combine meanings that

Table 7-19. Combinations of scopes in portmanteau expressions (*N* = 46)

		Frequency	
	Configurations	**N**	**%**
Predicted	π1 + π1	0	-
	π1 + π2	37	80.4
	π2 + π2	7	15.2
	π2 + π3	2	4.4
	π1 + π2 + π3	0	-
Not predicted	π1 + π3	0	-

frequently co-occur. The fact that the combination of π1, π2 and π3 does not occur may be because the frequency of a specific combination of three TMA expressions in one utterance is so low that it would never grammaticalize. The fact that the combination of π1 + π1 does not occur may lie in the function of π1-operators. They specify the property or relation designated by the predicate, by aspect, modality or quantification. The absence of this combination suggests that the specific combinations do not occur often enough to grammaticalize: apparently specific modal markers do not combine frequently with specific aspect operators.

Table 7-19 clearly shows that all the portmanteau expressions in the sample adhere to the predicted combination of scopes: a single expression may only denote meanings with adjacent or similar scope. There are no counterexamples to the predicted co-occurrences.

7.5.2.3 Conclusion

The Scope Hierarchy correctly predicts the possible combinations of semantic functions within a single expression (H3b). Both polysemous and portmanteau expressions combine operators with similar or adjacent scope, with the exception of the polysemous marker in Inuit, that combines perfect aspect and evidentiality. These meanings are, however, also related diachronically (7.2.4). The data clearly show that there is a very strong tendency that the synchronic use of markers reflects the semantic relatedness of different meanings and the scope relations between these meanings. Scope plays an important role in the limits on variation.

7.6 EXPRESSION FORM

This section will explore whether there is a correlation between scope and expression form of operators. Older grams are formally more grammaticalized, i.e. they are more fused with the main verb, more dependent on surrounding material and shorter in length. Although scope on the one hand and age of grams on the other hand are not identical, they are related and the hypothesis has been formulated as if they are alike:

Q4: *What is the expression form of TMA expressions?*

H4: Operators with wider scope show a higher or equal degree of formal grammaticalization than operators with narrower scope.

What is the degree of formal grammaticalization of specific expression forms? The degree of formal grammaticalization is higher if elements are phonologically more reduced, have fewer properties of their original lexical

category and have a fixed syntactic position or are even fused with other items. Abstracting away from language type, inflection shows the highest degree of formal grammaticalization, particles and auxiliaries show a lower degree of formal grammaticalization and periphrases are the least grammaticalized. Inflection is most reduced, has the most fixed position (is even fused), and shows the fewest lexical properties (see 5.4.4). However, the general language type, isolating, analytic, fusional or agglutinative, influences the highest possible degree of formal grammaticalization. Within isolating or analytic languages, most words are mono-morphemic and the highest degree of formal grammaticalization seems to be a particle, whereas in fusional or agglutinative languages, inflection is the most grammaticalized form.

7.6.1 Method

The TMA operators in the GRAMCATS sample are all coded very specifically for their expressions form. The different expression types are distributed as presented in Table 7-20. Almost half (49%) of the TMA expressions are inflectional (prefix, infix, suffix), whereas the other half consists for a substantial part of auxiliaries (22%) and particles (12%).

Table 7-20. Proportion of expression forms for TMA expressions (*N* = 919)

Expression Form	%
Stem change	0.8
Tone change	0.9
Reduplication	3.6
Zero	2.8
Suffix	42.2
Prefix	7.1
Infix	0.5
Periphrastic; bound + bound	1.8
Periphrastic; bound + unbound	5.4
Periphrastic; unbound + unbound	0.9
Auxiliary	21.6
Particle	11.8
Unclassified	0.4

In order to test H4, a general distinction is made between bound, non-bound and combined expression forms (periphrases). Bound expression forms include reduplication, stem- and tone change, zero expression, inflection (prefix, suffix, infix), or combinations thereof, the periphrastic constructions with two bound forms. They are considered to have the highest degree of formal grammaticalization. Non-bound expression forms are auxiliaries, and particles or combinations thereof. Finally, periphrastic constructions consisting of a bound and a non-bound element make up the third category. The few expression forms that are unclassified are excluded from further analysis.

In the next sections the relation between scope and expression form is examined. A complicating factor is that the potential degree of grammaticalization of expressions interferes with the morphological type of a language. Therefore, the relationship between morphological language type and the distribution of operators will be explored first.

7.6.2 Scope in different language types

If the morphological type of a language appears to be related to different distributions of operators, H4 cannot be tested in the complete sample; the proportion of certain language types might obscure the relation between scope and expression form. For this test, the languages are divided into three groups: (i) languages with only non-bound expression forms for operators, (ii) languages with only bound expression forms for operators, and (iii) languages with bound and non-bound expression forms for operators. In the sample, 23 languages have only inflectional or other bound expression forms for the TMA expressions, 7 languages have only non-bound expression forms and the other 46 languages have both bound and non-bound expression forms for TMA operators. For each language type the proportion of operators is presented in Table 7-21.

Table 7-21. Proportion of operator types in different language types (*N* = 76)

Languages with	No. of expressions	Type of Operator		
		π1	**π2**	**π3**
Only non-bound forms (*N* = 7)	70	59 %	35 %	6 %
Both forms (*N* = 46)	630	49 %	42 %	9 %
Only bound forms (*N* = 23)	256	39 %	49 %	12 %

The χ^2-test is applied on the raw data for testing dependence of scope and language type ($\alpha = 0.5$). It appears that the distribution is significantly different from chance ($\chi^2 = 12.8$; $p = 0.012$). Morphological language type does correlate with the distribution of scope. The proportion of π1-operators in languages with only non-bound forms is larger than the proportion of π1-operators in languages with only bound forms, whereas the proportion of π2- and π3-operators is small in languages with only non-bound forms and large in languages with only bound forms. There is thus a clear relation between languages with non-bound expression forms and narrow scope operators and between languages with bound expression forms and medial and wide scope operators. To conclude, H4 can be tested only in languages that have different expression forms. The proportion of languages with only bound expression forms is much larger than that of languages with only non-bound expression forms, the former group would influence the results too strongly.

7.6.3 Scope in languages with different expression forms

In order to control for the influence of morphological language type on the results, H4 is tested in the restricted group of languages that allow bound, non-bound and periphrastic expression forms. For these 46 languages wider scope operators will be studied to see if they are more or less bound than narrow scope operators. Non-bound forms are considered formally less grammaticalized than bound forms and periphrastic constructions are considered the least grammaticalized. Table 7-22 presents an overview of the distribution of operator types over expression form.

In order to find out whether scope and expression form are independent variables, the χ^2-test is applied. When all categories are compared, there is no reason to reject the independence hypothesis ($\chi^2 = 9.5$; $p = 0.05$). There does not seem to be a relation between scope and expression form. When, however, the distribution of π3-operators over expression form is compared to the

Table 7-22. Proportion of expression forms ($N = 630$) in languages with both bound and non-bound expression forms ($N = 46$)

		Expression forms		
Operators	***N***	**Bound**	**Periphrastic**	**Non-bound**
π1	312	51 %	10 %	39 %
π2	262	54 %	7 %	39 %
π3	56	38 %	5 %	57 %

distribution of π1- or π2-operators, there appear to be significant differences. Operators with wide scope have a smaller proportion of bound expressions and a larger proportion of non-bound expressions compared to π1-operatores (χ^2 = 8.1; p = 0.018) and compared to π2-operators (χ^2 = 8.0; p = 0.018). These differences are significant. The findings go against hypothesis 4. Wide scope seems to correlate with lower degrees of formal grammaticalization.

In sum, within languages that have different expression forms, **wide** scope correlates with non-bound expressions. However, when different language types are compared, **narrow** scope correlates with non-bound expressions and medial and wide scope with bound expressions.

7.6.4 Complicating factors

Since the results are very inconclusive, alternative factors will be explored. It is possible that semantic functions are blurring the picture, as was the case in 7.4. Certain semantic functions are more often expressed by bound or by non-bound forms than others and if they form a substantial part of a specific layer, they have a relative large influence on the figures. Therefore, a more detailed analysis is carried out, in which the relation between specific TMA domains and expression form is examined. Firstly, the distribution of TMA domains is examined within the group of languages with both bound and non-bound expression forms. See Table 7-23.

Table 7-23. Frequencies of expression forms for each semantic domain, in languages with both bound and non-bound expression forms (*N* = 46)

	Expression forms in %			
Semantic domain	**Bound**	**Periphrastic**	**Non-bound**	***N***
Participant-or. modality (π1)	17	12	71	70
Event-or. modality (π2)	22	10	68	51
Proposition-or. modality (π3)	37	7	56	43
Evidentiality (π3)	38	0	62	13
Irrealis (π2)	43	9	48	23
Aspect (π1)	56	11	33	218
Tense (π2)	65	5	30	144
Event quantification (π2)	61.5	11.5	27	44
Property quantification (π1)	96	4	0	24

Note. or. = oriented

Whether semantic domains and expression form are independent factors is again calculated on the raw numbers with the χ^2-test. It appears that semantic categories are not equally distributed over expression form ($\chi^2 = 98.7$, $p < 0.001$). Domains that are relatively frequently expressed by non-bound forms are participant-, event-, and proposition-oriented modality. Domains that are relatively frequently expressed by bound forms are tense, aspect and quantification. The domains of evidentiality and irrealis do not correlate significantly with a specific expression form. As the domains of aspect and tense are in general much more frequently expressed than other domains (compare Table 7-8) the bound expression forms are proportionally overrepresented in the group of $\pi 1$- and $\pi 2$-operators. It might again be more insightful to compare only semantically related domains.

When the semantically related domains of predicate- and event quantification are compared, there is a significant difference in boundness between predicate and event quantification ($\chi^2 = 9.7$, $p < .01$) in that property quantification is more bound than event quantification. This goes against the hypothesis. However, when tense and aspect are compared, they show an equal level of boundness ($\chi^2 = 4.9$, $p = 0.08$), just like the different types of modality ($\chi^2 = 6.1$, $p = 0.19$). These results do not support the idea that scope and expression form are related. In fact , there seems to be a relation between semantic domain and expression form. Tense, aspect and property quantification are more often expressed by bound forms, whereas modality is more often expressed by non-bound forms.

This idea is further investigated in different language types. Do certain language types have a preference for certain semantic domains? Languages are again divided in three groups: languages (i) with only bound expression for TMA, (ii) with only non-bound expression and (iii) with both types of expression. Table 7-24 presents the proportion of different TMA domains for each language type.

Whether language type and the presence of semantic domains are independent variables is calculated with the χ^2-test. It appears that these variables are not independent ($\chi^2 = 37.6$, $p = 0.0017$). The proportion of expressions of participant-oriented modality is relatively large in languages with only non-bound expression forms and relatively small in languages with only inflection. The proportion of different aspect expressions is relatively small in languages with only inflection and large in languages with both expression forms. The proportion of different tense expressions is relatively large in languages with only bound expression and small in languages with only non-bound expression. Finally the proportion of evidential markers is relatively large in languages with only bound expression, compared to the other two language types.

Table 7-24. Proportions of semantic domains within different morphological types of languages (*N* = 76)

	Languages with		
TMA domain (in %)	**Only bound forms *N* = 255**	**Both forms *N* = 630**	**Only non-bound *N* = 70**
Participant-or. modality (π1)	9	11	27
Event-or. modality (π2)	9	8	14
Proposition-or. modality (π3)	7	7	6
Evidentiality (π3)	5	2	0
Irrealis (π2)	4	4	3
Aspect (π1)	26	35	30
Tense (π2)	29	23	16
Event quantification (π2)	8	7	3
Property quantification (π1)	4	4	1

In sum, neither the distribution of semantic domains over language types nor the expression form for semantic domains is randomly distributed. As a result, languages with only bound forms have proportionally more operators with medial or wide scope, since the proportion of tense and evidential operators is relatively large and the proportion of aspect operators relatively small. Languages with only non-bound expression forms have proportionally more operators with narrow scope, because the proportion of participant-oriented modality markers is relatively large and the proportion of tense operators relatively small. Languages with different expression forms have a large proportion of aspect operators that are relatively often expressed by bound forms.

Notice that there is no one-to-one relation between the scope of the semantic categories and the expression forms. Aspect (π1) is often expressed by bound forms, whereas participant-oriented modality (π1) is often expressed by unbound forms.

The relation between semantic domain and expression form is probably even more complicated than the discussion shows, because the generalization over specific semantic functions may not be valid. Bybee & Dahl (1989) show that within broad semantic domains the specific semantic functions correlate with specific expression types. See Table 7-25. Within the sample of Dahl (1985),

progressive and perfect aspect are often periphrastically expressed, whereas perfective and imperfective are often expressed by bound forms. Past tense is most often expressed by bound forms, whereas future is in about half of the cases expressed periphrastically and in half of the cases by bound forms.

Table 7-25. Expression forms of major gram-types in sample of Dahl (1985, adapted from Bybee & Dahl 1989: 56)

Periphrastic		**Bound**	
perfect (16/18)	88%	past (33/45)	73%
		perfective (17/20)	85%
progressive (18/19)	95%	imperfective (7/7)	100%
future (27/50)	54%	future (23/50)	46%

7.6.5 Discussion and conclusion

In 6.6 it was shown that in English, expression form correlates with age of a gram, and only indirectly with scope. This section has shown that expression form correlates with semantic function, rather than with scope, and that semantic function correlates with morphological language type. Aspect, property quantification and tense are often expressed by bound expression in languages that have different expression forms. Since these categories are very frequent they constitute a large proportion of π1- and π2-operators; the high percentage of bound π1- and π2-operators in Table 7-22 may be solely the result of the semantics interfering. Language type also correlates with the presence of semantic functions. Participant-oriented modality markers are strongly represented in languages with only non-bound forms, whereas tense and evidential markers form relatively large groups within languages with only bound forms. The proportion of aspect operators is relatively large within languages with different expression forms.

An explanation for the correlations may lie in the grammaticalization paths. As modal expressions often have their sources in single lexical verbs, they may more easily grammaticalize in languages with only non-bound expression forms. As aspectual expressions often have their sources in periphrastic constructions, they may more easily grammaticalize in languages that allow bound expression forms. It would be a very interesting question for further research to find out what the influence is of the morphological type of languages on the ease with which specific constructions may grammaticalize.

Concerning the present research, it is evident that H4 should be rejected. Scope hardly seems to play a role in expression type, at most in an indirect way.

The Scope Hierarchy does not correctly describe the variation in expression forms.

7.7 ORDER OF EXPRESSION

The final area in which the Scope Hierarchy was expected to be reflected is the syntactic order of different TMA expressions. It is predicted that the order of TMA expressions reflects the Scope Hierarchy, because of the principle of iconicity.

Q5: *What is the expression order of TMA expressions?*
H5: The expression order of TMA expressions iconically reflects the scope relations as follows: π3 π2 π1 Predicate π1 π2 π3

In order to find out whether the syntactic order of morphemes indeed reflects their semantic scope, the possible orders of different TMA expressions were documented. Unfortunately, for many languages it was impossible to find reliable information on the order of expression, since most grammars lack an explicit discussion of order phenomena. In several grammars there are incidental examples that contain different TMA expressions, however, if the order of different expressions is not explicitly discussed in the grammar, it is not clear whether the order found in specific examples is the only order allowed in the language. The clearest evidence was found in examples that present an order of TMA expressions that is different from the predicted one, the counterexamples to the hypothesis. Examples that show the predicted order of morphemes should, however, be treated with more reservation, since different orders of expression might also be possible. For some languages, a template is presented that indicates the positions of different markers with respect to the verb stem. Then, the order of expression is clear, although a problem remains in that the co-occurrence of morphemes is often not explicitly discussed.

In spite of the difficulties, as much information as possible was collected on the expression order of TMA operators in different languages. For establishing the order of expression the criteria of Bybee (1985: 34) were followed:

1. Portmanteau expressions have no relative order of two morphemes, because they are fused.
2. When two TMA markers are expressed on different sides of the predicate, their distance to the verb depends on the possibility to place another morpheme in between the marker in question and the verb. If this is

possible for one marker, but not for the other one, the first marker is considered farther away from the predicate.[8]

3. When morphemes are mutually exclusive, there is no order between them.
4. Operators expressed by an affix are considered farther away from the predicate than operators expressed by reduplication or stem change.

First an overview is presented of the expression orders that are in accordance with the hypothesis, in Table 7-26. In this table, the examples are not repeated as in the original texts in the reference grammar: only the glosses are presented, thereby using my own analysis of the TMA expressions in question, which may be different from the analysis by the author of the grammar. A dash indicates that the gram is bound (inflection) and a space that the gram is unbound. A comma between two semantic functions indicates that these functions can be marked mutually exclusive by different expressions and a slash between two functions indicates that there are two possible interpretations of a single polysemous gram. In the rightmost column, the analysis with respect to scope is presented.

As an illustration, one of the examples will be discussed in detail. Consider (60), an example from Rukai in which different TMA expressions occur:

Rukai (P. J.-K. Li 1973: 160)

(60) *wa-uda-udal-ŋa*
PAST-IPFV-rain-COMPL
'it has been raining.'

In row 8, column 3 of Table 7-26, this example is represented using a general gloss only, according to my analysis: past–imperfectiveV–perfect. Furthermore it is indicated that this construction consists of a prefix for tense, a reduplicated verb stem for indicating imperfective and a suffix for perfect aspect. Column 4 presents the gloss in terms of scope: π2-π1Pred-π1. It is considered an example that supports the hypothesis, since reduplication (imperfective) is considered closer to the stem than inflection (tense). The order of expression thus reflects the scope relation between past tense and imperfective aspect.

[8] A slightly different, though comparable situation holds for Worora (Love 2000), in which tense is expressed on an auxiliary that comes in between the predicate and the tense inflection. In contrast, an iterative, frequentative and habitual are directly expressed on the verb without an intervening auxiliary. They are therefore considered closer to the predicate than tense.

Table 7-26. Examples in the sample in which expression order reflects scope relations

Language	Reference	Gloss [according to analysis of AB]	Order
Agau	Hetzron (1969: 35)	V–perfect–progressive–past	Pred-π1-π1-π2
Kanakuru	P. Newman (1974: 50ff)	Past/future–PRON V–imperfective/habitual	π2/π2-PRON Pred-π1/π2
Cheyenne	Leman (1980)	Uncertainty–tense–V	π3-π2-Pred
Tucano	Ramirez (1997: 151)	V–imperfective/habitual-uncertainty–tense–epistemic.possibility/evidentiality	Pred-π1/π2-π3-π2-π2/π3
Gugada	Platt (1972: 28,38)	V–progressive–tense V–progressive–epistemic.possibility/uncertainty	Pred-π1-π2 Pred-π1-π2/π3
Alyawarra	Yallop (1977: 61-62)	V–iterative/continuative–tense	Pred-π1/π1-π2
Worora	Love (2000: 33-35, 106)	V AUX–tense V–iterative/frequentative/habitual	Pred AUX-π2 Pred-π1/π2/π2
Rukai	P.J.-K. Li (1973: 160)	past–imperfectiveV–perfect [prefix– (redup)V–suffix]	π2-π1Pred- π1
O'odham	Mathiot (1973-78: Tables VI, X, XIX)	V–aspect/property-/event.quantification SUBJECT–tense–epistemic.possibility/uncertainty/evidentiality	Pred-π1/π1/π2 SUBJ-π2-π2/π3/π3
Kui	Winfield (1928: 85-86)	V– (im)perfective AUX–tense	Pred-π1 AUX -π2
Yagaria	Renck (1975: 116)	V–perfective–future progressive–V–future	Pred-π1-π2 π1-Pred-π2
Nimboran	Anceaux (1965: 109, 11)	V–progressive–iterative-present/past	Pred-π1-π1-π2/π2
Ono	Wacke (1930: 164-69)	V–progressive–tense V–frequentative–tense	Pred-π1-π2 Pred-π2-π2

Table 7-26 continued. Examples in the sample in which expression order reflects scope relations

Language	Reference	Gloss [according to analysis of AB]	Order
Bongu	Hanke (1909: 53)	V AUX (perfect) –future	Pred π1-π2
Yessan-Mayo	Foreman (1974: 38)	V–direction– "aspect"–"tense" "aspect" = completive, negative potentiality, continuative, iterative ; "tense" = present, near past, remote past, future	Pred-π1-π2
Temne	W.A.A. Wilson (1961: 26)	habitual ability V	π2 π1 Pred
Bari	Spagnolo (1933: 186)	future ability V	π2 π1 Pred
Zuni	S. Newman (1965: 50, 53)	V–ingressive–past V–progressive–past/present	Pred-π1-π2 Pred-π1-π2
Lao	Yates & Sayasithsena (1970: 70)	non.past root.possibility V	π2 π2/π1 Pred
Chepang	Caughley (1982: 94-95, 105-06, 12)	V–obligation $\text{obligation}_{\text{AUX}}$ –tense/irrealis V–perfective–non.past/irrealis/uncertainty V–completive–irrealis/uncertainty	Pred-π1 π1-π2/π2 Pred-π1-π2/π2/π3 pred-π1-π2/π3
Cantonese	Kwok (1971: 77-78)	uncertainty/epistemic.possibility future/ability V	π3/π2 π2/π1 Pred
Uigur	Nadzhip (1971: 117-18)	V–ability–past V–past–probability	Pred-π1-π2 Pred-π2-π3

In a similar way, Table 7-27 presents the examples that were found in the corpus that do not support the hypothesis. One example from Chepang will be discussed as an illustration. Notice that Chepang also occurs in the first table, with examples that support the hypothesis. However, the example in (61) is a counterexample to the hypothesis.

Chepang (Caughley 1982: 106)

(61) *jaʔ yom-ʔi–teʔ ŋayʔ-caʔ-naʔ*
tiger bear-AG-CIF get-UNC-IPFV
'Tigers or bears may get you.'

This example is represented in row 8, column 3 of Table 7-27 by its gloss: V-irrealis/uncertainty-imperfective. In (61), *-caʔ* is a marker of uncertainty (π3), but it can also express irrealis (π2). Column 4 presents the gloss in terms of its scope: Pred-π2/π3-π1. it shows an order that conflicts with the hypothesis, since operators with medial or wide scope are expressed closer to the predicate than an operator with narrow scope.

Palantla seems to be an exceptional case. The general template for the order of morphemes in this language is negation-aspect-tense-derivational/directive-V (Merrifield 1968: 21). The aspectual notions in this template are the imperfective and perfective, tense notions are past hodiernal and hesternal or remote, the derivational notions are not included in this research and directive morphemes include an habitual, progressive, prospective and completive marker. Although the template suggests Palantla to be a serious counterexample, as perfective and imperfective occur outside the scope of tense markers, the only co-occurrence of operators that in fact forms a counterexample is perfective–past–V. Other possible combinations in Palantla are all in line with the predicted order.

Table 7-27. Examples in the sample in which expression order does NOT reflect scope relations

Language	Reference	Gloss [by AB]	Order
Chacobo	Prost (1962: 116-18)	V-remote.past-perfective V-evidential-imperfective V-habitual.past-remote.past-perfective	Pred-π2-π1 Pred-π3-π1 Pred-π2-π2-π1
Tucano	Ramirez (1997: 151)	V- imperfective/habitual-uncertainty-tense-epistemic.possibility/evidential	Pred-π1/π2-π3-π2-π2/π3
Motu	Lister-Turner & Clark (n.d.: 14)	perfect/progressive non.future V-continuative.present/continuative.past	π1/π1 π2 Pred-π1+π2/π1+π2
Yessan-Mayo	Foreman (1974: 38)	Verb–direction–"aspect"–"tense" "aspect" = habitual ; "tense" = perfect	Pred-π2-π1
Kanuri	Lukas (1937: 25)	perfective-past-V	π1-π2-Pred
Palantla	Merrifield (1968: 21)	perfective-past-V	π1-π2-Pred
Maidu	Shipley (1964: 40)	[STEM-completive/ability/ingressive/continuative-evidential]-tense-(im)perfective/habitual […] = Verb theme. NB: unclear which combinations are allowed	[Pred-π1/π1/π1/π1-π3] –π2-π1/π2
Chepang	Caughley (1982: 106)	V-irrealis/uncertainty-imperfective	Pred-π2/π3-π1
Lahu	Matisoff (1973: 215, 36)	obligation iterative/repetitive ingressive continuative V potentiality obligation continuative perfect resultative	π1/π2 π1/2 π1 π1 Pred π1/π2 π1/π2 π1 π1 π1

For 22 languages of the 76 in the sample, examples or templates were found that support the hypothesis (Table 7-26), but it is not certain whether alternative orders are allowed in these languages. Although there is considerable support for the hypothesis, there is also a number of counterexamples, sometimes within the same languages (Tucano, Yessan-Mayo and Chepang). IN nine languages, examples or templates were found that go against the hypothesis (Table 7-27).

It is clear that the hypothesis is formulated too absolutely. There seems to be a tendency for an iconic reflection of semantic scope in syntactic order, but it is a tendency, not an absolute principle. Apparently, even though the functional relations between operators are to a certain extent mirrored in the expression order, there are other factors that may distort this 'ideal' iconic picture.

Some additional evidence for H5 can be found in the study of Bybee (1985) that is based on a different sample of 50 languages. Bybee (1985: 34-35) examined the order of inflectional TMA expressions in her sample. In 18 languages both aspect and tense is expressed. For 10 of these languages, the ordering is not relevant, because the expressions are either mutually exclusive, expressed in a portmanteau expression or with equal distance to the verb. In the other 8 languages, aspect markers are expressed closer to the stem than tense, whereas the opposite order does not occur. In 23 languages, both aspect and epistemic modality are expressed. In 10 of these languages aspect is expressed closer to the stem than modality, whereas the opposite order does not occur. Finally, in 20 languages both tense and epistemic modality are expressed. In 8 of these languages, tense is expressed closer to the stem and in the other languages the order is not relevant or unknown. In one language, Ojibwa, epistemic modality (dubitative) is expressed closer to the stem than tense. In terms of scope, the results in Bybee (1985) show that π1-operators of aspect are expressed closer to the predicate than π2-operators of tense and than π2-, or π3-operators of epistemic modality in all relevant cases. Markers of tense (π2) are expressed closer to the predicate than π2- or π3-operators of epistemic modality or mood in seven out of eight languages. These data clearly support the claim that there is indeed a strong tendency for scope to be iconically reflected in syntax.

To conclude, there is a rather strong tendency for iconic reflection of scope in syntactic order: examples in the GRAMCATS sample that support the hypothesis by far outnumber the counterexamples. Further support for H5 is found in the study of Bybee (1985). It would be interesting to find out why the scope relations are not always reflected. An explanation might be found in the continuous processes of grammaticalization. Old grams with medial or wide scope may be fused to the verb, whereas new grams with narrower scope are expressed by auxiliaries or periphrases. When these new grams also become

fused, they might merge with older grams. It is very improbable that they will be inserted in between the verb and the older gram, as this string is a stable construction in the language. Detailed diachronic surveys are needed to reveal how syntactic order and possible changes therein exactly arise.

7.8 DISCUSSION AND CONCLUSION

There is much evidence that the Scope Hierarchy is reflected in different linguistic features. However, the correlations between scope and certain linguistic domains are not always as clear as expected. With regard to the diachrony of operators, the layered structure makes the correct predictions (H1). Diachronic paths develop from narrow to wide scope and not the other way around. The only path that is not completely in line with the expectation is the development from a perfect aspect marker to an evidential expression, since this involves a large extension of scope. It also appears that frequency and variation generally decrease as scope increases (H2), although this decrease is less marked than expected: operators with narrow and medial scope are about equally represented, whereas operators with wide scope are clearly less frequent, both crosslinguistically and within languages. This suggests that narrow and medial scope operators do not differ fundamentally in markedness, whereas wide scope operators are undoubtedly more marked, that is, they are probably less relevant to communication.

The Scope Hierarchy appeared to be a very strong predictor of possible synchronic configurations of TMA expressions (H3a): there are (a few) languages that have only π1-operators, languages that have π1- and π2-opeators and languages that have π1-, π2- and π3-operators. Other configurations are not attested. It is however impossible to determine a dependency relation between different operator types. The difference in distribution can best be understood as a markedness cline, rather than a real **implicational** hierarchy. The Scope Hierarchy also makes correct predictions about single items that express multiple functions. Single items only express functions that have similar or adjacent scope, with the exception of a marker that expresses perfect aspect and evidentiality.

An area for which the Scope Hierarchy seems to be irrelevant is the expression form of operators. A correlation between scope and expression form (H4) could not be established. There were no indications of dependency between these variables. Expression form rather seems to correlate with semantic function. Finally, with respect to the expression order (H5), the predictions are too absolute, although there is a clear tendency for syntactic order to iconically reflect semantic scope. This is however not an absolute

principle. There are factors that compete with the Principle of Iconic Ordering (5.4.5).

All in all, the scope relations between operators are an important factor of influence on the possible variation in TMA systems. The results in this chapter that are based on crosslinguistic data, strongly support the findings in Chapter 6, that were based on only one language. The Scope Hierarchy cannot by itself explain all the facts about TMA systems. In particular, alternative explanations need to be found for the expression forms of TMA expressions. Furthermore, there are competing factors that influence the frequency and expression order of TMA operators. In spite of the shortcomings of the Scope Hierarchy, it does account for the limits on variation in adult languages to a large extent. Whether the Scope Hierarchy can also account for the limits on variation in stages of language acquisition will be explored in Part III.

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Theory, typology, acquisition

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Part III ***Acquisition***

INTRODUCTION TO PART III

In Chapter 1 it was hypothesized that universals in general and implicational hierarchies in particular describe restrictions on possible language systems in adult *and* in child language. In Part II it was found that the Scope Hierarchy is to a large extent reflected in TMA systems in adult language. Part III will discuss the TMA systems in child language. The Scope Hierarchy, $\pi1 \subset \pi2 \subset \pi3$, predicts that the presence of $\pi3$-operators in a language implies the presence of $\pi2$-operators and the presence of $\pi2$-operators implies the presence of $\pi1$-operators, but not the other way around (see 5.4.3). It is hypothesized that this implicational hierarchy also holds for different stages of first language acquisition. There will be no stage in child language in which $\pi2$-operators are present, but $\pi1$-operators are not, or in which $\pi3$-operators are present, but $\pi2$- and $\pi1$-operators are not. This entails that the acquisition order of operators follows the direction of the hierarchy: children will start out with narrow scope operators ($\pi1$), that express aspect, participant-oriented modality, and property quantification; the semantic functions of these operators help in building up a proper description of a state of affairs (see 2.4). They are presumably conceptually the least complex and the most basic in young children's conversations, which, as we know, are mainly about the here-and-now. After this, children will acquire operators with medial scope ($\pi2$) that express tense, event-oriented modality, irrealis and event quantification. The semantic functions of medial scope operators are more abstract: they modify the situating function of the utterance. As the conversations of children more and more concern the there-and-then, these functions will gradually emerge. Finally, operators with wide scope ($\pi3$), i.e., proposition-oriented modality and evidentiality, are acquired. These operators modify the presentation of the content that is transferred from speaker to addressee, and are the most complex and abstract. Whether the acquisition of TMA expressions in fact starts out with $\pi1$-operators, followed by $\pi2$-operators and $\pi3$-operators, so that there is no stage in language acquisition that is not in accordance with the Scope Hierarchy will be investigated in detail for the acquisition of English (Chapters

8 and 9) and in a more general approach for the acquisition of 24 other languages (Chapter 10).

Before starting these chapters on acquisition, however, it is necessary to examine briefly some presumptions that have been suggested for the acquisition of TMA systems. First, several proposals will be discussed that concern the acquisition of tense and aspect. Second, an important hypothesis with respect to the acquisition of different types of modality will be discussed.

There has been a major discussion on the semantic interpretation of early tense and aspect forms in child language. As the Scope Hierarchy does not so much concern forms, but rather the semantic functions of TMA expressions, the semantic interpretation of TMA forms in child language is of great importance to the study of the acquisition of TMA systems. A major cluster of related approaches to tense and aspect forms in child language claims that tense and aspect forms in child language mark situation types. Early studies on the acquisition of tense and aspect in English (R. Brown 1973), Italian (Antinucci & Miller 1976) and French (Bronckart & Sinclair 1973) found that young children use their tense/aspect morphemes almost exclusively with certain situation types: past or perfective forms were used with telic (punctual) events; present or imperfective forms with states and progressives or imperfectives with dynamic atelic activities. These findings were later confirmed for English (L. Bloom, Lifter, & Hafitz 1980; Clark 1996; Harner 1981; McShane & Whittaker 1988), and supported by crosslinguistic evidence from Turkish (Aksu-Koç 1988, 1998), Greek (Stephany 1997) and Cantonese (Erbaugh 1978). The close connection between tense/aspect morphology and situation type led to the hypothesis that early tense/aspect forms in child grammar would not be used to encode tense and aspect, but rather to encode event type (lexical aspect). Children would thus use past tense morphology to indicate that the event is telic and progressive morphology to indicate that the event is atelic. It was proposed that this non-adult like use of morphemes stems from a cognitive limitation to mark temporal deixis; children up to about 2;6 lack an abstract concept of time. This hypothesis is referred to in the literature as the Aspect Before Tense Hypothesis (L. Bloom et al. 1980), the Defective Tense Hypothesis (Weist, Wysocka, Witkowska-Stadnik, Buczowska, & Konieczna 1984) or the Aspect First Hypothesis (Wagner 1998).

Related to the Aspect Before Tense Hypothesis is the Language Bioprogram Hypothesis, formulated by Bickerton (1984). He tries to account for the fact that children at such an early age distinguish between situation types by positing that children have innate knowledge of the universal distinction between process and state and punctual and non-punctual events. In a similar vein, but different on details, Slobin (1985) has suggested the Basic Child Grammar Hypothesis, that states that children have prelinguistic knowledge of the

distinction between process and result. Notice that Slobin, in contrast to Bickerton, does not make any claims as to whether these concepts are innate or acquired and that Slobin's pre-programmed concepts—process [-telic] versus result [+telic]—are different from Bickerton's—process [+dynamic] versus state [-dynamic] and punctual [+punctual] versus non-punctual [-punctual].

Another approach related to the Aspect Before Tense Hypothesis is the Prototype Account (P. Li & Shirai 2000; Shirai & Andersen 1995). Shirai, Li and Andersen stress that the association between certain situation types and certain tense/aspect morphemes is not specific for child language, and reflects, in their terms, naturalness of combinability. By this, they mean that in discourse situations, there are prototypical or unmarked combinations between certain tense/aspect categories and certain event types.[1] Of events that have a clear end or result, it is often the end state that is relevant to human beings, for example when one has arrived at a location, something has been finished, food has been eaten up, etcetera. Therefore, at the points at which one comments on it, the event is likely to have ended. Furthermore, many telic events, such as fall, break, drop, or spill, last for such a short interval that it is nearly impossible to communicate about these events when they are still ongoing. Therefore, telic events prototypically combine with perfective aspect that presents the event as a whole, including its completion, or with past tense that stresses that the endpoint has been reached. On the other hand, for real world activities that have some duration in time, like playing, drawing a house, reading, peeling an orange, it is more probable that the inner phase is relevant to human beings. Durative activities or processes in which one is involved or which one observes—the wind blowing, a dog barking, a plane flying—are therefore more likely to be ongoing at the moment at which one comments on it then punctual events: therefore, durative situation types with a clear internal dynamic structure prototypically combine with imperfective aspect, that focuses on the internal structure of an event, or with present tense, which indicates that the event is overlapping speech time. The association between tense/aspect morphology and situation type is not limited to child language: in the input to children the relation is also present, although less strong (Aksu-Koç 1998; Andersen & Shirai 1996; Stephany 1981). The Prototype Account assumes that on the basis of distributional analysis, children create semantic representations of tense/aspect morphology that are restricted to the prototypical situation type of the morphological category. The children's semantic representations at that point exclude the combination of tense/aspect morphology with non-prototypical members.

[1] A similar claim is made for the relation between tense on the one hand and aspect or modality on the other hand, among others by Chung & Timberlake (1985). Compare their citation in 3.4.5.

If the above interpretations of early tense and aspect forms are correct, tense and aspect forms mark situation types, then this implies that tense and aspect forms should not be considered operators in the speech of young children. They do not yet constitute a (limited) TMA system. Whether this interpretation can indeed account for the data will be discussed in Chapter 9. In this chapter, the data on English language acquisition will be thoroughly re-examined to find out whether there are grounds for interpreting the tense and aspect forms as marking situation type. An alternative explanation will be presented that can account for the results, the Discourse Topic Hypothesis.

Although many researchers have claimed that early tense and aspect forms in child language are used with non-adultlike meanings, there are also researchers that have claimed the opposite: early tense forms in child language would mark tense semantics from the start. This position is defended, among others, by Smith (1980), Weist et al. (1984), Smoczyńska (1985) and Behrens (1993). The assumption is that children have no pre-established concepts that are mapped onto forms, but are from the start very sensitive to their input language. By analyzing form-function patterns they find out how their language divides up the tense/aspect domain, which semantic notions are encoded in their language and what the forms are that encode the distinctions. The above mentioned researchers found that past tense markers in child English, Polish and German occasionally refer to non-resultative and to non-immediate past and that although tense markers combine predominantly with one situation type, children use them from early on also with other situation types. There is thus no one-to-one relation between situation type and tense marking. Tense is used independently from situation type and not redundantly. As children use tense forms in appropriate, target-like contexts, it is assumed that these forms are used with target-like semantics. If the second approach to early tense and aspect forms is correct, then the use of adultlike forms may be taken as the use of adultlike semantics. Whether this interpretation is tenable from a crosslinguistic perspective will be discussed in 10.5.2, after the exposition of crosslinguistic data on the acquisition of TMA systems.

Part III is build up as follows. In Chapters 8 and 9, the acquisition of TMA in English will be investigated in detail: Chapter 8 focuses on the acquisition of TMA expressions and Chapter 9 explores the relation between TMA markers and situation type and the possible semantic interpretation of early TMA forms. Chapter 10 discusses the acquisition of TMA in a crosslinguistic perspective. To what extent an adultlike interpretation of early child forms can account for the data will also be evaluated in this chapter.

The crosslinguistic data in Chapter 10 will be the basis for exploring if there is a universal development of the semantics of tense and aspect. There have been to date two models that try to describe the developmental steps in the

acquisition of tense semantics, formulated by Weist (1986) and Christensen (2003). Weist proposed a stage model of the development of the temporal system, which is based on the assumption that children's general conceptual development precedes linguistic encoding. The linguistic encoding of certain temporal relations is considered sufficient evidence that the conceptual knowledge has evolved. Although Weist makes no explicit claims about the relation between conceptual and linguistic development, his figures suggest that a cognitive change almost immediately results in a linguistic change (Weist 1986: 371).

The first stage, the speech time system, begins when children acquire the notion of object permanence, around 1;0. Children only refer to the here-and-now and Reference time (RT) and event time (ET) are simultaneous to speech time (ST) (see 3.4.1 for an explanation of RT, ET and ST). Verb forms are unanalyzed or frozen forms: they are not yet used contrastively and children do not encode tense, aspect or modality by using them. The only linguistic distinction children make is between statements and requests.

The second stage, the event time system, develops around 1;6, when children become capable of taking an external and internal perspective on situations. An external perspective focuses on event properties as complete, punctual and resultative and an internal perspective on properties as ongoing, continuative, durative and incomplete. The linguistic temporal system is now mono-referential: ET may be located before, after or simultaneous to ST, whereas RT = ST. If external or internal perspective is encoded in a language (for example, perfective in Polish, progressive in Spanish), the distinction will be acquired and marked rapidly by the child. There is a natural relation between internal perspective and speech time and external perspective and anterior events. In the event time system, children

> can make the distinction between ongoing events during the speech time interval and complete events anterior to speech time. In addition, they (…) express their intentions and desires concerning potential subsequent events, i.e. a notion of "irrealis" '(Weist 1986: 366).

What is not expected and not attested is an internal perspective on past events, a past progressive.

The third stage, the restricted reference time system develops around 3;0, when children become capable of 'temporal decentration': they take other viewpoints on time than only the here-and-now. In the linguistic system, RT is now located before, after or simultaneous to ST and is established by temporal adverbs or adverbial clauses. Weist assumes that in the early reference time system, RT is either simultaneous to ST (like in the previous stage) or simultaneous to ET. RT is thus not yet a completely independent reference point in time. This is a transitional stage to an adultlike bi-referential temporal

system, which develops around 4;0: it is a free reference time system, in which ST, ET and RT represent three different points in time. The use of words for 'before' and 'after' signals flexibility in the reference system. A series of experiments in English, Polish and Finnish has supported the claim that children acquire bi-referential problems later than mono-referential problems (Weist, Atanassova, Wysocka, & Pawlak 1999; Weist, Lyytinen, Wysocka, & Atanassova 1997; Weist, Wysocka, & Lyytinen 1991).

A second model that tries to account for developmental steps in the acquisition of tense and temporal expressions is described by Christensen (2003). It has a completely different focus than Weist's model. According to Christensen, temporal information conveyed in the grammatical tense system is vague and incomplete so that the speaker has to supply additional temporal information. The exact temporal reference point is determined by a deictic, anaphoric or explicit specification. Deictic specification rests on extra-linguistic factors present in the discourse space. In (1) for example, the temporal and physical location of daddy are determined by the discourse situation (Christensen 2003: 33):

(1) *–Where is daddy? –He is in the kitchen.*

In the first stage of language acquisition, only deictic specification of the finite verb is available to the child:

> This means that the child acquires the essential formal items of the tense system and establishes the basic temporal meanings associated with these items in a context where the more specific temporal reference of the finite verb is determined by factors present at the time of speech. Since the child is not able to specify the temporal meaning of the finite verb by linguistic means (i.e. anaphorically or explicitly), the use of temporal items with reference to remote past (or future) events or states is highly restricted during the basic stage. (Christensen 2003: 34)

This furthermore means 'that the child has to rely on his interlocutor's ability to make an interpretation starting either from objects present in the discourse space or from mutual experiences or memories.' (Christensen 2003: 41) Later on, the child acquires linguistic forms to specify the temporal location. The first way is by anaphoric specification: the time of another event specifies the temporal location of the finite verb, consider (2) (2003: 33):

(2) [(i) *We went to the Coliseum*,] (ii) *and there he was.*

In (2) the time of the event expressed by (i) specifies the time of the state described by the finite verb in (ii). The second way to specify temporal

locations is by explicit specification, the use of time adverbials, such as the use of *last summer* or *in 1998* in (3) (Christensen 2003: 34).

(3) {*Last summer*/*In 1998*} *Karin went to Rome.*

According to Christensen's approach, the temporal system of a child does not fundamentally differ from an adult system: already at the basic stage it is fundamentally identical to one contextual type of the adult temporal system.

The models on tense acquisition of Weist and Christensen will be discussed again in 10.5.2.2 to see if they can account for the crosslinguistic data. In this chapter an alternative model on the acquisition of tense and aspect will be proposed.

A further important point that has to be discussed before presenting the actual data concerns the acquisition of different types of modality. There is some evidence in the literature that epistemic modality is acquired after deontic modality (e.g. Shephard 1982; Stephany 1986; Wells 1979, 1985). Note that this roughly corresponds to the hypothesis that follows from the Scope Hierarchy, as deontic modality primarily has narrow or medial scope and epistemic modality medial or wide scope. Both Stephany (1986) and Papafragou (1998; 2000) present possible explanations for the acquisition order of the different modal meanings. Stephany (1986: 393) claims that the acquisition order is a logical consequence of Piagetian cognitive development. From about 2 or 3 years old children begin to develop a notion of possibility as distinct from reality, where the notion of possibility is at first only understood in terms of potential future. Around age 7 or 8 children begin to understand the notion of undecidability and not before age 11 or 12 children develop the capacity of hypothetical reasoning. However, symbolic play and the ability to pretend, emerging around 1;6, may be an important precursor to the development of a concept of possibility.

Papafragou (1998; 2000) seeks the explanation for a later development of epistemic modality in the development of a theory of mind:

> My hypothesis [is] that epistemic uses of modals mark operations on mental representations: what the speaker engages in (…) [in epistemic modality] is (potentially conscious) reflection on the content of her own mental states. In other words, successful use of epistemic modals requires the speaker to perform deductive operations on abstract propositions (i.e. on the content of her beliefs *as such*) and to arrive at a warranted conclusion. Such metacognitive abilities are, I suggest, part and parcel of the child's developing theory of mind, and as such are expected to reach an adequate level only well after the third birthday. (Papafragou 1998: 373)

Whether the data on modality are in accordance with the presented explanations will be discussed in 10.5.3.3.

One of the main methodological issues in the next chapters is determining the moment of acquisition: when is a certain TMA expression acquired? Determining the moment of acquisition is a permanent question in research on language acquisition, especially because the appearance of forms does not necessarily imply the acquisition of the corresponding functions. On the other hand, children may communicate certain intentions without using the appropriate forms. In the first place, I have concentrated on the acquisition of adultlike forms. In Chapter 8 on English, I have applied several analyses to shed light on this matter from different viewpoints. Quantitative and qualitative measures are applied to determine the productivity of TMA expressions. The acquisition of TMA systems in the crosslinguistic data had to be determined on the basis of less detailed criteria for productivity. The semantic interpretation of early TMA expressions will be based on an inspection of the universal functions and contexts of use of the forms in child language and a comparison to adult use of those forms. This is the focus of Chapter 9 and section 10.5.

Chapter 8

Acquisition of TMA in English

8.1 INTRODUCTION

In this chapter it will be investigated how children acquire the TMA system in English. There have been numerous studies on the acquisition of English that include one or more of the expressions that will be studied in this chapter. However, this study will be different in that it assumes as a starting point the perspective of scope, which covers the complete semantic domain of TMA expressions. As discussed in 2.4, grammatical expressions that encode aspect and participant-oriented modality are operators with narrow scope (π1-operators). They modify the predicate and specify the property or relation designated by the predicate. Grammatical expressions that encode tense, event quantification, event-oriented modality and irrealis are operators with medial scope (π2-operators). They modify the situating function of the predication and relate the description of the set of possible events to the event the speaker has in mind. Finally, grammatical expressions that encode proposition-oriented modality are operators with wide scope (π3-operators). They modify the proposition and evaluate the propositional content. In Chapter 6 the specific forms and functions within the TMA system in adult English were discussed and classified. This classification serves as the basis for the analyses in this chapter. An overview of the English TMA system is here repeated in Table 8-4 to Table 8-6 in section 8.3.3.

How do children acquire the different expressions of the TMA system of their target language? In hypothesis H3a (see 5.4.3) it was predicted that possible TMA systems are restricted by the Scope Hierarchy: the presence of π3-operators implies the presence of π2-operators, which in turn implies the presence of π1-operators. H3a thus predicts that languages with π3-operators, but without π1- or π2-operators are impossible, just as languages with π2-operators but without π1-operators. In section 6.5 and, particularly, section 7.5, it was shown that H3a makes the correct predictions for possible synchronic configurations of TMA expressions. Only three configurations of TMA operators are crosslinguistically attested: languages that only have π1-operators, languages that have π1- and π2-operators and languages that have π1-, π2- and π3-operators. As argued in 5.4.6, H3a leads to specific expectations with

respect to language acquisition. The general hypothesis in this thesis is that the limits on possible linguistic systems also hold for every stage of child language, because there are similar underlying true universals, that is, cognitive and communicative factors. Only if the acquisition of linguistic elements follows the order of the markedness scale, from least marked to more marked, the language stages are at all times in accordance with the predicted limits on synchronic variation. With respect to the acquisition of grammatical TMA expressions, this leads to the following question and hypothesis:

Q6: *What is the acquisition order of TMA expressions?*

H6: The acquisition order of TMA operators follows the order of the Scope Hierarchy, π1-operator $\subset$ π2-operator $\subset$ π3-operator. Because of increasing complexity and decreasing communicative need, the acquisition order of TMA expressions is π1-operators before π2-operators, and π2-operators before π3-operators.

This hypothesis does not imply that all π1-operators of a specific language should be acquired before all π2-operators, and all π2-operators before all π3-operators, but it does imply that at every stage in child language in which one or more π2-operators are present, there will also be at least one π1-operator and in every stage in child language in which one or more π3-operators are present, there will also be at least one π2-operator (and consequently, also at least one π1-operator). Note that H6 pertains to the acquisition of the linguistic encoding of TMA, and not to the conceptual development of time, event structure, or modality.

In 5.4.6 it was argued that a further hypothesis relevant to language acquisition is H3b, which predicts that single expressions can only cover adjacent regions in semantic space. This implies that they can only have different semantic functions that have similar or adjacent scopes. Considerable evidence in support of this hypothesis was presented in 6.5 and 7.5. It is expected that children are as sensitive to semantic relatedness as adults so that the hypothesis also applies to the stages of child language. This leads to the formulation of Q7 and H7.

Q7: *In what order are the different functions of polysemous items acquired?*

H7: At any stage in language acquisition, a single expression can only cover adjacent regions in semantic space. As a result, a polysemous or portmanteau expression will only have semantic functions with similar or adjacent scopes.

In this chapter, H6 and H7 will be tested in English. Before this can be done, however, the methodology related to determining the acquisition order of operators will be explained.

8.2 CRITERIA FOR ACQUISITION

One of the main methodological issues in this research is determining the moment of acquisition: when is a certain TMA-expression acquired? It is a recurrent issue in research on language acquisition: how to determine productive use of a specific construction. One of the first researchers who tried to solve the issue was Brown (1973), who applied the criterion that the construction should be used correctly in 90% of the obligatory contexts. A problem with this measure is that it can only be used for morphemes that are obligatorily used in the adult stage of the language. In English, tense and progressive aspect are obligatorily expressed, but there are no contexts that require the use of a modal auxiliary. When a child says, for example, *I jump*, when she is not jumping at that moment, it cannot be determined whether she wanted to express *I wanna jump, I can jump, I'm gonna jump*, etcetera. As many TMA categories are not obligatorily expressed, the 90%-criterion is excluded as a measure for this study. A reliable measure for productivity is overregularization. However, this criterion applies well to inflectional categories that have irregular forms, but it is not a good measure for the productivity of auxiliaries or periphrases. A third measure, that has however appeared to be not very reliable, at least not in small samples, is frequency of use (Bates, Bretherton, & Snyder 1991). Pizzuto & Caselli (1994: 156), among others, have used more qualitative criteria for productivity: they consider a morpheme as productive if it is used with two different verbs, e.g., *walk<u>ed</u>* and *work<u>ed</u>*, and if the same verb appears with two different morphemes, e.g. *play<u>ed</u>*, *<u>gonna</u> play*. I will refer to these measures as variation in use and contrastive use, respectively. Both measures are used to reduce the chance that an expression is considered productive when the child has not yet analyzed the grammatical morphemes and the verb roots as different parts of a construction, and uses them instead as unanalyzed strings (cf. Lieven, Pine, & Baldwin 1997; Tomasello 1992). Although it is still possible that a child has not analyzed the different strings when she uses a morpheme with different predicates or a predicate with different morphemes, the more the child shows variation in use of a morpheme and contrastive use of different morphemes, the more likely it is that the child has in fact started to detect the form-function relations.

Because there is no definitive solution to the problem of determining productivity, I will use several criteria for the acquisition of TMA. These are relative frequency, variation in use and contrastive use. The first criterion is not

commonly used as a criterion for acquisition, but here it is relevant to consider the relative frequency of TMA expressions during development compared to the relative frequencies in the final adult stage and in the input. The rationale behind this analysis is that according to the Scope Hierarchy π1-operators are easier to acquire than π2- and π3-operators, and π2-operators are easier to acquire than π3-operators. However, as was shown in 6.4.1, the relative frequency of π2-operators in English is far higher than the relative frequency of π1-operators. On the basis of this input distribution, children will build up their own system. If in the children's system, the relative proportion of π1-operators (as part of all operators) is larger than in the adult distribution, whereas the relative proportion of π2-operators and even more, π3-operators is smaller, this suggests that it is indeed easier to acquire π1-operators than π2-operators than π3-operators. Thus if the proportion of narrow scope operators is relatively large in the early stages, that is, larger than it will be in the end, then it indicates that these operators are easier to acquire and that their relative importance is larger in child than in adult communication. This will be considered as evidence in support of the hypothesis. To resume, the proportion of π1-operators in the early stages does not need to be larger than the proportion of π2-operators to support the hypothesis, but it does need to be larger than the proportion in the final adult stage. Furthermore, the proportion of π3-operators needs to be smaller than in the adult stage to support the hypothesis.

Although relative frequency is an indication of the relative importance and ease of acquisition of operators, it does not reveal how productive a certain construction is—the child might use a handful of unanalyzed strings or frozen forms over and over again. Therefore, qualitative analyses are also needed. One of the main aspects of language acquisition is the acquisition of the form-function relation of strings or parts of strings. Many linguistic models, including FG, make a sharp distinction between content words and function words, or lexical and grammatical elements. Although this distinction is in fact gradual in language systems (cf. Chapter 5), the semantics of the two extremes are different in nature. The most lexical elements have a specific meaning; they designate a property, relation or entity and add content to the utterance. The most grammatical elements have an abstract or general meaning; they do not designate anything but function as modifiers of other linguistic units. They change the content of (parts of) the utterance. Children have to find out what the effect is of grammatical elements, how they modify the content of semantic units. They need to find out in what contexts they should be used and what contrastive forms are, that is, they need to construct paradigms. Only when the child is capable of selecting a grammatical form with the intention to create an effect, the form is deliberately applied and the child masters (at least the core of) the semantics. Bittner, Dressler, & Kilani-Schoch (2003a: xix-xx) distinguish

three phases in the development from unanalyzed towards analyzed forms: in the pre-morphological phase, the child uses only rote-learned forms. A single predicate occurs in only one form. In the proto-morphological phase the child detects and constructs morphological patterns of analogies or of first rules. This phase is characterized by some inflectional contrasts. Finally, there is morphology proper: the system of the child is now qualitatively similar to the adult model.

It could be argued that a child has only acquired the effect of grammatical elements in the final phase—morphology proper—when the element is used every time it should be. However, the analysis of the form-function relation already starts far before that point. As soon as children find out that a specific morpheme shows up in different strings, they have already started to break into the system. The more a child starts to use this morpheme spontaneously in different contexts and the more she uses it in contrast to other markers, the more reason there is to assume that she is deliberately applying the form and deliberately modifying (part of) the utterance. At the same time, she may not yet apply the morpheme every time it should be applied according to the adult norm. This may be because the child has not yet completely mastered all the conventions of use: she may not yet know that it is obligatorily used in certain contexts. It may also be because the child's processing capacities and cognitive load are not yet adultlike. As a result the child is only able to communicate when she restricts herself to the communicatively most important elements. Often, grammatical elements are not crucial for communication, as they have more general meanings than lexical elements (5.2). In many cases, they may be left unexpressed without disturbing the information flow too much. The same principle seems to hold for the presence or absence in children's utterances of lexical elements: the ones that are the least crucial for transferring the intended message (those that can be inferred from the previous context) are most likely left implicit (Greenfield 1979: 165-66). Further factors why children do or do not use a specific morpheme are the rate of activation and the degree of automatization of the elements. The most activated items at the time of speaking are most likely to be expressed and the processes that have been most automatized are most likely to be performed.

The acquisition of form-function relations is thus a gradual process that starts with just a few verbs, with just a few contrasts, but this is in fact where it starts. It is exactly this stage that I want to identify in order to establish the acquisition order of the earliest TMA expressions, since H6 predicts that finding out the form-function relation of π1-operators will occur before finding out the form-function relations of π2-operators or at the same time, and finding out the form-function relations of π2-operators will occur before finding out the relations of π3-operators, or at the same time. The moment that

the child starts to use single morphemes with different predicates (variation in use), I take it that she has started acquiring this specific morpheme. The threshold is arbitrarily set at at least five different predicates with one morpheme in order to be considered productive. Furthermore, the moment the child starts to use two or more different TMA morphemes on a single predicate, I take it that she has started acquiring a semantic contrast between these morphemes.

The acquisition of TMA will thus be investigated from three different angles: the relative frequency compared to adult-adult speech and input, the variation in use of morphemes and the contrastive use of morphemes (construction of paradigms). This leads to three subhypotheses, H6a-H6c:

H6a: The relative frequency of π1-operators is larger in child language than in adult language, whereas the relative frequency of π3-operators is smaller. The relative frequency of π2-operators differs least from the adult stage.

H6b: The variation in use of operators—use of a specific operator with different predicates—follows the order of the hierarchy: π1-operators are used with different predicates before π2-operators, which in turn are used with different predicates before π3-operators.

H6c: Contrastive use of operators—paradigmatic use of different operators on the same predicate—follows the order of the hierarchy: π1-operators are used contrastively before π2-operators, which in turn are used contrastively before π3-operators.

H6a is tested in 8.5, H6b and H6c in 8.6 and 8.7. Bear in mind that the focus lies on the acquisition of linguistic **forms**, in contrast to the development of concepts. When do children find out that certain semantic notions have to be encoded linguistically? In this chapter, it is assumed that the presence of adultlike forms in the children's speech expresses similar semantic functions as the adult TMA expressions, for example, a past tense form in the child's speech is analyzed as denoting past tense and a modal marker is analyzed within the context according to the adult English criteria. Whether this approach is indeed legitimate, will be explored in Chapter 9. The general methodological aspects for testing the hypotheses are discussed in section 8.3. Before the hypotheses will be tested in 8.5 to 8.8, a general sketch will be presented of the development of the TMA system in child English (8.4).

8.3 METHODOLOGY: GENERAL ASPECTS

8.3.1 Introduction

The discussion in this section is limited to the general aspects of methodology relevant to all hypotheses. Details that are only relevant for specific analyses will be discussed in the relevant sections.

8.3.2 Data selection

The speech of three different groups of subjects has been studied: First the spontaneous speech of eight American English children is examined. These data form the basis of this chapter. With respect to testing H6a, the input of the parents to three of the children is collected and the speech of American adults talking among themselves.

The first group of subjects are the children. Data were selected from CHILDES (MacWhinney 1995): four boys and four girls were selected, two from working class families (Eve, Sarah), one from a middle class family (Adam), and five from upper (middle) class families (Peter, Abe, Ross, Naomi, Nina). All children are monolingual in Standard American English and were recorded at home with their parents (both father and mother). Four children were the son or daughter of a linguist (Abe, Ross, Naomi and Nina) who also recorded the sessions; for the other four children one or more researchers were present at the recording sessions. The samples consist largely of daily conversation and a few fragments of monologues while playing alone. Table 8-1 shows the ages at which the children were recorded.

Samples of the children's speech were selected starting at age 1;6 with intervals of three months until the age of 2;6 and then with intervals of six months from 2;6 years onwards. From Adam and Sarah an additional sample was taken at 2;9 and from Sarah also at 3;3 and 3;9 because these children developed much more slowly than the others. Each sample at a particular age consists of exactly 750 child utterances in order to make the samples as comparable as possible. Main clauses, subordinate clauses with a finite verb, tag questions, and different types of verbless utterances[1] were counted as utterance. The number of 750 child utterances in one sample appeared to be feasible considering the available data and it yielded a reasonable number of items to be investigated. The samples are furthermore large enough for different topics and situations to occur in the interaction so that the use of TMA expressions will

[1] For example, utterances that consisted only of an exclamation, an onomatopee, a greeting, vocatives, sounds that signal (dis)agreement and pauses, phrases like *thanks* or *please*, elliptic answers to questions, etcetera.

not only be related to specific discourse topics. Large episodes of book reading in the transcripts are excluded from analysis, because the conversation is much more structured by the parents or the book than in 'free' conversation. Table 8-2 presents an overview of the samples for each child that were investigated. If there were not enough utterances available within the specific month, extra utterances were collected from the previous and/or following month, closest to the intended age. For example, for the sample of Peter 3;0, there was no speech available at this age. Therefore, the data closest to 3;0 are selected, from age 3;1.20. The numbers of the files included in the samples and the exact age ranges are presented in Appendix B.

Table 8-1. Children included in the research

Name	Age range	Reference
Naomi	1;1 - 5;1	Sachs (1983)
Eve	1;6 - 2;3	Brown (1973)
Peter	1;9 - 3;1	Bloom (1970)
Nina	1;11 - 3;3	Suppes (1973)
Adam	2;3 - 4;10	Brown (1973)
Sarah	2;3 - 5;1	Brown (1973)
Abe	2;4 - 5;0	Kuczaj (1976)
Ross	2;6 - 8;0	MacWhinney

Table 8-2. Overview of 750-utterance samples investigated for each child

	Samples at age																
	1;6	**1;9**	**2;0**	**2;3**	**2;6**	**2;9**	**3;0**	**3;3**	**3;6**	**3;9**	**4;0**	**4;6**	**5;0**	**5;6**	**6;0**	**6;6**	**7;6**
Eve	X	X	X	X													
Naomi	X	X	X	X	X		X		X			X					
Peter		X	X	X	X		X										
Nina			X	X	X		X										
Adam				X	X	X	X		X		X	X					
Sarah				X	X	X	X	X	X	X	X	X	X				
Abe					X		X		X		X	X	X				
Ross					X		X		X		X	X		X	X	X	X

As well as the speech of children, the speech of adults was collected, both the speech addressed to the children and that addressed to other adults. These data will be used for the quantitative analyses. The speech of adults addressed to the children (input, child-directed speech) was examined in the samples of Naomi, Nina and Abe. The input to these three children was selected because these children were recorded by (one of) their own parents without other investigators being present, so that the input in the samples is most likely to resemble the input the child is offered every day. Furthermore, these children together cover the whole age range from 1;6 up to 4;6 and there are overlaps in age between Naomi and Nina and between Naomi and Abe that may reveal individual differences. The input-samples consist of all the utterances of adults that are addressed to the child. As a consequence, the number of adult utterances is different for each sample. From age 3;6, the input was only studied with an interval of one year, which excluded the input to Abe at age 4;0 and 5;0. Table 8-3 provides an overview of the samples used for examing the input.

The third group of subjects consists of eight adults speaking to other adults. These data are taken from the Santa Barbara Corpus of Spoken American English (SBCSAE, Dubois 2000) and have already been discussed in 6.4.1.1. The discourse situations in these samples are very similar to the recordings of the children: they consist of normal everyday conversations between acquainted speakers in a familiar surrounding. The total corpus of adult-adult data consists of 2895 utterances. It is treated as one large representative sample of adult-adult American English.

Table 8-3. Number of adult utterances in the input files to Naomi, Nina and Abe

Input to	*N* utterances	Input to	*N* utterances
Naomi 1;6	1001	Nina 2;0	542
Naomi 1;9	793	Nina 2;3	804
Naomi 2;0	309	Nina 2;6	1070
Naomi 2;3	761	Nina 3;0	928
Naomi 2;6	635	Abe 2;6	730
Naomi 3;0	700	Abe 3;0	768
Naomi 3;6	471	Abe 3;6	577
Naomi 4;6	425	Abe 4;6	501

8.3.3 Coding of utterances

In each sample of 750 utterances, the utterances that contained one or more TMA expressions were selected and coded for their semantic function and their scope. The number of utterances that contains a TMA expression is different for each sample. Of the 750 utterances, several utterances were excluded from analysis: excluded were utterances in which the function of the TMA expression could not be interpreted reliably (1), utterances that were imitations of an immediately preceding adult-utterance (2), and utterances that were self-repetitions (3). In the examples presented in this thesis, the conventional abbreviations of CHILDES are used: CHI for child, FAT for father, MOT for mother, INV for investigator.

(1)	CHI:	he's too big.		
	CHI:	is that xxx.	> Excluded	(Nina, 2;3)
(2)	CHI:	It growed off.		
	FAT:	It grew off # right?		
	CHI:	Grew.	> Excluded	(Ross, 3;6)
(3)	CHI:	is this a daddy sheep?		
	CHI:	is this a daddy sheep?	> Excluded	(Peter, 2;6)

If the repeated utterance is only slightly different, it is not considered self-repetition and included in the research. If one of the other participants reacts to the child's utterance and the child repeats the utterance, it is also included in the research, up to a maximum of two repetitions.

Not all utterances that contained a verb were considered marked for TMA. For example, utterances with imperatives do not belong to the domain of TMA. This includes utterances with a 'you-imperative', as in (4), and utterances with *let('s)*, as in (5) ((co)hortatives):

(4) Here # you use my pen now. (Sarah, 3;3)

(5) Situation: Ross (2;6) is on his father's shoulders.
CHI: Let's go running.

Another category analyzed as unmarked for TMA are bare stems in contexts where adult English requires marking of tense, aspect or modality. This includes utterances without a subject, as in (6), since for these utterances it cannot be determined with certainty whether the bare stem is used correctly with a non-third person subject or used incorrectly with a third person subject,

in which case it is considered as unmarked for tense. Also considered unmarked for TMA are utterances in which the child expresses the subject and uses a bare stem, where he should have used an inflected form (7) or, probably, an auxiliary. In (8) for example, Eve might want to say: *Mommy has to fix the paper*.

(6) INV: Is it blue?
CHI: Yep. Cut [/] cut with my scissors. (Eve, 2;0)

(7) Mom have nose. (Eve, 2;0)

(8) Situation: Eve (1;9) tore paper
CHI: Mommy fix it. Mommy fix a paper.

All TMA expressions in the samples were coded for their semantic function and scope, on the basis of the adult system of English (6.2). Table 8-4 to Table 8-6 repeat the TMA expressions in English, their function and scope. These are the expressions and functions included in the study.

Table 8-4. English TMA expressions with narrow scope (π1)

Domain	Semantic function	Expression(s)
ASPECT	Progressive	*be –ing*
	Continuative	*keep –ing*
	Prospective	*be gonna / be going to*
	Immediate prospective	*be about to*
	Perfect	*have –ed*, *have* + irregular form
	Resultative	*be –ed*, *be* + irregular form
PARTICIPANT-ORIENTED MODALITY	Ability	*can, could*
	Root possibility	*can, could, may, might*
	Permission	*can, could, may, might*
	Volition	*wanna, will, would*
	Weak root necessity	*should, ought to, be supposed to*
	Weak obligation	*should, ought to, be supposed to*
	Internal need	*need (to), have to, have got to*
	Root Necessity	*must, have to, have got to*
	Obligation	*must, have to, have got to, need to, shall*

Table 8-5. English TMA expressions with medial scope (π2)

Domain	Semantic function	Expression(s)
TENSE	Past	*–ed,* irregular form
	Present	*–ø, –s*
	Future	*will, shall, would*
EVENT-ORIENTED MODALITY	Root possibility	*can, could, may, might*
	Permission	*can, could, may, might*
	Weak Necessity	*should, ought to, be supposed to*
	Weak Obligation	*should, ought to, be supposed to*
	Necessity	*nust, have to, have got to*
	Obligation	*must, have to, have got to, shall*
	Epistemic possibility	*could, may, might*
	(Negated) epistemic necessity	*need not, don't have to*
	Probability	*should, be supposed to*
IRREALIS	Hypothetical	*–ed,* irregular form, past modal
	Counterfactual	*had –ed,* past modal + *–ed*
EVENT QUANTIFICATION	Habitual	*used to, would, will*
	Frequentative	*keep –ing*

Table 8-6. English TMA expressions with wide scope (π3)

Domain	Semantic function	Expression(s)
PROPOSITION-ORIENTED MODALITY	Uncertainty / certainty that not	*could, may, might / can't, couldn't*
	Prediction	*will, would*
	Weak certainty	*should*
	Certainty	*must, have to, have got to*
	"Permission" / no permission	*might / can't*
	Weak obligation	*should*
	Obligation	*must, have to, have got to*

Some details of the analysis and coding of TMA expressions have to be explained. Although not explicitly included in the tables, copulas and auxiliaries are included in the research and considered marking tense. The utterances in (9) for example, are both coded as marking present tense.

(9)	This is my big bibby.	(Eve, 2;0)
	What's that?	(Eve, 2;0)

Note that correct bare stems in combination with an overt non-third person subject, as in *I want that* or *I like it* are regarded as marking present tense by a zero morpheme and they are therefore also coded for tense (π2).

Periphrastic utterances for aspect are coded for tense and aspect if the auxiliary and the non-finite form of the main verb are both expressed, for example, the utterance in (10) is coded for present tense and prospective aspect and (11) is coded for present tense and progressive aspect. However, if the auxiliary is left out, the utterance is only coded for aspect, for example, progressive (12) or prospective aspect (13). There are a few cases in which the auxiliary is present but the non-finite form is not (*I'm sing*). Then, the construction is coded for tense, but not for aspect.

(10)	I'm gonna kiss him.	(Ross, 2;6)
(11)	What's he doing?	(Eve, 2;0)
(12)	I getting sick.	(Eve, 2;0)
(13)	Mom going open my toy box.	(Eve, 2;0)

One of the grammatical TMA expressions for aspect in English (see Table 8-4) is excluded from the study, i.e., the construction *be -ed* for resultative aspect. The use of the early resultative forms, such as (*it's*) *broken*, *done*, *all gone*, are so similar to early adjectival constructions such as (*it's) empty, right, ready* etcetera, that it is very doubtful whether children distinguish between these two constructions. In order not to bias the results toward the hypothesized acquisition order, by analyzing these forms as π1-operators, these constructions are analyzed as a (tensed) copula with an adjectival predicate if the *be*-form is present or they are excluded from analysis if there is no *be*-form expressed.

Modal expressions that also mark tense are coded both for their modal function and for their tense function, for example, in (14), *can* is coded for permission (π1) and for present tense and in (15), *could* is coded for ability (π1) and for past tense. Modal expressions that do not mark tense are epistemic modal markers and past modal forms that are used to express polite or tentative non-epistemic modality. In (16), *might* does not mark past tense, and it is only

coded for epistemic possibility (π2). In (17), *could* is only coded for (polite) permission.

(14) You can go in the boat. (Naomi, 3;5)
(15) He looked both ways. And you could see him right in the house. (Naomi 3;5)
(16) Daddy # this arrow might get shot at you. (Abe, 4;6)
(17) Could I pull this please? (Adam, 4;0)

Finally, hypothetical and counterfactual constructions are coded for irrealis and, if relevant, also for a modal meaning. In (18), *could* is coded as marking ability (π1) and hypothetical (π2).

(18) I bet I could play it. (Adam, 4;6)

All samples were coded by a research assistant and completely double-checked by me. In order to check the reliability of coding, two samples, Abe 2;6 and Adam 4;6, were independently coded by both. Cohen's Kappa was calculated for assessing inter-coder reliability. The agreement on three decisions was determined: first, the agreement on whether an utterance should be excluded or included, second, the agreement on what type of operator (π1, π2, π3) an expressions is, and third, the agreement on the semantic function of the expression. In all cases, the kappa score was above .95, which is a satisfactory level of reliability. The disagreement on the semantic functions always concerned the specific modal function, such as ability versus root-possibility, or necessity versus obligation. As the modal expressions are later on grouped according to their more general sense 'potentiality', 'disposition', 'weak necessity', and 'necessity', this was not seen as problematic.

8.3.4 Analyses and statistics

In the next sections, various analyses will be applied, dependent on the particular hypothesis that is tested. In the quantitative analyses statistical tests will be used to examine whether the distribution of operators in child language is significantly different from the distribution of operators in adult-adult and input language. Statistical details will be discussed in the relevant sections. The analyses of variation in use and contrastive use will be qualitative in nature. The exact definitions of the criteria will be presented in 8.6.2 and 8.7.2.

8.4 GENERAL DEVELOPMENT

Before turning to the hypotheses, a general overview is presented of the development of TMA systems in child English. There is considerable individual variation in the speed with which the TMA system develops. Between 1;9 and 2;9 all children have started using TMA expressions. Naomi, and in particular Eve are very quick learners and around 2;0 they already use different types of expressions with some frequency. Adam and Sarah on the contrary are much slower: it is only around 2;3 that they start using TMA expressions and the frequency of TMA expressions remains very low for a few months. Although Naomi is an early starter, she is not a remarkably quick learner later on and the enormous gap around age 2;3 between Naomi on the one hand and Sarah and Adam on the other has completely disappeared around age 4;0. Of the older children, especially Abe is very precocious, and Ross' speech is also much more complex than the speech of Sarah, Adam and Naomi at similar ages. Although the speed of acquisition is different, the children show many similarities in the qualitative development of the TMA system. The development is divided into phases, somewhat arbitrarily based on the number of TMA expressions attested in a sample. The phases should not be considered distinct stages, but rather a gradual development. The overview sketches the development from a qualitative point of view, without detailed information on the frequency of specific operators. The exact numbers of TMA expressions per semantic domain are presented for each child in Appendix C.

8.4.1 Phase 1: Early TMA expressions

The first phase is defined as fewer than 100 TMA expressions within a sample. Phase 1 correlates more or less with an MLU in words below 2.5. Table 8-7 displays the ages and MLU's in words for the samples that belong to this phase.

Table 8-7. Ages and MLU in words of children in phase 1

Child	Age	MLU in words
Eve	1;6# – 1;9	1.5 – 2.3
Naomi	1;6# – 1;9	1.2 – 1.5
Peter	1;9# – 2;0	1.3 – 2.2
Nina	2;0#	2.1
Adam	2;3# – 2;9	2.1 – 2.4
Sarah	2;3# – 2;9	1.7 – 2.0

Note. # = first available sample of the child

In the earliest stage the main TMA expressions that are used are progressives (π1) and several constructions with present tense copula (π2). Most children use the progressive in the first phase already with a number of different verbs and rather frequently, except for Peter and Sarah, who both use it only three times in this phase. The progressives are used to refer to events that the child observes at the moment of speaking or that he or she is involved in at the moment of speaking. Progressives are mainly expressed without the auxiliary *be*, in which case they are analyzed as expressing aspect, but not tense. Occasionally, the auxiliary is also expressed. This is illustrated in (19):

(19)	Eve writing.	(Eve, 1;6)
	Swimming.	(Eve, 1;6)
	Baby's crying.	(Naomi, 1;9)
	Sitting down.	(Naomi, 1;9)
	Crying.	(Peter, 1;9)
	Mommy driving car?	(Peter, 2;0)
	Goldy sleeping.	(Nina, 2;0)
	That monkey crying.	(Nina, 2;0)
	What you doing mommy?	(Adam, 2;6)
	Playing cowboy.	(Adam, 2;6)
	Raining out.	(Sarah, 2;3)
	Boy doing?	(Sarah, 2;6)

All children use some constructions with a present tense copula, predominantly in contracted form. See (20):

(20)	That's mine.	(Eve, 1;9)
	There's a moomoo.	(Eve, 1;9)
	There's diaper.	(Naomi, 1;6)
	Where's bear.	(Naomi, 1;9)
	That's a mouse.	(Peter, 2;0)
	What's that.	(Peter, 2;0)
	That's my's.	(Nina, 2;0)
	There's a mommy.	(Nina, 2;0)
	Who's (th)at?	(Adam, 2;3)
	Dat's a my pencil.[2]	(Adam, 2;6)
	What's that?	(Sarah, 2;3)
	That's horsie.	(Sarah, 2;3)

[2] There is evidence that Adam considers *that's a* as one unanalyzed string, since he uses it several times before a possessive.

Each child has a few of these copula constructions that are very frequently used.[3] Most common are *where's X?*, *there's X*, *what's that/this?* and *that's X*. Note that these constructions are all coded as marking present tense, whereas it is very doubtful whether these constructions are analyzed by the child and whether the morphemes *'s* or *is* indeed function to mark present time for the child (cf. S. Wilson 2003).

In phase 1, most children only sporadically use other TMA-expressions. Eve, Naomi and Peter have two or three uses of a simple present (π2) in this phase and Nina has none. In contrast, Adam and Sarah use the simple present tense more often. Adam uses for example *I like*, *doesn't fit / it fits*, *don't want*, *don't know* and *don't see*. Sarah mainly uses *I got* and *I want*. The present tense is used to describe states that are relevant at speech time. See (21) for some examples:

(21)	I see Fraser	(Eve, 1;9)
	I see fire.	(Eve, 1;9)
	Hurts.	(Naomi, 1;9)
	I wa(nt) ba(na)na	(Naomi, 1;9)
	Peter has the cow.	(Peter, 2;0)
	What's [?] goes in there.	(Peter, 2;0)
	I like a bulldozer.	(Adam, 2;3)
	I have three.	(Adam, 2;6)
	I got train too.	(Sarah, 2;3)
	I like celery.	(Sarah, 2;6)

The past tense (π2) is also used very sporadically in phase 1. Naomi and Peter do not use it yet. Eve uses four different past forms and Nina uses the construction *NAME gave it/X* nine times to refer to presents that she got, but she uses no other past forms. Adam and Sarah differ from the other children again in that they do use past forms with some frequency. Early past forms are mainly irregular forms, but incidentally, there is a regular past. The past forms are all used for describing events that took place in the immediate past, except perhaps for Nina's use of *gave*. However, she does not specifically seem to refer to the past event of giving, but she is rather classifying each birthday gift that she is admiring with her mother according to the giver of the present. See (22) for some examples of past tense uses:

(22)	I did it.	(Eve, 1;6)
	Pulled Timmy.	(Eve, 1;9)

[3] Both Adam and Sarah use copula constructions frequently only from age 3;0.

Linda gave it.	(Nina, 2;0)
xxx car broke.	(Adam, 2;3)
I fell down.	(Adam, 2;6)
I went boom.	(Sarah, 2;3)
I broke it.	(Sarah, 2;6)

Most children do not yet use the prospective *be going to* or *gonna*. Only Adam and Eve use it occasionally. See (23):

(23)	You gonna make Eve grape juice ?	(Eve, 1;9)
	She gon burp.	(Eve, 1;9)
	Going go.	(Adam, 2;3)
	Gonna ride that.	(Adam, 2;6)

Furthermore, some of the children are using modal auxiliaries that express participant-oriented modality (π1). Naomi only uses *can't* in different contexts and once she uses *wan(na)*. Peter only uses *have ta* once. Adam and Sarah use modal auxiliaries six and seven times, respectively. Adam mainly uses *can't* and Sarah mainly uses *wanna*. See (24):

(24)	Can't push.	(Naomi, 1;9)
	I can't [eat].	(Naomi, 1;9)
	Have ta screw it.	(Peter, 2;0)
	I can write.	(Adam, 2;3)
	Can't read mail.	(Adam, 2;9)
	I wanna ride my horse.	(Sarah, 2;3)
	Can just walk?	(Sarah, 2;9)

In sum, in the first phase the children mainly use progressive aspect (π1) and present tense copula constructions (π2), although Peter and Sarah do not use the progressive very often and Adam and Sarah do use copula, but less frequently than the other children. There is limited use by most, but not all children of participant-oriented modality (π1), present tense on main verbs (π2) and past tense on main verbs (π2). Only two children use already prospective aspect (π1).

8.4.2 Phase 2: Consolidation

In the early samples, children show a sharp increase in the number of TMA expressions (tokens) in each following sample.[4] Nina's development is most

[4] Recall that every sample consists of 750 child utterances.

extreme in this respect, showing an increase from 49 TMA expressions in her sample at 2;0 to 226 TMA expressions in her sample at 2;3. In Sarah's data the increase is more gradual. The beginning of phase 2 is set when the child uses more than 100 TMA expressions (tokens) in a sample. The end of the phase is set when they use more than 400 TMA expressions in a sample. These boundaries more or less coincide with an MLU range between 2.5 and 3.5. See Table 8-8 for the exact samples and MLU ranges for each child.

Table 8-8. Ages and MLU in words of children in phase 2

Child	Age	MLU in words
Eve	2;0 – 2;3*	3.1 – 3.3
Naomi	2;0 – 3;0	2.3 – 3.2
Peter	2;3 – 2;6	2.5 – 3.3
Nina	2;3 – 3;0*	2.9 – 3.5
Adam	3;0	3.0
Sarah	3;0 – 4;0	2.6 – 3.2
Ross	2;6#	3.4

Notes. * = last available sample of the child. # = first available sample of the child.

Phase 2 can mainly be characterized as an elaboration and consolidation of phase 1. Now, all children use the progressive (π1) frequently. The expressions that were used sporadically or only by a few children in the previous phase, present tense (π2), past tense (π2), prospective (π1) and participant-oriented modality (π1), are now used by all children. These expressions become more frequently used during phase 2, and with more different verbs. However, the contexts in which the expressions are used are still very similar to phase 1. A completely new expression in this phase is future *will* (π2).

The progressive (π1) is still predominantly used without an auxiliary and it is mainly used to comment on an event that is ongoing at the moment of speaking. See (25):

(25) I cooking supper. (Eve, 2;3)
I'm getting the Frisbee. (Peter, 2;3)
The man feeding the dog ice cream. (Nina, 2;6)
What's my Mom doing ? (Naomi, 2;6)
I sitting on Daddy typewriter. (Adam, 3;0)
He jumping. (Sarah, 3;9)
I drinking. (Ross, 2;6)

Some children sporadically use the progressive with a past auxiliary (π2), to comment on a (recent) past event. This is done by Naomi (six times), Nina (three times), Sarah (two times) and Ross (one time). See (26) and (27) for examples:

(26) FAT: Naomi # were you playing out on the swings today?
CHI: Yes.
FAT: What did you do on them?
CHI: Boys [?] ride on my swing.
FAT: What?
CHI: <the boys> [?] were playing on my swing.
MOT: What was playing on your swing.
CHI: Kimb(erly) was playing on my swing. (Naomi, 2;3)

(27) Situation: Sarah (3;9) is teasing the pet bird.
MOT: Get your hand in [//] I mean hand out.
MOT: Hand <in> [//] out. Aah!
CHI: He was biting my arm.

The development of the different contexts of use of the progressive will be examined in more detail in Chapter 9, in order to find out what the meaning of the progressive form is in child speech, whether it can be considered adultlike or not.

In phase 2, all children are using the prospective (*be going to*) (π1) quite frequently, mainly without the auxiliary *be*, and often in the contracted form *gonna* (see (28)). It is mainly used in first person to express the present intention of the child to do something in the immediate future. Occasionally, it is combined with a third person (Adam, Sarah) or the intention does not concern an event in the immediate future, but tomorrow (Adam).

(28) Are you gonna eat? (Eve, 2;3)
Gonna jump. (Naomi, 2;0)
I'm going to bring Raggedy+Ann medicine. (Naomi, 2;6)
Going get paper right there. (Peter, 2;3)
I going to feed the dolly applesauce. (Nina, 2;3)
It's gonna break. (Adam, 3;0)
Urs(u)la goin(g) buy (a)nother one tomorrow? (Adam, 3;0)
She gonna go way up there. (Sarah, 3;0)
I'm going to turn it on. (Ross, 2;6)

As explained in 8.3.3, the omission of the auxiliary in aspectual constructions is analyzed as the lack of tense marking. Although the auxiliary is realized more and more often in phase 2, the progress is very gradual. For example, in the data of Naomi at 2;0, 23 aspectual constructions (progressives and prospectives) have an auxiliary, whereas 32 have not. At the age of 2;3, in 27 constructions the auxiliary is realized and in 17 it is left out. At 2;6, it is realized in 21 constructions and left out in 22. At 3;0, it is realized in 33 constructions and left out in 8. At 3;6, it is nearly always realized: the auxiliary is present in 53 constructions and left out in only one construction.

The present tense copula constructions (π2) are still overwhelmingly present in phase 2. They are mainly used in fixed constructions, but each child uses more different constructions now. All children use *where's X?*, *there's X*, *what's that/this?* and *that's X*. Other constructions that have become frequent now are *it's X*, *this is X*, *he's X*, *here's X*, *I'm X* and *is it/this X*? Much less frequent constructions are *X is*, *you're*, *are you*? *these/those are*, *we are* and *who's that?*.

At the end of phase 2, most children (except for Peter) have started using past tense copulas (π2). However, there is large variation in frequency: Adam uses it only once whereas Naomi uses it fourteen times. Most common are *it/this/that/I was X*, or *what/who was it/that*. Children rarely use *were*. Past copulas are mainly used to describe a state in the immediate past, as in (29)-(31). Sometimes it is questionable if the child uses the form correctly. See (32):

(29) CHI: Oh, look at this.
MOT: What?
CHI: Look at the tape.
MOT: Where was it stuck?
CHI: Yes. It was on my foot. (Nina, 3;0)

(30) Situation: Father answers the door.
CHI: Who was that? (Naomi, 3;0)

(31) MOT: Is your cocoa cool enough?
MOT: Good.
MOT: It warms your tummy.
CHI: That was a xxx very hot. (Naomi, 2;6)

(32) Situation: Nina (3;0) picks up her new jump rope
CHI: That was my jump rope.

In addition to aspectual and copula-constructions, all children use the simple present tense (π2). It is predominantly used to describe states that hold at the

moment of speaking. Most children use the following constructions: *I want*, *X goes + LOCATION*, *I have / you have /X has* or *I got, I need*, and *I like*. Especially *I want* is very frequently used by all children, with both nominal and verbal phrases as complement. Recall that only *wanna* is analyzed as a modal auxiliary (6.2.1) depending on the transcription in the data. Some examples of present tense uses are presented in (33):

(33)	I like noodle soup	(Eve, 2;0)
	I want the (a)nother one.	(Naomi, 2;3)
	Goes in this.	(Peter, 2;3)
	Those fit down there, ok?	(Nina, 2;3)
	D(o) you wan(t) me cut your hair?	(Adam, 3;0)
	I want two birthdays.	(Sarah, 3;0)
	I got one cookie.	(Ross, 2;6)

At the end of phase 2, most children begin to use the present tense occasionally for other purposes than only describing present states. However, there is individual variation in that Peter does not do this at all, and Sarah does it occasionally already from the beginning of phase 2. The present tense is sometimes used to describe a habitual or general state, (34) and (35), and sometimes it occurs in conditional clauses with *when* or *if* (36). In those cases, the present tense does not refer to a state that is necessarily relevant to the moment of speaking, but rather to a general truth.

(34)	CHI:	Raisin toast is good.	
	CHI:	It's good.	
	MOT:	Mmhm.	
	CHI:	Don't eat it at dinner (be)cause I <u>eat</u> it at breakfast.	(Naomi, 3;0)
(35)	Frogs go aroun(d) in puddles.		(Sarah, 3;9)
(36)	When we <u>get</u> there we can't sleep.		(Ross, 2;6)
	If you <u>catch</u> cold <you wear the> [//] #		(Sarah, 3;6)

The development in the contexts of use of the present tense will be studied in more detail in Chapter 9.

With respect to the past tense (π2), most children show a large increase in the frequency of past tense forms during phase 2 and in the end they use more than 20 different past forms (types) in one sample. This does, however, not hold for Peter and Adam, who do not use more than 8 and 12 different past

forms, respectively. There is large individual variation in the forms that are used, but all children use *did* and *fell* (*down*), and most use *broke*. The past forms are used for different purposes. In the early samples in phase 2 and in all samples of Adam and Peter, they are mainly used for describing an event that has just ended or of which the result is relevant at the moment of speaking. See (37)-(40):

(37) INV: Where are you going?
CHI: Baby went down the hall.
INV: The baby?
Situation: Peter goes to see where the baby is.
INV: She's right there. (Peter, 2;3)

(38) CHI: Whoops # I dropped the money on the floor. (Peter, 2;6)

(39) CHI: I [!] can't open door I have to go a different way.
CHI: There now I opened the door. (Ross, 2;6)

(40) INV: Oh, this is a nice book. I haven't seen this book before.
CHI: We bought it for me. (Eve, 2;0)

In the later samples, the past forms are more and more used to describe events that took place in the (more remote) past. See (41)-(42):

(41) FAT: Remember that tiger last night on your leg?
CHI: Yeah. He scratched me. (Ross, 2;6)

(42) FAT: Yesterday she was playing with the letter blocks and she didn't want me to play with her and she said # <I'm not going to share these # I'm going to share these by myself>["]
CHI: And you took my nose away.
FAT: That's right # I took your nose away and I wouldn't give it back until you shared your toys with me.
CHI: And you put my nose back.
FAT: And then I put your nose back.
CHI: And I said something else. (Naomi, 3;0)

The uses of the past tense will be studied in more detail in Chapter 9, in order to establish the function of this form in child language.

In phase 1, most children were already using one or two modal expressions. In phase 2, all children are using several modal expressions, though only for participant-oriented modality. They use most often *can* or *can't* for ability or inability, root-possibility or permission, *wanna* for volition and *have to* or *got to* for necessity. See (43):

(43)	I can write abc.	(Eve, 2;0)
	We have [to] fix it.	(Eve, 2;0)
	You wanna see?	(Naomi, 2;0)
	I can't reach it.	(Peter, 2;3)
	Got to be careful.	(Nina, 2;3)
	You can drink first, ok?	(Nina, 2;3)
	I don't wan(t) (t)a look both ways.	(Adam, 3;0)
	Can I play my game ?	(Sarah, 3;6)
	Bear wanna sleep with me.	(Ross, 2;6)

A new form for most children in phase 2 is *will* or *'ll*. This form only gradually comes in. Adam is the only one who does not yet use this form. It is predominantly used in combination with first person to express intention to do something, and sometimes in combination with second person as an indirect order. Sarah and Ross also use *won't* now and then. These forms are analyzed as future tense markers (π2). See (44):

(44)	I will write one # two # three.	(Eve, 2;3)
	You will lie down.	(Naomi, 2;0)
	I'll go get it.	(Peter, 2;3)
	I will make you a train.	(Nina, 2;3)
	That daddy will go in the playpen, right?	(Nina, 2;3)
	Ya won't get a piece of paper.	(Sarah, 3;6)
	I will close my eyes too.	(Sarah, 3;9)
	I'll be incredible Hulk.	(Ross, 2;6)

To sum up, in phase 2 the relative frequency of TMA-expressions continues to increase. All children now use progressive and prospective aspect, and modal expressions for participant-oriented modality. Children use the simple present and past tense much more frequently than in phase 1. They still use these forms mainly to refer to states that hold at the present and to events that have just happened or of which the result is relevant to the moment of speech. However, most children have also started using the past tense for describing past events and some of the children occasionally use the present tense for describing

habitual or generic states. There is limited use by most but not all children of *will* or *'ll*, mainly to express intentions.

8.4.3 Phase 3: Complex expressions

The samples in which more than 400 TMA expressions are used are considered phase 3. This correlates with a MLU in words above circa 3.5. See Table 8-9 for an overview of the ages and MLU-ranges of the children in phase 3. The MLU of Abe is not counted as in his data the division of turns is not according to the CHILDES standard. In a substantial number of cases, more than one clause is transcribed as one turn which leads to very high MLU's.

Table 8-9. Ages and MLU in words of children in phase 3

Child	Age	MLU in words
Naomi	3;6 – 4;6*	3.3 – 4.2
Peter	3;0*	3.5
Adam	3;6– 4;6*	3.6 – 4.5
Sarah	4;6 – 5;0*	3.5 – 3.6
Abe	2;6# – 5;0*	not calculable
Ross	3;0 – 7;6*	4.4 – 6.1

Notes. # = first available sample of the child; * = last available sample of the child

In phase 3, the new uses of forms of phase 2 become settled. The present tense (π2) is still predominantly used for describing states in the present, but it is now also much more commonly used to refer to habitual or generic states or general truths about the world, as in (45):

(45) If fish get out will they die? (Naomi, 4;6)
You cover it like this. (Ross, 3;0)

The simple past tense (π2) is much more often used for describing events that took place in the more remote past. Children now also often use temporal *when*-clauses, to specify the time of the event. See (46):

(46) You were green when I took off the glasses. (Adam, 4;0)
That was nice when you got me presents. (Abe, 3;0)

The past copula (π2) is also used far more frequently, to refer to recent (47) and remote (48) past states. It is also used in *when*-clauses (49) and in narratives (50).

(47) MOT: That's not a 'd'. This is a 'd'.
CHI: Uhoh. I was wrong. (Sarah, 4;6)

(48) And I cried. I was mad at Dad because he ate all up. (Ross, 3;6)

(49) FAT: When did you dream about it?
CHI: When I was in my bed. (Abe, 4;0)

(50) Just one yellow duck was happy ever after. (Naomi, 3;6)
Once upon a time there was a tiger. (Ross, 3;6)

Furthermore, the past auxiliary (π2) in aspectual constructions becomes much more frequent in phase 3. It is used to refer to immediate past events, (51) and (52), but also in the description of more remote past events (53). Like copulas, past auxiliaries occur in *when*-clauses (54) and narratives (55).

(51) Were you talking to Paul or me? (Adam, 4;0)

(52) CHI: No no Mark.
FAT: Did he do something bad?
CHI: Yeah. He took my tape recorder out and was trying to break it. (Ross, 3;6)

(53) Situation: Mother starts telling that Sarah has had a hard week lately.
MOT: She had a stomachache, (a)n(d) a a headache # (a)n(d) +..
CHI: No, my back was hurtin(g). (Sarah, 5;0)

(54) He roared at us when he was chasing us. (Abe, 3;6)

(55) The poisonous dragon was outside playing baseball. (Abe, 4;0)

Will or *'ll* is predominantly used to refer to immediate future events (same day) (π2). It is still mainly used with first person, expressing intention, but other combinations have become more frequent now, as shown in (56). It is sometimes used to refer to more remote future (57). *Will* is now also used in conditional clauses more often (58). This use is analyzed as future tense (π2).

(56) When will mommy be home? (Abe, 4;6)
Perhaps we will make a deal. (Ross, 4;6)
You'll win. (Sarah, 5;0)

(57) Comment: Marky is younger brother of Ross (4;6).
FAT: In a couple of years when we come here Ross will be six and Marky will be four.
CHI: Yeah # and we'll be easier to handle.

(58) I'll love you if you hold the ladder for me. (Ross, 4;6)

Phase 3 is furthermore characterized by the acquisition of a number of new constructions that are all relatively infrequent in adult English. This concerns irrealis (π2), perfect aspect (π1), event quantification (π2) and event- and proposition-oriented modality (π2, π3).

Irrealis (π2) expressions are sporadically used from about 3;0 or 3;6. Abe and Ross use irrealis constructions rather frequently (15 times) from 4;0 and 4;6, respectively, but the other children do not reach this level of competence. The irrealis function that is most often expressed is the hypothetical (see (59)). An expression commonly among the first hypothetical uses is *would like*. Only rarely a counterfactual is expressed, but the children keep having difficulty with using the correct construction. For an illustration, see (60), in which Abe uses the hypothetical construction to express counterfactuality:

(59) I could have a cookie if you would make some ok? (Abe, 3;6)
If I had my crane # I could put this right up here. (Abe, 4;0)
He wouldn't mind if I used his pillow? (Ross, 4;6)
I wish the world were like it were when you were a little baby. (Ross, 4;6)
That would be silly, wouldn't it? (Naomi, 4;6)

(60) FAT: What do you think would have happened last night if you would have never got to touch the ball? What do you think would have happened then?
CHI: I would cry so bad.
FAT: You would have cried?
CHI: Yeah
FAT: What else would have happened?
CHI: I would make you fall on the floor and then I could touch the floor. (Abe, 5;0)

The use of perfect aspect (π1) also comes in very late. Children use it sporadically from around 3;0. A rather common construction used by most children is *I have (never) seen / heard* or *have you seen / ever heard* ...? See (61):

(61)	I never seen a bandana.	(Adam, 3;0)
	I never heard of him.	(Adam, 4;6)
	I see you have bought new toys.	(Adam, 4;6)
	Have you seen my gun?	(Abe, 3;6)
	Have you ever heard about a dog mailman?	(Abe, 4;0)
	I've seen them.	(Ross, 4;0)
	We've been waiting for that for a long time.	(Ross, 4;6)
	Ever heard of a animal that say cuckoo cuck(oo)?	(Sarah, 4;6)
	No, I haven't. [been speaking]	(Naomi 4;6)

The perfect remains infrequent throughout the samples. Although the frequency of the perfect is also very low in the adult stage of American English, the children use it even less frequently. In the adult conversational data there are on average 19 perfect constructions per 750 utterances, whereas the children use it rather consistently with a frequency of circa five instances per 750 utterances from about 4;6 onward. Only Abe uses the construction 13 times in his sample at 4;6, which is adultlike.

Expressions of event quantification (π2) also belong to the constructions that come in later. They are very infrequently though consistently used with one or two instances per sample from about 3;6 or 4;0. Adam is the first who uses these expressions, from age 3;0, although it is doubtful whether he really understands the form (see (62)). Sarah is the last who uses event quantification, at age 5;0. All the possible expressions are used in the child data: *used to* and *would* for past habitual, *will* for present habitual and *keep –ing* for frequentative.

(62)	I <u>used to</u> shave, just like daddy.	(Adam, 3;0)
	Why Paul <u>keeps</u> go<u>ing</u> over here?	(Adam, 3;6)
	Sometimes this foot <u>will</u> get tender.	(Abe, 4;0)
	My mommy <u>keeps</u> gett<u>ing</u> mad at me.	(Naomi, 4;6)
	A long time, you <u>would</u>n't let us see it.	(Ross, 6;0)
	When I was four, I <u>used to</u> go.	(Sarah, 5;0)

Event-oriented (π2) and proposition-oriented modality (π3) also come to be used in phase 3. Event-oriented modality is used from about age 3;0 (Ross, Abe and Peter) or 4;0 (Naomi, Adam and Sarah) with circa five to eight instances per sample. Most commonly used are *could*, *might*, and *have to*. In (63), Abe uses a root-possibility marker *could* in combination with a passive construction. This raises an event-oriented reading. The modal auxiliary expresses the impossibility of the occurrence of the event of 'the clothespin being snapped', and does not express an inherent property of the first argument (which is left implicit).

(63) CHI: Where did you put that other clothespin?
MOT: I put em in the bag
CHI: No. That one that couldn't be snapped. (Abe, 3;6)

In (64), *might* is used to indicate epistemic possibility. It is analyzed as event-oriented modality (objective epistemic modality), as the father and transcriber seem to have understood it that way.

(64) CHI: This is very breaky
FAT: What?
CHI: Because it's very sharp and it falls [= It might fall.] . And my mommy <u>might</u> break this and fall this.
FAT: You mean might break it and make it fall?
CHI: Yeah.
FAT: I see.
CHI: That's how my momma gonna do it. And then she's going to be in a bad mood.
FAT: And then she's going to be in a bad mood. Yeah, she would be. (Ross, 3;0)

Finally, in (65), Adam uses *have to* to indicate a general rule of conduct that is not particularly laid on a specific participant. This is an example of event-oriented deontic modality.

(65) MOT: No # they shouldn't throw it on the sidewalk at all # should they? That's where we found those. [= popsicle sticks]
CHI: <u>Have to</u> throw dem in the trashcan where people can't reach dem. (Adam, 4;0)

Proposition-oriented modality (π3) comes in around the same age as event-oriented modality, but the frequency is much lower: two or three instances per sample. To compare, in the adult-adult sample there are in every 750 utterances 12 and 7,4 expressions of π2- and π3-modality, respectively. The expressions that are used by the children are *should*, *will*, *might*, *must* and *have got to*. Some instances of *will* that occur in conditional clauses, mainly in combination with a progressive, are analyzed as expressing prediction (π3). See (66):

(66) Situation: Ross (4;0) brought the Hulk's book to his father.
CHI: Daddy # if Marky is going to be the hulk # he<u>'ll</u> be needing this.

In (67) *might* is used to express uncertainty and in (68) and (69) *must* and *have got to* are used to express certainty.

(67) CHI: Someping [: something] <u>might</u> come out my pocket.
MOT: What d(o) you have in your pocket?
CHI: I got dirt in dere. (Adam, 4;6)

(68) She <u>must</u> have learned that in a stupid way. (Ross, 4;0)

(69) Situation: Ross (7;6) and his father are speculating why Ross has feet like the Indians.
CHI: It-'has gotta be an ancestor.

Finally, in (70) *should* is used to express weak certainty, which is based on inference.

(70) CHI: I even ate the house up except for the floors. Aren't you cold, Daddy?
FAT: Nope.
CHI: You <u>should</u> be because I ate up our whole house. (Abe, 4;6)

In sum, children in phase 3 begin to acquire TMA expressions that are infrequent in the adult stage of English: perfect aspect, irrealis forms, event-and proposition-oriented modality and event quantification. The use of the future tense is more common now for all children. The present and past tense are now freely used in different contexts, just like the future tense.

In the last samples of the children, the use of TMA expressions is not yet identical to the adult stage. This implies that the development continues for quite a long time to get the details right.

8.4.4 Summary

The TMA system of most children starts out with progressive aspect (π1) and present tense copula (π2), which presumably are unanalyzed constructions at that stage. In the second phase participant-oriented modality (π1), prospective aspect (π1) and past and present tense main verb forms come in (π2). The third phase is characterized by the acquisition of irrealis (π2), perfect aspect (π1), event-oriented modality (π2), event quantification (π2) and proposition-oriented modality (π3). There is individual variation. In particular Sarah's development is rather different in that she immediately begins with many different TMA expressions, but with little variation of use: she uses a few present tense forms, a few past tense forms, a few progressives, a few copula

constructions, and a few modal auxiliaries. She furthermore shows a much slower and more gradual increase in frequency of TMA expressions.

In order to test the hypotheses, the exact acquisition order of TMA expressions needs to be determined by objective measures of productivity, as discussed in 8.2: relative proportions of operators compared to the final stage, variation in use and contrastive use. This is the topic of the next three sections.

8.5 QUANTITATIVE ANALYSIS

8.5.1 Introduction

The first analysis regards the relative frequency of operators, not specified for or subdivided according to semantic function. In 6.4.1.3 it was shown that operators in adult-adult conversations are unevenly distributed. See Table 8-10:

Table 8-10. Distribution of operators in adult-adult conversations (*N* = 2502)

Operators	*N*	%
π1	403	16
π2	2072	82
π3	27	1

The proportion of π1-operators (tokens) in adult English is much smaller than the proportion of π2-operators. This unevenness in the adult distribution implies that if the child distribution shows a smaller proportion of π1-operators than of π2-operators this does not necessarily mean that π1-operators are acquired later, for the child may simply show an adultlike distribution of operators. If the proportion of π1-operators in child language is significantly larger than in the adult sample and the proportion of π2-operators is equal to or smaller than the proportion in the adult sample, then this indicates that π1-operators are easier to acquire for the child. A larger proportion of π1-operators in child than in adult language, and an equal or smaller proportion of π2-operators may therefore be taken as support of H6. The same way of reasoning holds for the proportion of π3-operators. If the proportion of π3-operators is smaller in the child samples than in the adult sample and the proportion of π2-operators is equal to or larger than in the adult samples, this indicates that the acquisition of π2-operators starts earlier than the acquisition of π3-operators. A general problem with respect to π3-operators, however, is that the frequency in the target stage is very low. This implies that, if π3-

operators are absent in a child's sample, it may be because they are acquired later, or it may be because they are used with an adultlike low frequency and they are simply not attested in the restricted amount of data of the child (cf. Tomasello & Stahl 2004). It is therefore important to compare the proportions of different categories to the final distribution in adult language, in order to determine the order of acquisition. Is the distribution for the child at that particular age different from what adults do? Or do they show an adultlike distribution from the start? In H6a the expected outcomes are formulated:

H6a: The relative frequency of π1-operators is larger in child language than in adult language, whereas the relative frequency of π3-operators is smaller. The relative frequency of π2-operators differs least from the adult stage.

8.5.2 Method and analysis

The distribution of different types of operators in the adult-adult conversations is taken as the final stage of English, where the child eventually ends up. Only if the distribution in the child sample and the adult sample differ significantly from one another, this yields information about the acquisition order of TMA-expressions. Statistical tests have been applied in order to test whether H_0 could be rejected: the distributions of operator types in the child's speech and in adult speech are equal. Recall that the TMA expressions in the different samples are classified according to their scope, what type of operator they are. If the number of TMA expressions in a child's sample is larger than 25 ($N_{child} > 25$), the distribution of these operators in the child's sample is compared to the adult sample by a statistical test. The χ^2-test is used if the criterion of Siegel & Castellan (1988) is reached:

> When r is larger than 2, (…) the χ^2-test may be used if fewer than 20 percent of the cells have an expected frequency of less than 5 and if no cell has an expected frequency of less than 1. (p.123).

For many samples, the criterion of Siegel & Castellan was not reached, because the expected frequency for π3-operators was less than 1. In those cases, only the distribution of π1- and π2-operators in the child's speech was compared to the distribution of π1- and π2-operators in the adult sample. This implies that only part of the hypothesis could be tested, namely whether π1-operators are acquired before π2-operators. In those cases, Fisher's Exact test was used.

A further general remark regarding the statistical methods concerns the significance level (α). In this study it is set at .01, which is rather strict. The reason for this decision is that the number of analyses is very large, which increases the experimentwise risk (the risk of any false rejection). By keeping α

at .01 per hypothesis, the experimentwise risk does not become too large (Cohen 1992: 156). Whenever H_0—the distributions of operator types in the child's speech and in adult speech are equal—could be rejected, it is determined which categories in child and adult sample differed most. The discussion of the results is limited to these categories.

8.5.3 Results

8.5.3.1 Child distribution compared to adult distribution

The results are presented more or less from the youngest to the oldest child: (i) Eve, from 1;6 to 2;3; (ii) Peter, from 1;9 to 3;0; (iii) Nina, from 2;0 to 3;0; (iv) Naomi, from 1;6 to 4;6; (v) Adam, from 2;3 to 4;6; (vi) Sarah, from 2;3 to 5;0; (vii) Abe, from 2;6 to 5;0 and finally (viii) Ross, from 2;6 to 7;6. For each child, the absolute numbers of TMA expressions analyzed according to their scope are presented in Table 8-11 to Table 8-18. In these tables, it is indicated which test is applied for comparing the distribution in child and adult language: the χ^2-test compares all operators and the Fisher's Exact test only the proportions of π1- and π2-operators. If the number of TMA expressions in the child's sample was below 25, the distributions are not compared by a statistical test, since this created expected frequencies that were too low for the Fisher's Exact test. The frequency of different types of operators as the proportion of all operators is presented for the eight children in Figure 8-1 to Figure 8-8. Each column in a figure presents the distribution of different types of operators for a specific sample. Only samples are presented in which the number of TMA expressions in the child's sample is above 25. The rightmost column in each table shows the distribution in the adult-adult conversations, which was already presented in Table 8-10. In order to be able to interpret the value of the quantitative results, qualitative discussion is provided where needed. The absolute frequencies of TMA expressions for each semantic domain are presented in Appendix C.

Table 8-11 and Figure 8-1 present the absolute and relative frequencies of operators in Eve's speech. The first sample at 1;6 contained only six TMA-expressions. No statistical test was applied and this sample is not presented in Figure 8-1. For all other samples, the expected frequencies for π3-operators were lower than 1, so that the χ^2-test could not be used. Therefore, only the distributions of π1- and π2-operators in Eve's samples are compared to the adult distribution with Fisher's Exact Test. In all samples the distributions are significantly different: the proportions of narrow scope operators in Eve's speech are significantly larger than in the adult sample, whereas the proportions of medial scope operators are significantly smaller than in the adult sample. This is in accordance with the hypothesis.

Table 8-11. Absolute frequency of operators in Eve's speech, compared to adult distribution

EVE	Age			
Operators	**1;6**	**1;9**	**2;0**	**2;3**
π1	4	50	74	78
π2	2	9	106	180
π3	-	-	-	-
N =	6	59	180	258
p (F's Exact) =	-	< .001	< .001	< .001

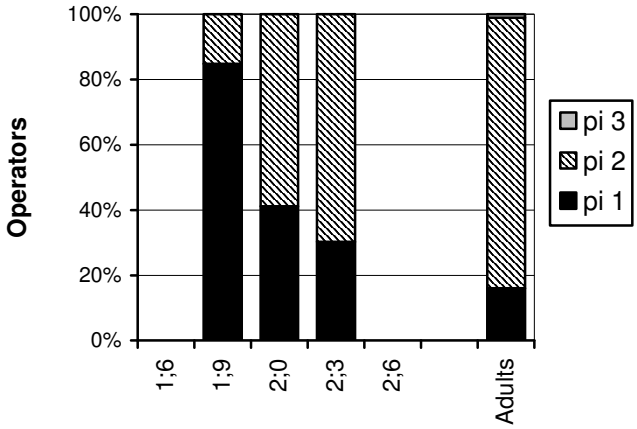

Figure 8-1. Distribution of operators in Eve's speech and adult sample

The distribution of operators in Peter's speech is presented in Table 8-12 (absolute frequencies) and Figure 8-2 (relative frequencies). The Fisher's Exact test was used at 2;0 to compare the distribution of operators with narrow scope and medial scope in Peter's samples and the adult sample. From age 2;3 onwards the χ^2-test could be used. The distribution of operators appears to be significantly different from the adult sample only at 2;0 and 2;6. At 2;0 the proportion of π1-operators is smaller in Peter's speech than in adult language, whereas at 2;6 the proportion of narrow scope operators in Peter's speech is larger than in adult language. How can this pattern be explained? The

distribution at 2;0 is contrary to expectations in that the proportion of π1-operators is smaller than in the adult sample, and as a consequence, the proportion of π2-operators is large. However, when the adult data are compared in more detail to Peter's sample, it is clear that Peter's category of π2-operators is far from adultlike at 2;0. It appears that the large number of π2-operators is for a major part the result of present tense copulas (46 of the 51 items). They make up 92% of all the present tense expressions in Peter's speech, whereas in the adult sample, only 40% of all present tense expressions are copulas. Most of the copulas in Peter's speech could be considered unanalyzed forms. Peter uses *what's this* or *what's that* (*there*) 28 times. Furthermore, he uses the constructions *that's X* seven times and *this is X* eight times.[5] It is likely that the copulas in these constructions are no real expressions of present tense in Peter's speech, but unanalyzed chunks. The productivity of both π1- and π2-operators thus seems to be very limited at age 2;0. At 2;3, the distribution of operators is not significantly different from the adult sample, but again, when the data are examined in more detail, it appears that Peter only incidentally uses TMA expressions in a creative way. Appendix D presents all utterances with TMA expressions that are used by Peter in this sample. Especially the group of π2-operators consists for a very large part of fixed constructions. The group of present tense markers consists for 69% of present tense copulas. In contrast, π1-operators seem to be used more creatively and variably. Only around 2;6, Peter seems to have started using TMA expressions more actively and productively. The proportion of present tense marking by copulas has dropped to 59% and both π1- and π2-operators occur in a variety of constructions. It is in this sample that the proportion of π1-operators is larger in Peter's speech than in adult speech. This suggests that at this age, Peter is more actively acquiring π1-operators than π2-operators, whereas in the previous samples there was no indication that Peter was actively acquiring π2-operators. Finally, at 3;0, the distribution is comparable to the adult distribution. The proportion of present tense copula has further decreased to 47%, which approximates the adult proportion of 40%. In sum, Peter seems to start with a phase of mainly unanalyzed usage of TMA expressions, especially constructions with present tense copulas, which lasts until about 2;3. Around that age he is beginning to discover the function of TMA expressions and is more actively applying them. This seems to be easiest for TMA expressions with narrow scope, as their proportion is relatively large at 2;6. Around 3;0, Peter seems to master the use of the most frequent TMA markers in English (tense, aspect and participant-oriented modality).

[5] The other three expressions with copulas are *back is open*, *here'is a daddy* and *where's the screw*.

Table 8-12. Absolute frequency of operators in Peter's speech, compared to adult distribution

PETER	**Age**				
Operators	**1;9**	**2;0**	**2;3**	**2;6**	**3;0**
π1	2	2	39	88	70
π2	0	51	150	263	359
π3	-	-	0	0	1
N =	2	53	189	351	430
p (F's Exact) =	-	< .01			
χ^2 =			4.5	20.5	2.8
p (χ^2) =			.11	< .001	.25

Table 8-13. Absolute frequency of operators in Nina's speech, compared to adult distribution

NINA	**Age**			
Operators	**2;0**	**2;3**	**2;6**	**3;0**
π1	11	54	39	88
π2	38	172	196	280
π3	-	0	0	0
N =	49	226	235	368
p (F's Exact) =	.244			
χ^2 =		11.1	2.6	17.2
p (χ^2) =		< .01	.28	< .001

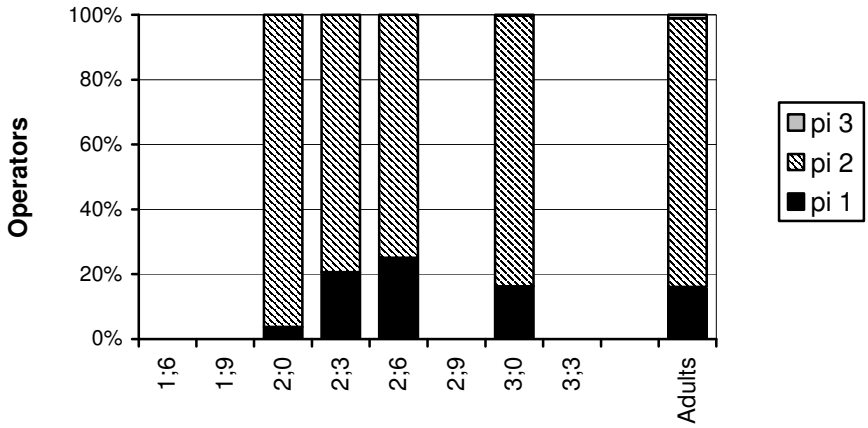

Figure 8-2. Distribution of operators in Peter's speech and adult sample

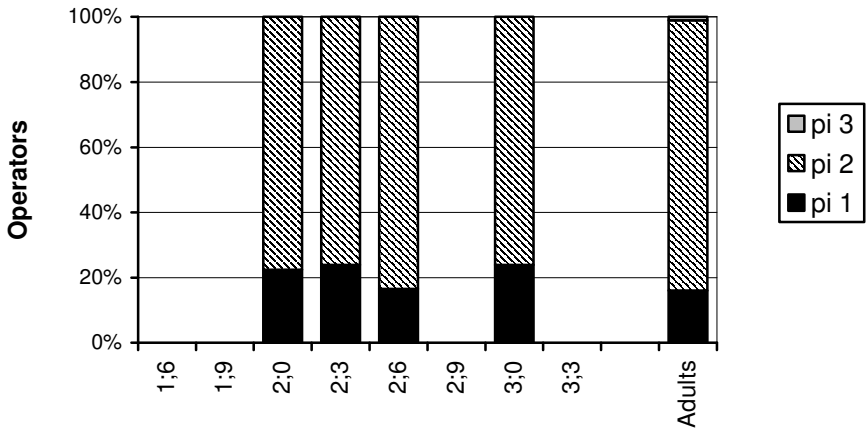

Figure 8-3. Distribution of operators in Nina's speech and adult sample

The distribution of operators in Nina's speech is presented in Table 8-13 and Figure 8-3. At 2;0, there is no significant difference between the child and adult distribution of π1- and π2-operators according to Fisher's Exact test. The χ^2-test is used for the samples from 2;3 onwards. There appear to be significant differences at 2;3 and 3;0 in that the proportion of π1-operators in Nina's speech is larger than in the adult sample and the proportions of π2- and π3-operators is smaller. This suggests that π1-operators are more prominent in Nina's speech than they are in adult speech, whereas π2- and π3-operators are less prominent.

Table 8-14. Absolute frequency of operators in Naomi's speech, compared to adult distribution

NAOMI	**Age**							
Operators	**1;6**	**1;9**	**2;0**	**2;3**	**2;6**	**3;0**	**3;6**	**4;6**
π1	0	44	66	67	64	77	125	85
π2	2	53	108	165	208	232	307	387
π3	-	0	0	0	0	0	1	0
N =	2	97	174	232	272	309	433	472
χ^2 =	-	56.7	54.8	26.3	12.2	17.9	42.7	6.0
p (χ^2) =		< .001	< .001	< .001	< .01	< .001	< .001	.05

Table 8-15. Absolute frequency of operators in Adam's speech, compared to adult distribution

ADAM	**Age**						
Operators	**2;3**	**2;6**	**2;9**	**3;0**	**3;6**	**4;0**	**4;6**
π1	4	32	42	67	132	136	161
π2	14	38	51	165	314	358	437
π3	-	-	-	0	0	0	1
N =	18	70	93	232	446	494	599
p (F'sExact)	-	< .001	< .001				
χ^2 =				26.3	50.1	40.8	41.2
p (χ^2) =				< .001	< .001	< .001	< .001

The distributions of operators in Naomi's samples are presented in Table 8-14 and Figure 8-4. All the samples from 1;9 up to 3;6 are significantly different from the adult distribution according to the χ^2-test The proportions of π1-operators in the samples of Naomi are always larger than in the adult sample and he proportion of π3-operators is always smaller than in the adult sample. At 1;9 and 2;0 the proportion of π2-operators is also smaller than in

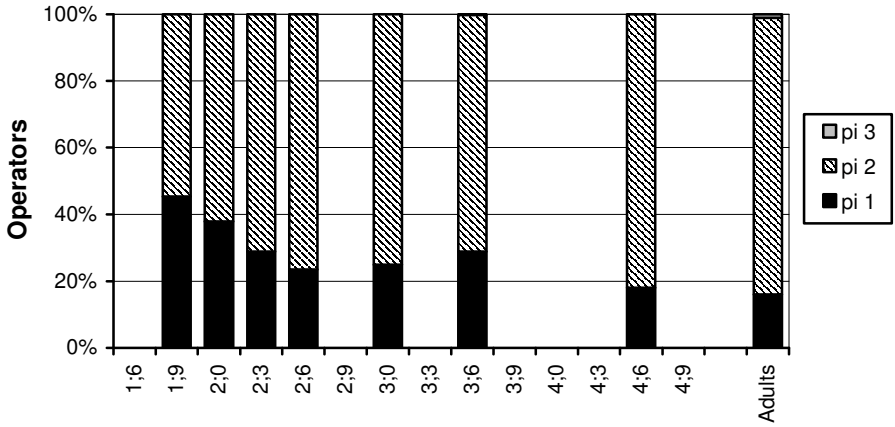

Figure 8-4. Distribution of operators in Naomi's speech and adult sample

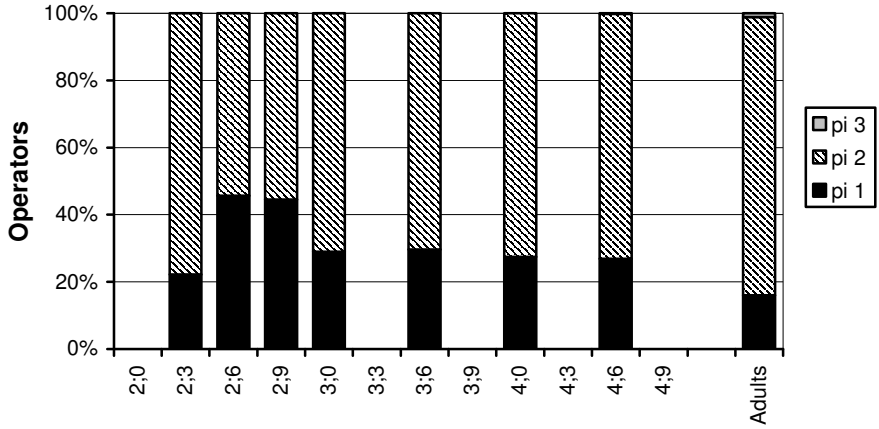

Figure 8-5. Distribution of operators in Adam's speech and adult sample

the adult sample. The results are in accordance with H6a: π1-operators are relatively more dominant in Naomi's speech than in adult speech, whereas π2-operators are less dominant up to 2;0 and π3-operators are less dominant at least up to the age of 3;6.

The distribution of scope in Adam's language is presented in Table 8-15 and Figure 8-5. In the samples at 2;6 and 2;9 the proportion of narrow scope operators is significantly larger than in the adult sample, according Fisher's Exact test. For the samples from 3;0 years onward χ^2 was calculated. The

proportion of π1-operators in these samples is larger than in the adult sample whereas the proportion of π2- and π3-operators is smaller than in the adult sample. These results strongly support H6a.

The distribution of operators in Sarah's speech is presented in Table 8-16 and Figure 8-6. In the samples from 3;6 up to 4;6, the proportion of operators with narrow scope is larger than in the adult sample and the proportions of operators with medial and with wide scope are smaller than in the adult sample. At 5;0, Sarah uses no π3-operators, whereas four instances of π3-operators might have been expected. However, as the proportions of π1- and π2-operators at this age are nearly similar to the adult distribution, and constitute the vast majority of all operators, the absence of π3-operators does not lead to a general significant difference with the adult sample. In general, the data support H6a: when Sarah's distribution is different from the adult sample, it is skewed towards a larger proportion of π1-operators and a smaller proportion of π3-operators. What is, however, unexpected from H6a is that the differences do not occur in the earliest samples: from 2;3 to 3;3, the proportion of π1-operators is not larger than in the adult sample. This suggests that Sarah starts acquiring π1- and π2-operators simultaneously, which was already discussed in 8.4.4 and from 3;6, she acquires π1-operators at a faster rate. A qualitative analysis of Sarah's early data reveals that she at first uses fewer progressives than the other children, whereas she starts very early with a few present tense and past tense forms, such as *I got*, *I like* and *I want* and *broke* and *did*. The uses of the present tense forms are remarkably frequent, at least from 2;9. At 2;9 the phrase *I want* accounts for 24 of the 65 π2-operators, at 3;0 for 48 of the 132 π2-operators and at 3;3, *I like* and *I want* together account for 47 of the 191 π2-operators. From 3;6 onwards, in contrast, the use of *I want* is much more sparse. At 3;6, it is only used 13 times, at 3;9 20 times (including five *I don't want*'s), and from that age it is used at most six times per sample. The high frequency of this single construction probably influences the proportion of π2-operators to a large extent. At the age at which the use of this construction drops down, Sarah appears to be using π1-operators relatively more often than is done in the adult stage of English.

Table 8-16. Absolute frequency of operators in Sarah's speech, compared to adult distribution

SARAH	Age									
Operators	**2;3**	**2;6**	**2;9**	**3;0**	**3;3**	**3;6**	**3;9**	**4;0**	**4;6**	**5;0**
π1	6	1	4	15	31	83	76	93	93	82
π2	24	26	61	121	161	244	228	245	321	350
π3	-	-	-	0	0	0	0	2	0	0
N =	30	27	65	136	192	327	304	340	414	432
p (F'sExact)	.617	.109	.028							
χ^2				4.1	2.1	20.4	17.9	26.7	14.1	6.6
p (χ^2) =				0.13	.35	<.001	<.001	<.001	<.001	.04

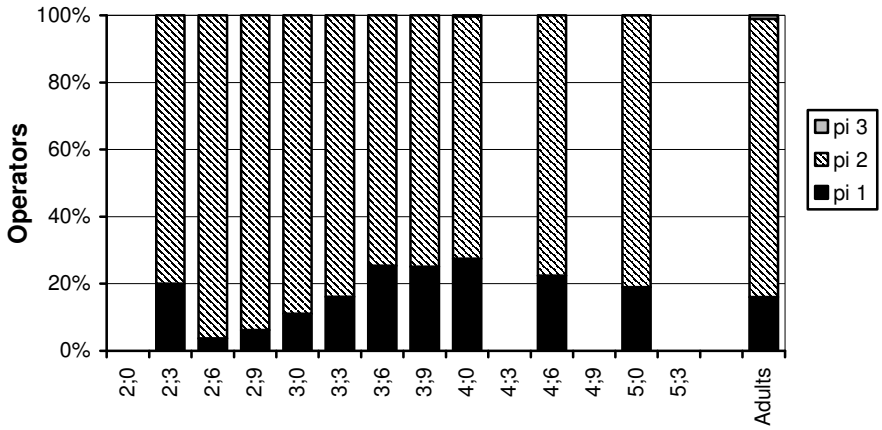

Figure 8-6. Distribution of operators in Sarah's speech and adult sample

The distribution of operators in Abe's speech is presented in Table 8-17 and Figure 8-7. Up to 3;6, there are significant differences between Abe's distributions and the distribution in the adult sample: in the samples of Abe the proportions of π1-operators are larger and the proportions of π2- and π3-operators smaller than in the adult sample. This suggests that the acquisition of

Table 8-17. Absolute frequency of operators in Abe's speech, compared to adult distribution

ABE	**Age**					
Operators	**2;6**	**3;0**	**3;6**	**4;0**	**4;6**	**5;0**
π1	111	140	146	151	155	145
π2	381	492	552	589	620	569
π3	0	2	1	5	5	2
N =	492	634	699	745	780	716
χ^2 =	16.8	15.3	13.7	7.3	7.0	10.3
p (χ^2) =	< .001	< .001	< .01	.026	.031	<.01

Table 8-18. Absolute frequency of operators in Ross' speech, compared to adult distribution

ROSS	**Age**								
Operators	**2;6**	**3;0**	**3;6**	**4;0**	**4;6**	**5;6**	**6;0**	**6;6**	**7;6**
π1	97	94	50	67	91	85	106	92	58
π2	277	495	443	464	524	530	469	417	441
π3	0	1	2	4	0	5	2	2	3
N =	374	590	495	535	611	620	577	511	502
χ^2 =	25.2	4.4	13.9	4.9	7.5	2.6	4.3	3.1	7.8
p (χ^2) =	< .001	.110	< .001	.086	.024	.276	.119	.214	.019

π1-operators is ahead and the acquisition of π2- and π3-operators lags behind, which is in accordance with the hypothesis. At 5;0, the proportion of π1-operators is again larger and of π3-operators smaller than in the adult sample.

Finally, the distribution of operators in Ross' speech is presented in Table 8-18 and Figure 8-8. At 2;6 there is a significant difference between Ross' sample and the adult sample in that the proportion of π1-operators is larger in Ross' speech and the proportion of π3-operators smaller. At 3;6 the proportions of operators with both narrow scope and wide scope are

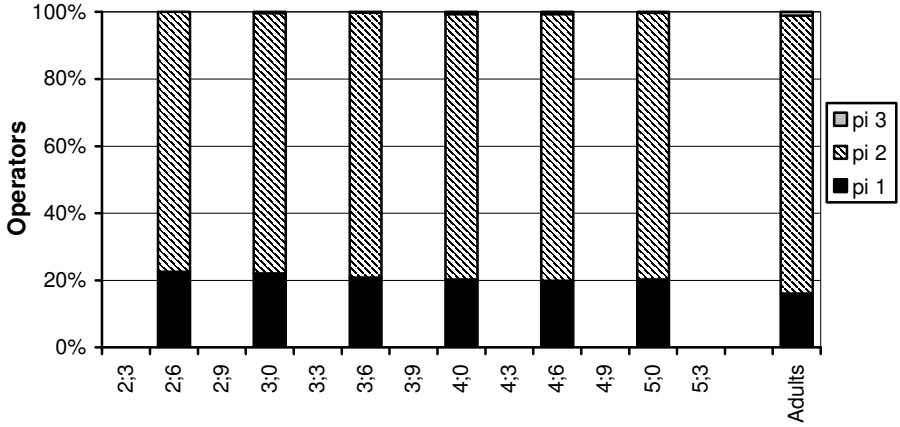

Figure 8-7. Distribution of operators in Abe's speech and adult sample

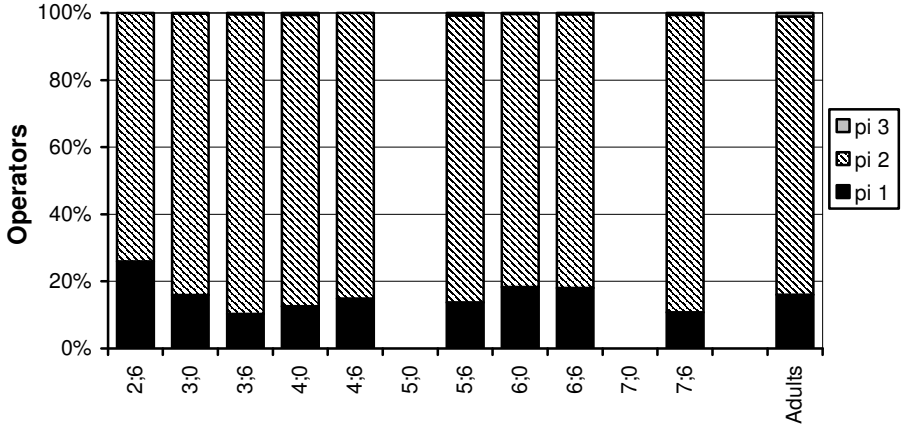

Figure 8-8. Distribution of operators in Ross' speech

significantly smaller than in the adult sample. The distributions of operators in all other samples do not differ significantly from the adult distribution. Why the proportion of π1-operators is so small at 3;6 is unclear. There are no specific constructions that predominate Ross' speech and the sample does not show any peculiarities. As π1-operators in the samples before 3;6 are already used frequently and with many different predicates, I do not take the small proportion at 3;6 as an indication that Ross has not yet mastered π1-operators. What is important with respect to the hypothesis is that the earliest sample

shows a distribution of operators that is different from the adult sample in the expected direction. Operators with narrow scope are at first more dominant in Ross' speech than in adult speech.

8.5.3.2 Summary

If the distribution of operators in the children's samples differs from the adult distribution, it is in most cases the result of a larger proportion of operators with narrow scope in the child samples. The exceptions are the samples of Peter at 2;0 and Ross at 3;6. They both show a significantly smaller proportion of operators with narrow scope than the adult sample. The sample of Peter appears to contain many frozen forms with a present tense copula. Why the sample of Ross shows an unexpected distribution is unclear.

The data in general confirm the expectation that the proportion of π1-operators is larger in child language than in adult languages. There are large individual differences in the ages until which the proportions differ, varying from about 3;0 to 4;6. Furthermore, not all early samples show a distribution that is different from the adults. In particular Sarah's development is remarkable in that the distributions in her samples up to 3;3 do not differ from the adult stage. In general, the data suggest that children start acquiring π1- and π2-operators around the same time, whereas the acquisition of π1-operators goes faster at a certain stage. On the basis of these results, the general hypothesis that π1-operators are acquired **before** π2-operators may be too absolute: π1-operators seem to be acquired **before** or **simultaneously** with π2-operators.

The proportion of π3-operators is very small both in adult and in child language, which makes the value of a statistical difference for this type of operator disputable. The low frequency or often complete absence of wide scope operators may either result from an adultlike distribution which makes the chance of occurrence in 750 utterances very low, or it may be the result of later acquisition. What speaks in favor of the latter explanation, is that the observed frequency of π3-operators in the children's samples is **always lower** than the expected frequency. For example, the expected frequency of π3-operators in Adam's sample at age 4;6 is 5.4 π3-operators but the observed frequency is one π3-operator; the expected frequency in Sarah's sample at 5;0 is 3.9, whereas the observed frequency is 0; the expected frequency of π3-operators in Abe 5;0 is 6.4, but the observed frequency is 2. This pattern holds for all child samples, which justifies the conclusion that the use of π3-operators is not yet adultlike in the later samples. This supports the hypothesis that π3-operators are acquired later than π1- and π2-operators.

8.5.3.3 Role of input

When the distribution in the children's samples is different from the distribution in the adult-adult conversations, then this might be caused by the complexity of the different operators, as assumed, but it may also be the case that children simply imitate what they hear. The distribution of operators in the children's samples may be a reflection of the distribution they hear in the input. Is the distribution of operators in the input skewed in the same direction as in the children's samples? The distributions of operators in the samples of Naomi, Nina and Abe will be compared to the distribution in the input to these children. The distribution of operators in the input will also be compared to the distribution in adult-adult conversations in order to find out whether parents adjust their language when speaking to children. This will be tested by Fisher's Exact test or the χ^2-test, depending on the expected cell frequencies (see 8.5.2).

The data are presented in a similar format as in the previous section. The tables present the absolute numbers of operators in the input to the child, divided for scope. The test results are also presented in the tables. Furthermore, when the number of TMA expressions is larger than 25 in the child's sample, the distribution of operators in the child's sample is compared to the distribution in the input with Fisher's Exact test or with the χ^2-test. These results are only discussed in the text. Finally, the figures contain a comparison of the relative frequencies in the child data, the input and the final adult stage. The distribution for the child and the input in one sample are presented in columns next to each other at each age. The rightmost column displays the distribution in the adult-adult conversations (see Table 8-10). Only child samples that contain more than 25 TMA expressions are included in the figures. The absolute frequency of TMA expressions for each semantic domain is presented in Appendix E.

The absolute frequency of operators in the input to Naomi is presented in Table 8-19. The relative frequency of operators in Naomi's speech, the input to Naomi and in the adult sample is presented in Figure 8-9. The distribution in the input is first compared to the adult-adult conversations. It appears that the distribution in the input to Naomi is different from the adult sample at 1;6, 1;9, 2;0, 2;3 and 3;6. At 1;6, the proportion of π1-operators is smaller in the input than in the adult sample. In the other samples the proportion of π1-operators in the input is larger than in the adult sample. In all the input samples for which it could be tested, the proportion of π3-operators is smaller than in the adult sample. The distribution in the input to Naomi at 2;6, 3;0 and 4;6 does not differ significantly from the adult sample. Overall, the results indicate that Naomi's parents adjust their language when speaking to a child by using proportionally more π1-operators and fewer π3-operators. However, this is not

Table 8-19. Absolute frequency of operators in input to Naomi, compared to adult sample

Input to NAOMI	Input							
Operators	**at 1;6**	**at 1;9**	**at 2;0**	**at 2;3**	**at 2;6**	**at 3;0**	**at 3;6**	**at 4;6**
π1	64	142	44	127	92	103	72	66
π2	440	444	120	473	408	435	240	300
π3	0	1	0	0	0	0	0	1
N =	504	587	164	600	500	538	312	367
χ^2 =	9.5	25.0	14.1	14.7	6.8	8.5	12.5	2.9
p (χ^2) =	< .01	< .001	< .001	< .001	0.03	0.01	< .01	0.24

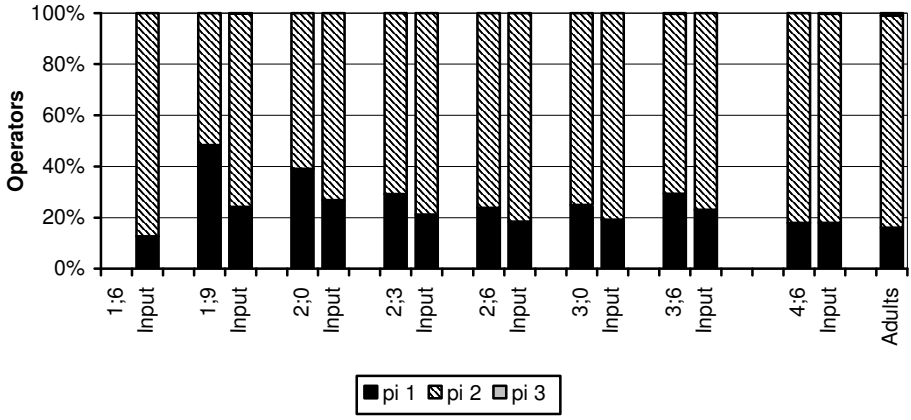

Figure 8-9. Distribution of operators in Naomi's speech, input to Naomi, and adult sample

the case for the earliest sample at 1;6 and neither for most samples from 2;6 onward.

Furthermore, the distribution in Naomi's language is compared to the distribution in the input. It only differs significantly from the input at 1;9 (Fisher's Exact test: $p < .001$) In this sample, the proportion of π1-operators is larger in Naomi's speech than in the input. The results show that the distribution of operators in the input language is skewed in the

Table 8-20. Absolute frequency of operators in input to Nina, compared to adult sample

Input to NINA	Input			
Operators	**at 2;0**	**at 2;3**	**at 2;6**	**at 3;0**
π1	101	204	271	136
π2	444	646	812	675
π3	0	1	4	3
N =	545	851	1087	814
χ^2 =	7.6	32.5	42.2	3.5
p (χ^2) =	.02	< .001	< .001	.17

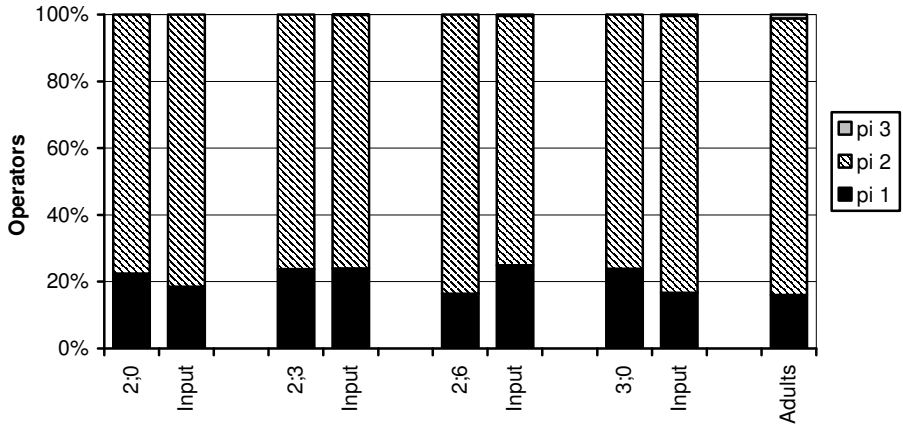

Figure 8-10. Distribution of operators in Nina's speech, input to Nina, and adult sample

same direction as in Naomi's speech. However, the distribution in Naomi's language is skewed more than in the input at 1;9 and it is skewed up to a later age, to 3;6, whereas the distribution in the input at 2;6 and 3;0 was not different from the adult distribution.

The absolute frequency of operators in the input to Nina is presented in Table 8-20. Figure 8-10 presents the distribution of operators in Nina's speech, the input to Nina and in the adult sample. The input to Nina is compared to the adult sample. It appears that at 2;0, 2;3 and 2;6, the proportion of operators

with narrow scope in the input is larger than in the adult sample. The proportion of operators with wide scope is always smaller than in the adult sample. These differences are significant at 2;3 ($\chi^2 = 32.5$, $p < .001$) and 2;6 ($\chi^2 = 42.2$, $p < .001$). These results clearly show that the parents of Nina are adjusting their speech when talking to a child, by using relatively more π1-operators and fewer π3-operators.

The input distribution and the distribution in Nina's speech are also compared. At 2;0 and 2;3, there are no significant differences (at 2;0, p (F's Exact) = .57; at 2;3, p (F's Exact) = 1.0). However, at 2;6 and 3;0 the distribution of operators in the input and in Nina's speech are significantly different (at 2;6, p (F's Exact) < .01; at 3;0, p (F's Exact) < .01). At 2;6 the proportion of π1-operators in Nina's speech is small compared to the input and similar to the adult distribution whereas at 3;0 the proportion of π1-operators is large compared to the input and the adult distribution and the input is similar to the adult distribution. The general tendency in both the input and the child sample is that the distribution is skewed from the adult distribution in that the proportion of π1-operators is larger for some of the samples. However, the exact samples for which this holds are not the same. Nina's distribution differs in her last sample at 3;0, whereas the input distribution by then is similar to the adult distribution.

Finally, the distribution of operators in the input to Abe is examined. See Table 8-21 and Figure 8-11. First, the distribution in the input is compared to the adult sample. There appear to be no significant differences between the samples. The proportions of π1-operators are larger in the input at 2;6 and 3;0 than in the adult sample, but this does not lead to a significant difference. Moreover, in each sample the proportions of π3-operators are smaller in the input than in the adult sample, but this does not lead to significant differences either. This suggests that the parents of Abe are only slightly adjusting their language when speaking to Abe and that they are addressing him in a very adultlike way.

The distribution in the input is furthermore compared to the distribution in Abe's speech. There appear to be no significant differences in the distribution of scope at all ages. (At 2;6, p (F's Exact) = 0.12; at 3;0, $\chi^2 = 15{,}3$, $p = 0.57$; at 3;6, p (F's Exact) = 0.09; at 4;6, p (F's Exact) = 0.12). Considering the fact that Abe's distribution was different from the adult sample at 2;6, 3;0 and 3;6, this implies that Abe's distribution is more skewed from the target stage than the input language. The distribution in the input language is in between Abe's distribution and the adult distribution, so that no significant differences are attested either way.

Table 8-21. Absolute frequency of operators in input to Abe, compared to adult sample

Input to ABE	Input			
Operators	**at 2;6**	**at 3;0**	**at 3;6**	**at 4;6**
π1	114	140	75	57
π2	494	570	395	299
π3	2	4	3	2
N =	610	714	473	358
χ^2 =	5.1	6.2	.8	.8
p (χ^2) =	.08	.04	.67	.65

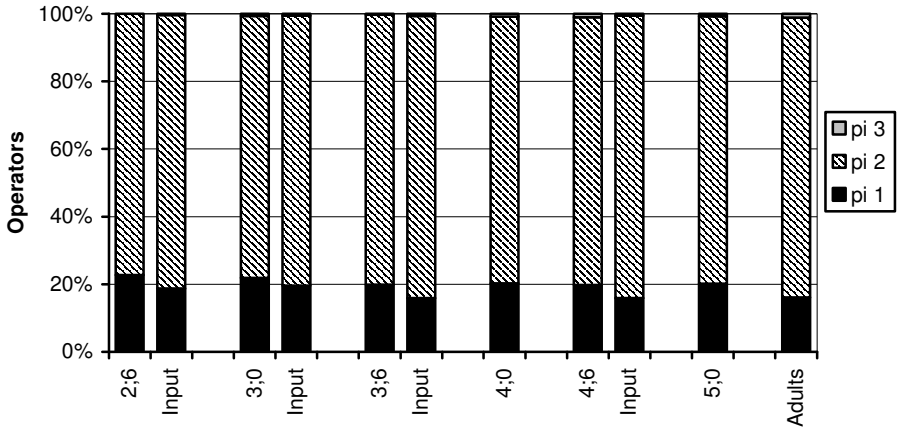

Figure 8-11. Distribution of operators in Abe's speech, input to Abe, and adult sample

8.5.3.4 Summary

The input shows either a similar distribution of operators as in adult-adult language or the distribution is skewed in the same direction as in the children's speech: the proportion of π1-operators is larger in the input than in the adult-adult sample and the proportion of π3-operators is smaller than in the adult sample. It seems that the parents adjust their language addressed to their child until the child is around age 2;6.

For Abe, his distributions of operators are never significantly different from the distributions in the input. However, his distributions do differ significantly

from the adult sample up to 3;6, whereas the input distributions do not differ significantly from the adult distribution. The distributions in the input are thus very similar to the distribution in the adult-adult-conversations and also very similar to the distribution in Abe's samples, whereas these two distribution do differ from each other. This implies that the input distribution must lie somewhere in between the child and the adult distribution. The input distribution is skewed in the same direction as Abe's distribution, but not enough to raise a significant difference with the adult sample.

The correlation between the distribution of operators in the input and in child language is high, but there are differences. The distribution of Naomi at 1;9 differs, in that her proportion of π1-operators is larger than in the input, whereas the proportion of π1-operators in the input was already larger than in the adult sample. Secondly, Nina's distribution differs at 2;6 and 3;0 from the input. At 2;6, the parents show a more childlike distribution while Nina's distribution seems to be adultlike. At 3;0 the opposite pattern holds. It is unclear why this is the case.

It can be concluded that the distribution in child directed speech is skewed in the same direction as in child language, but to a lesser extent: the input samples differ less from the adult-adult sample than the child samples do. The input thus seems to be a strong influential factor, but cannot by itself account for the distribution in child language: the children do not simply imitate what they hear.

8.5.4 Discussion and conclusion

It appears that H6a is in general confirmed. For each child there are several samples in which the distribution of operators differs from the adult sample in that the proportion of π1-operators is larger than in adult-adult-conversations. Moreover, the proportion of π3-operators in the children's samples is lower than in the adult-adult conversation, in cases where this could be tested. Can these results be interpreted as evidence for the acquisition order of π1-operators before or at the same time as π2-operators and π2-operators before or at the same time as π3-operators (H6)? The hypothesis should be slightly modified to account better for the data. Most children start acquiring π1- and π2-operators around the same age, but the acquisition of π1-operators goes a bit faster. π1-Operators are thus not necessarily acquired before, but rather before or simultaneously to π2-operators and at a faster rate. This is still in accordance with the Scope Hierarchy and H3: children never have a TMA system that contains π2-operators, but no π1-operators, or π3-operators but no π1- and π2-operators. Regarding the acquisition of π3-operators, these are acquired later than the other two types of operators.

Reasons for the children acquiring π1-operators before or simultaneous to π2-operators and not the other way around were also explored. The Scope

Hierarchy predicts (H6) that operators with narrower scope are less complex and express less abstract meanings. Therefore, they are easier to acquire. However, the acquisition order may also be influenced by the distribution in the input. Therefore, the input to three children was examined. It appeared that the distribution of operators in the input is skewed in a similar direction as the distribution in child language, compared to the adult-adult stage. The category of π1-operators is proportionally larger and the category of π3-operators proportionally smaller than in adult-adult conversations. However, the distribution in the input is skewed to a lesser extent and up to a younger age, around 2;6. The data show that the children do not exactly copy the distribution in the input. In two samples, the proportion of π1-operators is significantly larger in the child's speech than in the input and in one sample, the proportion of π1-operators is smaller. The input probably has an important effect on the acquisition order of the TMA expressions, as the frequency of operators with narrower scope is larger than the frequency of operators with wider scope, but the input cannot in itself account for the distribution in the children's samples. Furthermore, it has to be explained why parents adjust their language when speaking to children. The Scope Hierarchy forms a reasonable explanation for this: adults try to use the forms that their children understand, the forms that are cognitively least complex and communicatively most fundamental. Finally, notice that it is not the absolute frequency of operators that is decisive for the acquisition order: although π2-operators predominate in the input, it is not the case that they come in before π1-operators. This would be the expected development if language acquisition was only driven by frequency analyses of the input.

8.6 QUALITATIVE ANALYSIS: VARIATION IN USE

8.6.1 Introduction

Since the frequency does not yet show how productive the TMA-expressions are, qualitative analyses are also needed. For Peter and Sarah, for example, it already appeared that the preponderance of certain constructions did largely influence the frequency patters. The first qualitative analysis involves variation of predicates: does the child use the TMA expression with different main predicates? If a child uses a specific morpheme only with one predicate, it is highly plausible that the string is unanalyzed and that the child is not consciously using the morpheme. When the child uses the morpheme with more different types, there is more chance that the child has analyzed the form

at least to a certain extent, and recognizes that part of the construction occurs in different contexts. With respect to this criterion, H6b was formulated:

H6b: The variation in use of operators—use of a specific operator with different predicates—follows the order of the hierarchy: π1-operators are used with different predicates before π2-operators, which in turn are used with different predicates before π3-operators.

The analysis of variation in use is restricted to i) the acquisition of inflection on the main predicate and ii) the acquisition of auxiliaries. These groups are studied separately so that the complexity of the form (inflection might be harder or easier to acquire than auxiliaries) does not influence the results. First the acquisition of inflection on the main predicate will be examined in 8.6.3. The inflections on copulas or auxiliaries are excluded from analysis. This group is very homogeneous: it consists of *do*-support forms, *be*- and *have*-auxiliaries and inflection (or lack thereof) on modal auxiliaries. The expression forms are so different that there is not much ground for considering them as one formal group. Second, the acquisition of auxiliaries and periphrastic (unbound) constructions are investigated in 8.6.4. This analysis takes place at three levels: in the first analysis, the use of each specific form is examined. In the second analysis, all modal expressions with similar functions are aggregated. Finally, all modal expressions with similar scope are combined.

8.6.2 General method and analysis

As argued in 8.2, there is no general agreement about the question with how many different predicates a form needs to be used to decide upon its productivity. A criterion of two different predicates is used in some research (Pizzuto & Caselli 1994), but in my view this is a very low standard. For this analysis the threshold is therefore made higher and set at five different predicates. This is of course also an arbitrary decision. However, since every inflection or every auxiliary has to correspond to the same arbitrary threshold, it does give insight in the order of acquisition. For each inflection or auxiliary included in the test the co-occurrences with different predicates are traced in each sample. The sample in which the form is used with the fifth new predicate is considered the age of acquisition. The different predicates with which the expression forms are used are thus cumulated. Predicates that can take prepositions—*go*, *go up*, *go down*; *sit*, *sit down*; *take*, *take away*, etcetera—or that can describe different event types—*draw quickly* (atelic) vs. *draw a house* (telic)—are considered the same basic predicate. Further methodological details that hold for the specific analyses are discussed in the relevant sections.

8.6.3 Acquisition of inflection

The first analysis concerns inflectional expressions that are realized on the main predicate (in contrast to inflection on copulas or auxiliaries). The forms included in this study are the following:

- Progressive *–ing* (π1): (*be*) *running*, *walking*;
- Regular perfect aspect *–ed* (π1): (*have*) *walked*, *jumped*;
- Regular past tense *–ed* (π2): *pushed*, *pulled*;
- Simple present tense *–s* (π2): *jumps*, *looks like*;
- Simple present tense –ø in appropriate contexts (π2): *(I) want*-ø, (*you*) *need*-ø, (*we*) *have*-ø;
- Regular past forms used as hypothetical (π2): (*if I*) *pushed (it*, *then it would fall*).
- Regular perfect forms used as counterfactual (π2): (*if I had*) *pushed* (*it, then it would have fallen*).

The criterion that is applied is:

> If a child has used a certain inflection spontaneously[6] with at least five different predicates the inflection is held to be acquired.

In (71) an example of the analysis is presented. At 2;3, the progressive is used three times, but only with two different predicates, *go* and *rain*. In the sample at age 3;0, Sarah uses the progressive inflection with the fifth different predicate, *play*. This age is taken as the age at which the inflection *–ing* has become productive. It is assumed that Sarah has at least begun to discover the form-function relation between *–ing* and progressive function.

(71)	I'm going.	(Sarah, 2;3)	1st
	I'm going.	(Sarah, 2;3)	
	Raining out.	(Sarah, 2;3)	2nd
	Boy doing?	(Sarah, 2;6)	3rd
	He crying.	(Sarah, 3;0)	4th
	Playing Laura.	(Sarah, 3;0)	5th → criterion reached
	Washing my hands.	(Sarah, 3;0)	

For the perfect and counterfactual form, the auxiliary *have* has to be present in order to be coded that way or it has to be clear from the context that the

[6] Spontaneously = not imitated. Cf. 8.3.3.

child intends to express a counterfactual. The zero present tense inflection -ø is only counted when the subject is present and the stem form is the correct one.

The ages at which the children have acquired the different inflectional forms according to the five-predicates criterion are presented in Table 8-22 to Table 8-29. Eve, Peter, Nina, Naomi and Adam first use the progressive –*ing* (π1) productively. The tense inflections (π2) follow several months later. Abe and

Table 8-22. EVE's use of inflection with five different predicates

	1;6	1;9	2;0	2;3
π1		*-ing*		
π2			*-ed* *-ø*	*-s*

Table 8-23. PETER's use of inflection with five different predicates

	1;9	2;0	2;3	2;6	3;0
π1			*-ing*		
π2				*-s*	*-ed* *-ø*

Table 8-24. NINA's use of inflection with five different predicates

	2;0	2;3	2;6	3;0
π1	*-ing*			
π2		*-ø*		*-s* *-ed*

Table 8-25. NAOMI's use of inflection with five different predicates

	1;6	1;9	2;0	2;3	2;6	3;0	3;6	4;6
π1		*-ing*						
π2				*-ed*	*-s* *-ø*			

Table 8-26. ADAM's use of inflection with five different predicates

	2;3	2;6	2;9	3;0	3;6	4;0	4;6
π1		*-ing*					
π2				*-s* *-ø*	*-ed*		

Ross use all or most inflections productively in their first available sample at 2;6: in this sample, they are already past phase 1 of the development of TMA expressions (see 8.4). Therefore, their data do not reveal information on the acquisition order of their very first productive TMA expressions. Sarah, finally, is at variance with the other children: she starts out with the zero inflection for present tense (π2) at 2;9. At 3;0 she uses the progressive (π1) and present tense *–s* (π2) productively. These data support hypothesis H6b to a large extent, except for Sarah's development.

None of the children reaches the five-predicate criterion for the regular forms of the perfect. Sarah, Abe and Ross have used five irregular forms of the perfect at age 4;6, 4;6 and 5;6, respectively, but none of them has used five different predicates with the form *have –ed*. So, whereas the progressive is clearly the first inflection that is acquired by most children (which corresponds to findings of Brown 1973 and others), the perfect is one of the last inflections acquired in American English. Abe's data show that the acquisition of the hypothetical and counterfactual occurs later than the past and present tense.

Since Eve, Adam and Sarah, were the subjects in Brown's research, it is known at what age they reached the criterion of 90% correct use in obligatory contexts for the progressive, the regular past and the simple present third

Table 8-27. SARAH's use of inflection with five different predicates

	2;3	2;6	2;9	3;0	3;3	3;6	3;9	4;0	4;6	5;0
π1				*-ing*						
π2			*-ø*	*-s*		*-ed*				

Table 8-28. ABE's use of inflection with five different predicates

	2;6	3;0	3;6	4;0	4;6	5;0
π1	*-ing*					
π2	*-ed* *-ø*	*-s*			*-ed* (hyp)	(*would have*) *-ed* (cfl)

Notes. hyp = hypothetical ; cfl = counterfactual

Table 8-29. ROSS' use of inflection with five different predicates

	2;6	3;0	3;6	4;0	4;6	5;6	6;0	6;6	7;6
π1	*-ing*								
π2	*-s* *-ed* *-ø*								

Table 8-30. Age at which inflectional categories are acquired, according to the five predicates criterion (this thesis) versus the 90% criterion (R. Brown 1973)

	Eve		Adam		Sarah	
Inflection	**five predicates**	**90% correct use**	**five predicates**	**90% correct use**	**five predicates**	**90% correct use**
-ing	1;9	1;9-1;11	2;6	2;6-2;11	3;0	2;10-3;1
-ed	2;0	1;11-2;2	3;6	not yet at 3;6	3;6	not yet at 4;0
-s	2;3	not yet at 2;3	3;0	not yet at 3;6	3;0	3;8-4;0

person singular. In Table 8-30, the criterion of Brown is compared to the criterion applied in this study.

It appears that there is not much difference for the age at which the progressive reached the criteria. Further, the past tense *–ed* is acquired by Eve around the same age according to Brown's and to my criterion. However, the age of acquisition for the past *–ed* and the present 3rd person *–s* is according to my criterion considerably younger. There are a few instances of overregularization that support the conclusion that the child already uses the inflection productively at this younger age. Adam uses two overregularizations at 3;6: one regular past and one simple present *–s*, whereas Brown claims for both inflections that they are not yet acquired at 3;6. Consider (72):

(72) Mommy # he growed enough. (Adam 3;6)
Mommy doos [= does] two. (Adam 3;6)

The same holds for Sarah. In the samples at 3;6 and 4;0, Sarah uses a regular past inflection where she should have used an irregular form. See (73) and (74). Brown claims that Sarah has not yet mastered the regular past *-ed* at the age of 4;0.

(73) Supposed to be there # you. Where ya winned. (Sarah 3;6)

(74) MOT: In the car # what happened to the balloon in the car?
CHI: Um # flewed away when I put it out the window. (Sarah 4;0)

The 90% criterion of Brown thus sets the point of acquisition rather late, whereas the criterion of five different predicates sets it much earlier.

Overgeneralizations show that the child is already actively and creatively applying the inflection at this younger age. The five-predicates criterion does not indicate the age at which the child has mastered all the conventions of when and how to use certain expressions, but it does indicate the age at which the child has analyzed the constructions and is making her first creative productions. With respect to Sarah's data, the analysis of Brown points out that although Sarah starts out with the present tense *–s* simultaneously to the progressive, near mastery of the progressive (90% criterion) precedes near mastery of the present tense *–s*. This suggests that Sarah's early inflectional forms may not yet be analyzed. She seems to have a more "holistic" learning style (cf. Bates et al. 1991; Nelson 1981).

To summarize, the variation in use of inflection show that most children use the progressive marker productively as the first or one of the first operators expressed by inflection. After the progressive (π1), the inflections for tense (π2) are acquired, but the order of acquisition of present and past tense is individually determined. Inflectional forms for irrealis (π2) and perfect aspect (π1) are acquired last. Sarah shows a different development, in that she starts out with zero present tense inflection (π2), followed by progressive (π1) and present tense –s. However, Brown's analysis shows that Sarah's use of TMA expressions develops very slowly and that her early inflectional forms may be unanalyzed. The data strongly support H6b.

8.6.4 Acquisition of auxiliaries

The second analysis concerns the acquisition of auxiliaries and periphrastic constructions that consist of unbound elements. When children use auxiliaries or periphrases with different predicates, they very probably use them as analyzed forms. Unlike inflection, they are phonologically rather salient and therefore easier to be recognized as separate elements. The analysis includes the following forms:

- Prospective *gonna* and *going to* (π1): *gonna go, going to put*;
- Immediate prospective *about to* (π1): *about to go*
- Each different modal auxiliary (π1, π2 and π3): see explanation below;
- Future *will*, *'ll*, and *would* (π2): *will go*, *'ll put*;
- Habitual *would* and *used to* (π2): *used to eat*, *would sleep*;
- Hypothetical or counterfactual *would* or *'d* (π2): (*if I pushed it*, *then it) would (fall*) or (*if I had pushed it*, *then it) would (have fallen*).

A similar criterion is applied as in the previous analysis:

If a child has used a certain auxiliary spontaneously with at least five different predicates the auxiliary it is held to be acquired.

To illustrate this criterion, see (75) for the use of *can* by Adam. He has used it with five different predicates at age 3;0.

(75)	I can <u>write</u>.	(Adam, 2;3)	1st	
	I can <u>find</u> little stick	(Adam, 3;0)	2nd	
	I can <u>stand up</u>.	(Adam, 3;0)	3rd	
	I can <u>take</u> top <u>off</u>.	(Adam, 3;0)	4th	
	It can <u>fly</u>.	(Adam, 3;0)	5th	→ criterion reached

All formally different modal auxiliaries are counted as separate expression forms. For the primary (*can*, *may*, *shall* etc.) and secondary (*could*, *might*, *should* etc.) modals, the negated form of the auxiliary (*can't*, *couldn't*, *won't*) is counted as a distinct form from the positive variant (*can*, *could*, *will*), since negation leads to different strings and these strings could be stored as separate items by the child. For the 'emerging' modals (*have to*, *need to, wanna* etc.) the past forms are considered different types. Contracted auxiliaries are analyzed separately from full forms as it is not sure whether the child has analyzed them as the same form. This concerns the distinction between *going to* and *gonna*, *will* and *'ll* and *would* and *'d*.

When the lexical predicate is not realized but can be inferred from the context, the implied predicate is counted. In (76), for example, Naomi uses *can't* without realizing the main predicate. However, the preceding context makes clear that *take off* is the implied predicate and this is the predicate that is counted for the analysis.

(76)	MOT:	Okay, you can take them off.	
	CHI:	Can't.	
	MOT:	Oh, sure you can, honey.	(Naomi, 1;9)

Only one of the five predicates was allowed to be an implicit predicate: all other predicates have to be explicit.[7]

The ages at which the children have acquired specific auxiliaries according to the five-predicates criterion are presented in Table 8-31 to Table 8-38.

[7] Some children, such as Naomi, at first omit the predicate in most cases. Although this does indicate that the child uses the form in different contexts, I assume that the use with an explicit predicate is more reliable evidence for the acquisition of the auxiliary.

Table 8-31. EVE's use of auxiliaries with five different predicates

	1;6	1;9	2;0	2;3
π1			*have to*	*gonna* *going to* *can* *can't*
π2				*will*
π3				

Table 8-32. PETER's use of auxiliaries with five different predicates

	1;6	1;9	2;0	2;3	2;6	3;0
π1					*gonna* *can* *can't* *wanna*	
π2						*'ll*
π3						

Table 8-33. NINA's use of auxiliaries with five different predicates

	2;0	2;3	2;6	3;0
π1			*gonna* *wanna*	*going to* *have to*
π2		*will*		*'ll*
π3				

Table 8-34. NAOMI's use of auxiliaries with five different predicates

	1;6	1;9	2;0	2;3	2;6	3;0	3;6	4;6
π1			*gonna* *going to* *can* *wanna*	*can't*			*could* *have to* *would*	
π2					*will*	*'ll*		*won't*
π3								

Table 8-35. ADAM's use of auxiliaries with five different predicates

	2;3	2;6	2;9	3;0	3;6	4;0	4;6
π1				*gonna* *going to* *can* *can't*	*have to*	*wanna*	*could*
π2					*will*	*won't* *could*	
π3							

Table 8-36. SARAH's use of auxiliaries with five different predicates

	2;3	2;6	2;9	3;0	3;3	3;6	3;9	4;0	4;6	5;0
π1				*gonna*	*can't* *wanna*	*going to* *can*	*have to* *got to*	*won't*	*will*	*could* *supposed to*
π2						*won't*	*will*	*'ll*		*can*
π3										

Table 8-37. ABE's use of auxiliaries with five different predicates

	2;6	3;0	3;6	4;0	4;6	5;0
π1	*gonna* *wanna*	*can* *can't*	*going to* *could* *have to* *need to*		*couldn't* *will*	*should* *shouldn't*
π2		*will* *'ll*	*would**	*can* *could*		*won't* *might* *would*#
π3				*will*		

Notes. * = hypothetical ; # = counterfactual

Table 8-38. ROSS' use of auxiliaries with five different predicates

	2;6	3;0	3;6	4;0	4;6	5;6	6;0	6;6	7;6
π1	*gonna* *going to* *can't* *wanna*	*can* *will*		*have to* *got to*	*could*	*shouldn't*	*should*	*may* *had to*	*supp.to*
π2		*will* *'ll*	*won't*		*might*	*wouldn't* *would**	*can*	*'d**	*supp.to*
π3									

Notes. * = hypothetical ; supp. to = supposed to

The tables show that, except for Nina, all the children have acquired one or more auxiliaries with narrow scope—mostly *can('t)*, *wanna*, *gonna* and/or *have to*—before they have acquired one or more auxiliaries with medial scope—mainly *will*, *'ll* or *won't*. Thus, except for Nina, none of the children goes through a stage in which the language system contains π2-operators, but no π1-operators. Note that this also holds for Sarah. Furthermore, the acquisition of π1-operators seems to proceed more quickly than that of π2-and π3-operators. Although children are acquiring π1-operators and π2-operators from the same moment, children use more different auxiliaries with narrow scope than with medial scope. Nina, like Sarah in the previous analysis, is the one counterexample. She uses *will* very frequently at 2;3, so that she immediately reaches the threshold. However, she does acquire π1-operators at a faster rate. This implies that the hypothesis is too absolute, but that there is a very strong tendency that children start out with π1-operators and that they acquire these operators at a faster rate than π2-operators.

According to the five-predicates criterion, only Abe arrives at the acquisition of a π3-operator and this occurs later than his acquisition of narrow and medial scope operators. So none of the children has a language system with π3-operators, but without π1- or π2-operators. The acquisition of π3-operators clearly develops last, which is in accordance with H6b.

8.6.5 Acquisition of modal domains only

In the previous analysis, the main unit of analysis was the exact form of all auxiliaries. Since the frequency of auxiliaries is rather low, the children do not always reach the criterion of five predicates for individual auxiliaries. The criterion can however be reached by more children if auxiliaries that express the same sense and have scope over the same element are aggregated. This analysis is restricted to auxiliaries with modal functions as these may occur with all types of scope. There are four groups of auxiliaries for each modal sense (cf. 6.2.5):

1. Auxiliaries that express the sense of potentiality: *can*, *can't*, *could*, *couldn't*, *may*, *might*;
2. Auxiliaries that express the sense of disposition: *wanna*, *will*, *would*, *wouldn't*, *won't*;
3. Auxiliaries that express the sense of weak necessity: *be supposed to*, *shall*, *should*, *shouldn't*, *ought to*; and
4. Auxiliaries that express the sense of necessity: *have to*, *had to*, (*have*) *got to*, *need to*, *needed to*, *must*.

Not included in this analysis are *will* when used to express future tense or present habitual and *would* when used to express irrealis or past habitual. The same criterion is applied as in the previous analysis:

> If expressions of π1-potentiality are used with at least five different predicates than π1-potentiality is held to be acquired; if expressions of π2-potentiality are used with at least five different predicates than π2-potentiality is held to be acquired; if expressions of π1-necessity are used with at least five different predicates than π1-necessity is held to be acquired, etcetera.

As an illustration of this analysis, consider (77):

(77) Situation: younger brother of Ross (3;0) is fooling around in his chair in the car.

FAT:	Why is he trying to get out of his chair?		
CHI:	Because he's not supposed to. [get out of his chair]	(Ross, 3;0)	1st
	You shouldn't wake me up.	(Ross, 3;0)	2nd
	You're supposed not to be the Wizard of Oz.	(Ross, 3;6)	3rd
	You're supposed to be the Daddy.	(Ross, 3;6)	4th
	You shouldn't sing it because it's something special.	(Ross, 4;0)	5th
		→ criterion reached	

At 3;0, Ross uses two expressions for weak necessity (π1), *supposed to* in combination with the implied predicate *get out of his chair* and *should* in combination with the predicate *wake up*. At 3;6, Ross uses two more expressions for weak necessity (π1), with two new predicates: *supposed to* with the nominal predicate *the Wizard of Oz* and with the nominal predicate *the Daddy*. Finally, at 4;0, Ross uses an expression for weak necessity (π1) *should* in combination with the predicate *sing*. This is the fifth different predicate used with an expression of weak necessity (π1). It is assumed that Ross at this age has acquired the expression of weak necessity with narrow scope (π1).

The ages at which the children have acquired the modal domains according to the five-predicates criterion is presented in Table 8-39 to Table 8-46.

Table 8-39. EVE's use of modal domains with five different predicates

	1;6	1;9	2;0	2;3
π1			necessity	potentiality disposition
π2				
π3				

Table 8-40. PETER's use of modal domains with five different predicates

	1;6	1;9	2;0	2;3	2;6	3;0
π1				potentiality	disposition necessity	
π2						
π3						

Table 8-41. NINA's use of modal domains with five different predicates

	2;0	2;3	2;6	3;0
π1			disposition	potentiality necessity
π2				
π3				

Table 8-42. NAOMI's use of modal domains with five different predicates

	1;6	1;9	2;0	2;3	2;6	3;0	3;6	4;6
π1			potentiality disposition		necessity			
π2								
π3								

Table 8-43. ADAM's use of modal domains with five different predicates

	2;3	2;6	2;9	3;0	3;6	4;0	4;6
π1				potentiality	necessity	disposition	
π2						potentiality	
π3							

Table 8-44. SARAH's use of modal domains with five different predicates

	2;3	2;6	2;9	3;0	3;3	3;6	3;9	4;0	4;6	5;0
π1					potentiality disposition	necessity				weak necessity
π2									potentiality	
π3										

Table 8-45. ABE's use of modal domains with five different predicates

	2;6	3;0	3;6	4;0	4;6	5;0
π1	potentiality disposition		weak necessity necessity			
π2			potentiality		necessity	
π3				disposition		

Table 8-46. ROSS' use of modal domains with five different predicates

	2;6	3;0	3;6	4;0	4;6	5;6	6;0	6;6	7;6
π1	potentiality disposition necessity			weak necessity					
π2		potentiality						necessity	weak necessity
π3									disposition

It appears that most children have acquired expressions with narrow scope for the senses of potentiality, necessity and disposition rather early. Sarah, Abe and Ross have also acquired one or more expressions with narrow scope for weak necessity, but this sense comes in later. The first expressions with medial scope that are acquired express the sense of potentiality for all children. This concerns expressions of general deontic statements, general root-possibility or objective epistemic possibility. Abe and Ross have also acquired expressions with medial scope for necessity and Ross also for weak necessity.[8] Ross and Abe have furthermore acquired modal expressions with wide scope: both children use *will* or *would* of the domain of disposition to express prediction (π3). The tables show that for all modal domains, potentiality, disposition, weak necessity and necessity, the narrow scope meanings are acquired before the

[8] Recall that there is no modal expression of disposition with medial scope in English. *Will* and *would* with medial scope are analyzed as future tense markers.

medial scope meanings and in all cases the medial and narrow scope meanings within a specific modal domain are acquired before the wide scope meanings. This strongly supports H6b: π1-operators are used with more different predicates before π2-operators and these in turn are used with more different predicates before π3-operators.

Even though the modal auxiliaries are aggregated with respect to their modal sense and scope, in only two cases does a modal domain with wide scope reach the criterion. A further aggregation lowers the threshold even more: all modal expressions with the same scope are now considered equal. The criterion is then:

> If a child uses a modal expression with narrow scope spontaneously with five different predicates, then narrow scope modality is held to be acquired; if a child uses a modal expression with medial scope spontaneously with five different predicates, then medial scope modality is held to be acquired, etcetera.

This is illustrated for Sarah's use of medial scope operators in (78):

(78)	You can't <u>get</u> it off.	(Sarah, 4;0)	1st
	You can <u>see</u> a &bu +...	(Sarah, 4;0)	2nd
	You can <u>make</u> cupcake out of these # Mommy.	(Sarah, 4;0)	3rd
	But ya can't <u>get</u> it out.	(Sarah, 4;0)	--
	You can <u>make</u> things out of this # a bone out this.	(Sarah, 4;0)	--
	He can <u>get dead</u>.	(Sarah, 4;6)	4th
	(Sup)posed to <u>have</u> a d@l in it.	(Sarah, 4;6)	--
	Can one <u>have</u> it on these?	(Sarah, 4;6)	5th
		→ criterion reached	

At 4;0, there are three different predicates used with a medial scope operator: the predicates *get* (*out / off*), *make* (2) and *see*. They are used with *can* or with *can't*. The pronoun *you* in all the examples refers to non-specific, general 'you', that could be paraphrased by *one*. These are examples of event-oriented root-possibility and permission. At 4;6, there are three more uses of event-oriented modals. *Can* is used in its function of event-oriented epistemic possibility marker with *get dead* and of event-oriented permission marker with *have*. *Get dead* was considered a separate predicate from *get out/off* as it does not contain a preposition. Furthermore, *supposed to*, expressing event-oriented weak necessity is used with *have*, but this predicate is not new. At 4;6, Sarah has thus used modal expressions with medial scope with five different predicates: *get* (*out/off*), *make*, *see*, *have*, and *get dead*.

The ages at which the children use five different types of narrow, medial or wide scope modality are presented in Table 8-47. It appears that the further aggregation does not result in more children reaching the criterion for π2- and π3-operators. The general analysis of modal operators clearly shows that the acquisition of modal expressions with narrow scope occurs for each child before the acquisition of modal expressions with medial scope, which in turn occurs before the acquisition of modal expressions with wide scope.

Table 8-47. Acquisition of scope within modal domain (five predicates criterion) for all children

	Age											
CHILD	**1;9**	**2;0**	**2;3**	**2;6**	**3;0**	**3;3**	**3;6**	**4;0**	**4;6**	**5;0**	**6;0**	**7;6**
Eve		π1		-	-	-	-	-	-	-	-	-
Peter			π1			-	-	-	-	-	-	-
Nina	-			π1		-	-	-	-	-	-	-
Naomi		π1								-	-	-
Adam	-	-			π1			π2		-	-	-
Sarah	-	-				π1			π2		-	-
Abe	-	-	-	π1			π2	π3			-	-
Ross	-	-	-	π1	π2							π3

8.6.6 Discussion and conclusion

The analysis of variation in use, both of inflection and of auxiliaries, shows that most children use one or more π1-operators with more different predicates at an earlier stage than π2-operators. The use of π3-operators with at least five different predicates occurs last. There are, however, two children that do not completely fit in with this picture. First, Sarah uses zero present tense inflection (π2) before other types of inflection. Nevertheless, she did use narrow scope **auxiliaries** (π1) before medial scope **auxiliaries** (π2). Sarah seems to be a holistic learner: she probably has not analyzed the early inflectional forms, even though she uses them with five different predicates. Second, Nina uses future tense *will* (π2) before she uses other types of auxiliaries. However, she does acquire inflectional expressions with narrow scope before inflectional expressions with medial scope and, within the domain of modality, she acquires π1-operators before π2-operators. To conclude, there is a very strong tendency for children not to have TMA systems with π2-operators but without π1-

operators. Furthermore, none of the children goes through a stage in which π3-operators are present, but π2- and π1-operators not.

The data on auxiliaries and modal domains furthermore show that children use more different narrow scope expressions with five predicates than medial or wide scope expressions. Children thus acquire different π1-operators at a faster rate than different π2-operators and these in turn are acquired at a faster rate than π3-operators.

8.7 QUALITATIVE ANALYSIS: CONSTRUCTION OF PARADIGMS

8.7.1 Introduction

The second qualitative analysis concerns the contrastive use of morphemes, or, the construction of paradigms. When children start using the same predicates with different morphemes, there is evidence that they have started analyzing the predicate and the morpheme as separate elements. In this section, H6c will be tested:

H6c Contrastive use of operators—paradigmatic use of different operators with the same predicate—follows the order of the hierarchy: π1-operators are used contrastively before π2-operators, which in turn are used contrastively before π3-operators.

8.7.2 Method and analysis

The contrastive analysis is restricted to verbal predicates (versus nominal, adjectival and adverbial predicates). Only the six youngest children are included, since both Abe and Ross already have mastered tense (π2) and aspect (π1) in the first sample that is available. The data from the previous analysis indicate that contrastive use of π3-operators should be very rare. For the analysis of contrasts, all the files that were available for the subjects in CHILDES were examined, that is not only the files that were included in the samples at every third or sixth month, but the complete available corpus. If the same predicate was used with two or more different TMA expressions that have the same scope, this was considered contrastive use. The rationale behind this analysis is that all TMA expressions with the same scope have the same communicative function (see 2.4): all TMA expressions with narrow scope contribute to the description of the property or relation that is ascribed to the argument; all TMA expressions with medial scope contribute to situating the event. In many cases,

only one TMA expression with a specific scope is used in a clause.[9] For example, when an aspectual marker is used, in general, no modal marker with participant-oriented modality can also be used. However, it is perfectly fine to combine π1-operators with a tense marker (π2) and therefore, they do not express contrastive meanings, they do not belong to the same paradigm. Only one contrast is counted for a specific predicate per scope level: for example, if three different aspectual or participant-oriented modal markers were used with the same predicate, this was counted as one contrastive use for π1-operators and not as three contrasts. The analysis is not restricted to a specific sample or age in order to give the child as much credit as possible. Limiting the analysis to one specific month, for example, would greatly reduce the chance to find contrastive uses, thereby underestimating the abilities of the child (cf. Gillis 2003). Only if the database was extremely dense, could a contrastive analysis be restricted to a limited time period. The age at which the second TMA expression with the same predicate was used, is the age at which the child is considered to have acquired the contrast. Each contrastive use attested was counted cumulatively, up to the file in which the 50th contrast occurred. The reason to stop the analysis at the 50th acquired contrast is that the analysis is meant to cover the initial phase and it is assumed that at this point, the child does in fact use several operators productively.

To illustrate the analysis of π1-operators, consider the examples (79)-(81). In (79), there is contrastive use of π1-operators with the predicate *make*: it is combined with a progressive (π1) and with *can*, denoting permission (π1). The contrastive use is acquired at 2;1, when the actual contrastive form takes place.

(79)	Becca <u>making</u> a table.	(Nina, 2;0.10)	1st
	Oh, you <u>can make</u> a snowman.	(Nina, 2;1.22)	2nd
		→ π1-contrast for *make* acquired	

In (80), there is contrastive use of π1-operators with the predicate *take*: it is combined with *can't* for expressing (in)ability and with a prospective.

(80)	I <u>can't take</u> that off.	(Nina, 2;1.22)	1st
	I <u>going to take</u> a Maggie's house.	(Nina, 2;1.22)	2nd
		→ π1-contrast for *take* acquired	

Finally, in (81), there is contrastive use of π1-operators with the predicate *sleep*: it has been used with a progressive already at 1;11, but at 2;2 it is also used with

[9] Exceptions are combined aspect markers, such as perfect progressive and the combination of event-quantification and tense (past habitual).

prospective aspect, volition *wanna* and obligation *have to*. Since only one contrast for a specific predicate is counted per scope level, all different π1-operators with the predicate *sleep* are counted as one π1-contrast. Contrastive use of π1-operators on the predicate *sleep* is thus acquired at 2;2.

(81)	Sleeping.	(Nina, 1;11.29)	1st
	Going to sleep.	(Nina, 2;2.28)	2nd
	You gonna sleep.	(Nina, 2;2.28)	
	I wanna go sleep.	(Nina, 2;2.28)	
	You still have to sleep.	(Nina, 2;2.28)	→ π1-contrast for *sleep* acquired

The contrastive use of π2-operators appeared to involve mainly tense oppositions, since no other π2-operators are used at the early ages. All different **forms** that express tense were considered as contrastive expressions. This means that, apart from the contrasts between present, past and future time reference, different forms that express the same tense are also considered as contrastive uses. For example, auxiliaries in the aspectual periphrases and in *do*-support forms (*do*, *don't*, *does* or *did* and *didn't*) were considered as tense variants. This means that if a simple present and a present *be*-auxiliary are both used in combination with a specific predicate, such as *he run**s*** and ***is** running*, this is considered contrastive use. If a child uses a predicate with a simple past and with a *do*-support form, like *he jumped* and *did he jump*, this is also considered contrastive use. Of the *be*-auxiliaries, only the first form is counted: so *am*, *are* and *is* and the contractive forms '*m*, '*re*, and '*s* are all considered as one expression form and the first of these forms that occurs with a specific verb is the one that is taken into consideration. A *be*-auxiliary in a progressive construction was considered the same tense marker as a *be*-auxiliary in a prospective construction. Recall that bare stems in contexts where adults would use a finite form, such as *I run* instead of *I'm running* or *Mommy have* instead of *Mommy has* were excluded from analysis.

It was complicated and time-consuming to search for all possible irregular past and simple present forms the child might have used. The first search was therefore confined to the irregular past and simple present forms that the child had used in the samples analyzed in 8.5 and 8.6. Furthermore, every predicate that was used with two different TMA expressions, for example a progressive and a modal auxiliary, was also distilled from the complete corpus.

In (82)-(84) some examples are presented of contrastive use of π2-operators. In (82) the predicate *bite* is used both with the present tense auxiliary '*s* and with the future tense marker *will*. There is thus contrastive use of π2-operators at 2;2.

(82)	He's biting me.	(Nina, 2;1.29)	1st
	Giraffe will bite the man.	(Nina, 2;2.6)	2nd
		→ π2-contrast for *bite* acquired	

In (83) there is contrastive use of π2-operators with the predicate *go*. At 2;2, it has occurred both with the present tense auxiliary '*s* and in the past irregular form.

(83)	He's going on the pencil.	(Nina, 2;1.15)	1st
	Went Rachel's home.	(Nina, 2;2.6)	2nd
		→ π2-contrast for *go* acquired	

Finally, in (84) the predicate *need* is used with different tense expressions. It is used with present tense inflection (-*ø*) and also with future *won't* and with the present tense auxiliary *don't*. This contrast is acquired at 2;2. Although *need* is used with three different π2-operators, it is counted as one contrast, since only one contrast per predicate per operator type is included.

(84)	I need-*ø* it.	(Nina, 2;1.15)	1st
	I won't need that blanket.	(Nina, 2;2.28)	2nd
	I don't need that blanket.	(Nina, 2;2.28)	2nd
		→ π2-contrast for *need* acquired	

Note that irregular past tense forms (π2-operators) were included in the study, although it cannot be decided whether a child has analyzed the past irregular form as belonging to the same paradigm as the stem-forms, since the phonological form is different. The number of contrasts that include an irregular form will be discussed below.

8.7.3 Results

In Table 8-48 to Table 8-53 the cumulative number of contrastive uses that the child has made are presented. The analysis was ended in the file in which the child reached the 50th contrast. At that moment, none of the children had used π3-operators contrastively, therefore, this category is not presented in the tables.

The first contrast that is found for Eve and Nina is a contrast between π1-operators, for Adam and Sarah it is a contrast between π2-operators, and Naomi and Peter make their first contrast between both types of operators in the same month. In this respect, there is no clear distinction between the different types of operators. Children seem to start around the same age with

Table 8-48. Cumulative number of contrasts within operator classes in Eve's data

EVE	**Age**						
Operator	**1;8**	**1;9**	**1;10**	**1;11**	**2;0**	**2;1**	**2;2**
π1	2	4	10	14	21	29	35
π2			1		8	11	15

Table 8-49. Cumulative number of contrasts within operator classes in Naomi's data

NAOMI	**Age**						
Operator	**1;10**	**1;11**	**2;0**	**2;1**	**2;2**	**2;3**	**2;4**
π1	4	12	22	24	25	26	27
π2	1	7	13	16	19	23	24

Table 8-50. Cumulative number of contrasts within operator classes in Peter's data

PETER	**Age**				
Operator	**2;1**	**2;2**	**2;3**	**2;4**	**2;5**
π1	8	11	26	28	36
π2	2	5	9	11	19

Table 8-51. Cumulative number of contrasts within operator classes in Nina's data

NINA	**Age**				
Operator	**2;1**	**2;2**	**2;3**	**2;4**	**2;5**
π1	3	10	20	24	30
π2		7	15	20	25

Table 8-52. Cumulative number of contrasts within operator classes in Adam's data

ADAM	**Age**							
Operator	**2;3**	**2;4**	**2;6**	**2;7**	**2;8**	**2;9**	**2;10**	**2;11**
π1		3	9	17			27	32
π2	1	2	4	5	8	11	17	

Table 8-53. Cumulative number of contrasts within operator classes in Sarah's data

SARAH	Age								
Operator	**2;3**	**2;7**	**2;8**	**2;9**	**2;10**	**2;11**	**3;0**	**3;1**	**3;2**
π1		2	3	10	11	12	16	20	26
π2	1	2		6	10	11	12	18	24

both operator types. However, there is a clear distinction in the rate with which children expand their contrastive uses of operators. The age at which the children reach the 50th contrast is very different. This will be partly caused by the different sample sizes, the frequency of recording and the age at which the recordings start, but it is may also be an indication for the speed of language development for the individual children. Although the files of Sarah and Adam are large, they are quite late with the 50th contrastive use. Despite individual variation in speed of acquisition, for each child the number of contrastive uses of π1-operators increases at a faster rate than the uses of π2-operators. In the last sample, Eve, Peter and Adam have nearly twice as many contrastive uses of π1- than of π2-operators. In the data of Naomi, Nina and Sarah this difference is much smaller, but it is there.

Note that a contrastive use of which one of the two expressions was an irregular past tense form was also counted as a contrastive use for operators with medial scope. However, it is not certain whether an irregular past form is indeed analyzed by the child as belonging to the same paradigm as the stem-forms, since the phonological form is different. Of all the contrastive uses with medial scope, there are for each child several contrastive uses that consist of an irregular past tense form and another expression with medial scope. There are 3 such irregular past forms in a contrastive use for Eve, 8 for Naomi, 3 for Peter, 4 for Nina, 10 for Adam and 11 for Sarah.

8.7.4 Discussion and conclusion

The analysis of contrastive use clearly points out that π1-operators are more productive in children's language than π2-operators. However, the results show that H6c should be slightly modified: children do not necessarily use π1-operators contrastively **before** π2-operators. However, they do use them contrastively **more often**. In other words, they do not necessarily start making contrasts with π1-operators before making contrasts with π2-operators, but the rate with which they make new π1-contrasts is faster than for new π2-contrasts. None of the children makes a contrast for π3-operators. This suggests that π1-

operators are easier to acquire than π2-operators and these in turn are easier to acquire than π3-operators.

8.8 POLYSEMOUS MARKERS

The final analysis of the data concerns question and hypothesis 7:

Q7: *In what order are the different functions of polysemous items acquired?*

H7: At any stage in language acquisition, a single expression can only cover adjacent regions in semantic space. As a result, a polysemous or portmanteau expression will only have semantic functions with similar or adjacent scopes.

The polysemous markers in English are the modal auxiliaries. These were already under discussion in 8.6.4. H7 predicts that there is no single expression form in child language that can function as a π1- and a π3-operator, but not as a π2-operator. According to the five-predicates criterion, only Abe has acquired an expression with wide scope, namely *will*. The overview of his acquisition of auxiliaries is here repeated in Table 8-54.

Table 8-54. ABE's use of auxiliaries with five different predicates

	2;6	**3;0**	**3;6**	**4;0**	**4;6**	**5;0**
π1	*gonna* *wanna*	*can* *can't*	*going to* *could* *have to* *need to*		*couldn't* ***will***	*should* *shouldn't*
π2		***will*** *'ll*	*would**	*can* *could*		*won't* *might* *would*#
π3				***will***		

Notes. * = hypothetical; # = counterfactual

The overview shows that at all stages, the possible functions of *will* have adjacent scope. At first, Abe has acquired *will* in its meaning of future tense, mainly in combination with first person to express intention. This use is analyzed as a π2-operator. At 4;0 he has acquired *will* in its meaning of prediction, in which case it functions as a π3-operator. Finally, at 4;6 he has acquired *will* in the meaning of volition, a π1-operator.

Abe's data not only support the idea that polysemous expressions can only have similar or adjacent scope, they also show that children not necessarily start out with the function that has the narrowest scope, but rather with the function

that is most frequent in the input. For *will*, the future tense use (π2) in the input is far more frequent than the prediction use (π3) and the volition use (π1). The latter functions have the same frequency in the input to Abe. The fact that volition-*will* is acquired later than prediction-*will* may be explained by the fact that Abe already has a strong marker for volition in his repertoire, *wanna*, whereas *will* in its prediction use (π3) serves a completely new function in Abe's system.

H7 is thus supported by the data, albeit only testable in one child on one form. There are no single expressions in this child's speech that at the same time function as a π1- and a π3-operator, without also functioning as a π2-operator. The different functions of single expressions in the child's speech have adjacent scopes. It is not necessarily the case that he first uses an expression with the most narrow scope. This hypothesis needs to be tested clearly including data from other children.

8.9 DISCUSSION AND CONCLUSION

In this chapter hypotheses 6 and 7 were investigated for American English.

H6: The acquisition order of TMA operators follows the order of the Scope Hierarchy, π1-operator ⊂ π2-operator ⊂ π3-operator. Because of increasing complexity and decreasing communicative need, the acquisition order of TMA expressions is π1-operators before π2-operators, and π2-operators before π3-operators.

H7: At any stage in language acquisition, a single expression can only cover adjacent regions in semantic space. As a result, a polysemous or portmanteau expression will only have semantic functions with similar or adjacent scopes.

H6 was tested in three ways: by looking at the relative frequency, the variation in use and the contrastive use of operators. The three analyses all showed the same tendency: children do not necessarily start out with only π1-operators, but the rate at which they acquire these operators is faster than the rate with which they acquire π2-operators. This was shown by a larger relative proportion of π1-operators in child language than in adult language and in input language, by more different π1-operators compared to π2-operators that are used with five different predicates and by more contrastive uses of π1-operators than of π2-operators. All children use π3-operators only marginally.

The distinction between π1- and π2-operators is not very large. This is mainly caused by the fact that children use tense markers rather early and these

constitute the majority of all π2-operators. Other π2-operators, however, come in much later than the first π1-operators. So, more specifically, the distinction between progressive and prospective aspect, participant-oriented modality and tense does not seem to be very large. Operators that are acquired late (after 3;0) are perfect aspect, event-oriented modality, event quantification, irrealis and proposition-oriented modality.

Why do children acquire π1-operators at a faster rate than π2-operators and why are π3-operators acquired last? According to the Scope Hierarchy, π1-operators are communicatively more relevant than π2- and π3-operators and they are cognitively least complex, so they are easier to acquire. The analysis of the input supports the idea that π1-operators are more dominant in the communication of young children than in adult-adult language. The parents adjust their language when speaking to children by using relatively more π1-operators (less π2- and π3-operators). However, the distribution is less skewed than in the children's speech.

The acquisition of polysemous forms by Abe supports the view that single items at every stage in child language, like in adult language, can only express multiple meanings with adjacent scope (H7). However, further research is needed, based on data of more children.

In this chapter the study on the acquisition of TMA in English focused on the acquisition of adultlike **forms.** The child forms were analyzed assuming that they express similar semantics as in adult language. In 8.4, however, it was already suggested that children may use certain expression forms with functions different from adult use. Chapter 9 deals with the question of what the functions of TMA forms in early child speech are. To this end, the contexts of use of certain TMA-forms will be examined and compared to the use of these forms in adult-adult language and input.

Chapter 9

Functions of TMA in Child English[1]

9.1 INTRODUCTION

As was discussed in the introduction to Part III, it is often reported that there are strong associations in child language between tense or aspect morphology on the one hand and situation type on the other hand. The following associations are reported for different languages:

- Imperfective or progressive with activities, [+dynamic, -telic]
- Perfective or past tense with telic events, [+dynamic, +telic][2]
- Imperfective or present tense with states, [-dynamic].

Associations in first language acquisition between tense/aspect morphology and situation type appear to hold across languages, e.g. in Mandarin (Erbaugh 1978), Turkish (Aksu 1978), Greek (Stephany 1981, 1997), Japanese (Shirai 1998) and English (Shirai & Andersen 1995), but they are not as strong in every language. The associations have also been shown to hold in the input (e.g. Aksu-Koç 1998; Andersen & Shirai 1996; Stephany 1981). However, the distribution in adult-adult interaction has not been examined in most studies, with the exception of Stephany's study on Greek (1981) who found close similarities between patterns in adult and child language.

Various explanations have been proposed for the correlations found in child language, for example that the grammatical markers encode situation type rather than grammatical aspect or tense (e.g. Antinucci & Miller 1976; L. Bloom et al. 1980; Bronckart & Sinclair 1973). This deviating use of the morphemes would stem from a cognitive limitation to mark temporal deixis. This is referred to as the Aspect Before Tense or the Aspect First Hypothesis. A related explanation is the Prototype Account (P. Li & Shirai 2000; Shirai 1991, 1994; Shirai & Andersen 1995). On the basis of distributional analysis, children would

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[1] An earlier version of this chapter appeared as Boland (2003).

[2] Some studies report that the association holds for *punctual* telic verbs (e.g. Shirai & Anderson 1995), while others report an association with telic verbs in general (e.g. Tomasello 1992, Clark 1996).

create semantic representations of tense/aspect morphology that are restricted to the prototypical situation type of the morphological category. The semantic representation thus excludes the combination of morphology with non-prototypical members.

If these explanations are correct, then this has important consequences for testing the predictions of the Scope Hierarchy. The Scope Hierarchy predicts that there are no languages that do not linguistically encode the modification of the predication (function of π2-operators) if they do not also linguistically encode the modification of the predicate (function of π1-operators). However, if the TA forms in early child English denote situation type, then they do not serve as modifiers of the predication or the predicate. Children, then, would not use the TA forms for expressing the semantic functions of tense and aspect and these forms should not be considered operators.

In this chapter part of the data on English language acquisition will be re-examined to find out whether there are grounds for interpreting the early tense and aspect forms as marking situation type. This is done by comparing the distributions of unmarked and marked combinations in child data, input language and adult-adult interaction.

In most studies on the acquisition of aspect, there are no data presented on the association between tense/aspect morphology and situation type of that specific language in adult-adult conversation. It is however necessary to know how 'natural' the association is between tense/aspect encoding and situation type, to make sure that the association is specific for child language, in other words that there is indeed a phenomenon to explain. The first question to be addressed here is: what is the distribution of different combinations of tense/aspect morphology and situation type in adult English? This will be discussed in 9.3.1. The second question that will be examined in this chapter is whether the association between tense/aspect morphology and situation type in child language differs from that found in adult language. Only if children behave differently from the target pattern, is it meaningful to investigate the factors that influence the distributional patterns in child language. The development in child language will therefore be investigated in 9.3.2. Thirdly, a possible correlation between the distribution in the input and in child language is explored. It was shown in the previous chapter that language directed to children differs from what adults do when they converse among themselves and it might be the case that the distribution of situation types over morphology in input to children differs from adult-adult interaction. The patterns found in child language might be a reflection of the distribution in the input. Whether input language differs from adult-adult language and whether child language indeed reflects input language is examined in 9.3.3.

The next step will be to evaluate the explanations for the associations in child language between tense-aspect morphology and event type (9.4). The distribution patterns of prototypical and non-prototypical combinations in the different types of data give reason to propose an alternative explanation for the associations in child language, the Discourse Topic Hypothesis (9.4.3). This hypothesis states that there is a close relation between discourse topics and the use of specific linguistic forms. It includes the cognitive and communicative development of children and accounts for the patterns found in child language, input language and adult-adult language. The Discourse Topic is tested in 9.5 by analyzing the linguistic contexts in which the associations do and do not occur and by exploring the discourse topics in the different data sets.

9.2 METHODOLOGY

9.2.1 Data selection

The data used for examining the distribution of tense-aspect morphology over situation type are a selection of the data that were used for the analysis in Chapter 8 and discussed in 8.3.2. The distribution in adult speech is investigated in the adult-adult data of the SBCSAE (Dubois 2000), consisting of the spontaneous conversations of eight adult speakers. The distribution in child language is investigated in the samples of Naomi (Sachs 1983), Nina (Suppes 1973) and Abe (Kuczaj 1976). Of Naomi, the samples at age 1;6, 1;9, 2;0, 2;3, 2;6 and 3;0 are examined. Nina's samples are examined at 2;0, 2;3, 2;6 and 3;0 and Abe's samples at 2;6, 3;0, 3;6, 4;0, 4;6 and 5;0. Each child sample consists of 750 child utterances. Finally, the input data to two of the three children, Nina and Abe, is used to examine the distribution of tense-aspect morphemes over situation type in the input language. The input to Nina is investigated at 2;0, 2;6, and 3;0 and for the progressive also at 2;3. The input to Abe is investigated at 2;6, 3;0, 3;6 and 4;6. All adult utterances addressed to the child in these samples are included in the study.

9.2.2 Coding

In the samples, all finite verbs with simple present, progressive or simple past (regular and irregular) inflection were coded for form and situation type. Simple present tense forms include forms with third person singular *–s* and zero forms that correctly occur with a non-third person singular subject. Every targetlike combination of a subject and a present tense form, such as *I want*, *he has, it looks like* … etcetera, was encoded as simple present. For the progressive and the simple past, only the inflection (not the presence of a subject) was taken as a

criterion for inclusion, since here, the choice of the inflection is not dependent on the type of subject.

The coding of situation types in this study is restricted to the oppositions between [-dynamic] and [+dynamic] situations and then, within the category of [+dynamic] situations, between [-telic] and [+telic] situations. See Figure 9-1 for a schematic representation of the different event types distinguished in this study. In 3.2 situation types have been discussed in detail. The term state is used for all [-dynamic] situations. The term activity is used for all [+dynamic / -telic] situations, including the category of semelfactives (C. S. Smith 1991) and the term telic event is used for all telic events, including both the accomplishments and achievements of Vendler's verb classification (1967).

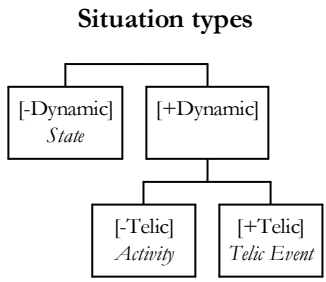

Figure 9-1. Classification of event types

Since the internal structure of a situation does not depend on the verb alone (see 3.2) the analysis of situation types is based on the situation described by the bare verb (without tense and aspect marking), its arguments and adjuncts. Note that the classification of situations is a classification of the inherent semantics of a verb and its arguments and not a classification of "real" situations. Real situations can be viewed in various ways, even within one language: *John was very scared of the dog* or *the dog scared John enormously* both express that John was very afraid of the dog (Dik 1997a: 125), but in the first example this is described as a state and in the second example as a telic event. It is language-specific how real world events are described linguistically and it is also dependent on the individual speaker how a specific real world event is presented.

A situation is classified as a state, when it is static and stable, when it lacks 'shifts in variation' and 'consist of an undifferentiated period' (C. S. Smith 1991: 37). Moreover, the criterion of input of energy is used:

> With a state, unless something happens to change that state, then the state will continue (...). With a dynamic situation, on the other hand, the situation will only continue if it is continually subject to a new input of energy. (Comrie 1976: 49)

Although there is considerable agreement in the literature on the definitions of states and non-states, no linguistic test is available that unequivocally distinguishes states from non-states. Clear examples of activities are *run in the park*, *take pictures*, *cry*, and *read* and clear examples of states are *know John*, *feel sorry*, *own a house* and *live in Florida*. The former situations have internal dynamics and require input of energy to last in time. The latter situations, in contrast, have no internal variation and do not require an input of energy to continue. Although most situations can be classified unproblematically, there are some situations such as *wear (a sweater)*, *hold (a basket)*, *wait (for the train)*, *sleep*, *dream,* position verbs like *stand* and *sit,* and perception verbs like *see*, *hear* or *listen*, of which it is less clear how they should be classified. These verbs are all rather common in child language. For these situations it is disputable whether they have internal dynamics and whether they require an input of energy. Shirai & Andersen (1995) in their research on English have classified each verb as an activity that yields a habitual reading in the simple present tense (as opposed to its use in the progressive), thus including position verbs. I, however, agree with Smith (1991: 250) and Comrie (1976: 37) that position verbs like *stand*, *sit* and *lie* describe a state even though they often occur in the progressive. With progressive marking, these verbs refer to a state that is temporary, whereas in the simple present they refer to a permanent state. It is, however, in both cases a state that is referred to, and not an activity. Only when verbs refer to a particular stance—for example *Mary was sitting up as straight as she could* (from C. S. Smith 1991: 250)—is the situation classified as an activity. Other verbs that occur in the progressive but seem to lack any internal variation are *wait*, *hold*, *live (somewhere)* and *wear (clothes)*. They are all classified as states. Two other problematic cases are *sleep* and *dream*. In this study they are both analyzed as an activity, as opposed to *be asleep*, or *have a dream* that are analyzed as states. Finally, perception verbs are classified as state if they describe an non-controlled event, such as *see* or *hear*, and as activities if they describe a controlled event, such as *look* or *listen*.

Dynamic situation types can be divided into atelic and telic: telic events involve a certain change of state, whereas atelic events (activities) do not. Telic events describe 'a process that leads up to a well-defined terminal point, beyond which the process cannot continue.' (Comrie 1976: 45). As discussed in 3.2 the best test to distinguish telic from atelic events is to use the question in (1):

(1) If X is interrupted in the course of V-ing, has he then V-ed?

If the answer to this question is 'yes', the situation is encoded as atelic. If the answer is 'no' it is classified as telic. For example, the answer to the following question is positive: If Mary is interrupted in the course of searching for a

stamp, has she then searched for a stamp? Searching for a stamp is therefore classified as an activity. In contrast, the answer to *If Mary is interrupted in the course of writing a letter, has she then written a letter?* is negative and writing a letter is classified as a telic event. Most samples were first coded by a research assistent and completely checked by me. In order to test inter-coder reliability, two samples were independently coded by both.[3] Cohen's kappa was calculated and the score was >.95. The reliability of the coding was thus satisfactory.

9.3 RESULTS

9.3.1 Distribution in adult-adult language

In the adult conversations, there were in total 995 tokens of a simple present, progressive or simple past that were all coded for situation type. The distribution of situation type over tense/aspect morphology was analyzed at first for each adult individually. The distributions presented in Figure 9-2 are the weighted means of these distributions.

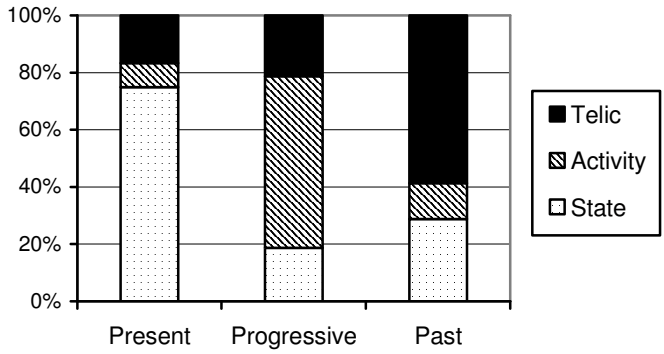

Figure 9-2. Proportions of event types for simple present (*N* =569), progressive (*N* =121), and simple past (*N* =305) in American English adult-adult conversation

The conversational data of adults show a strong association between simple present and states (mean 75%), between progressive and activities (mean 60%) and between simple past and telic events (mean 59%). Hereafter, these combinations will be referred to as the **unmarked** combinations. Of all the

[3] In fact, in an earlier stage of the research, not only the predicates that were marked for present, past and progressive were coded for situation type, but all predicates in the sample. Cohen's Kappa is based on all these codings of situation type.

simple present tokens only 8% combines with activities and 17% with telic events. The progressive combines with states in 19% of all cases and with telic events in 21% of all cases. Of all the past tokens 29% combines with states and 12% with activities. All these combinations will be referred to as **marked**.

To conclude, there is a level of association between tense/aspect morphology and situation type that is perfectly natural in conversational adult English: about 60% association between progressive and activities and past and telic events and 75% between present and states. The question is whether children differ from this pattern of associations in their production. Only in so far as the associations in English child language are stronger or weaker than the adult-adult level or different altogether, is there a phenomenon specific for child language that needs explaining. Therefore, the distribution in the child samples will be investigated.

9.3.2 Distribution in child language

In the literature on the acquisition of tense/aspect morphology in English (L. Bloom et al. 1980; Clark 1996; Shirai 1991; Shirai & Andersen 1995; Tomasello 1992) there is agreement that the progressive in early child language is overwhelmingly used with activities and the past with telic events, figures running up to 90 or 100%. The study of the simple present is restricted to the acquisition of third person singular *–s* and here the results are not very consistent or not reported at all. These studies suggest that there is indeed a difference between adults and children. Whether this is indeed the case can only be examined when child and adult data are analyzed in the same way, as was done in this study. The χ^2-test was applied in order to find out whether the distribution in the child samples is significantly different from the distribution in the adult sample. Like in Chapter 8, the χ^2-test is applied when fewer than 20 percent of the cells have an expected frequency less than 5 and if no cell has an expected frequency less than 1 (Siegel & Castellan 1988: 123). Whenever the χ^2-test could not be applied on the three separate categories because the expected frequencies were too low, the two categories that form a marked combination with the morphology were combined for the analysis and the Fisher's Exact test is used to calculate p, if possible: this is always described in the text. The significance level was again set at $\alpha = .01$, like in 8.5.2, as the number of analyses is quite large. The results are presented separately for each morpheme: first the use of the progressive is discussed, then the use of the simple past and finally the use of the simple present. The distributions for each child are presented in figures, showing the relative frequencies. The rightmost column presents the distribution in the adult sample. All samples that contain the relevant morphemes are presented in the columns.

9.3.2.1 Progressive

Figure 9-3 to Figure 9-5 display the proportion of situation types in the progressive in child language for each child. The rightmost column in each figure presents the distribution of situation types in the progressive in the adult conversations, which was also presented in Figure 9-2. In this sample, 21% combines with telic events, 60% with activities (unmarked combination) and 19% with states.

At 1;9, 2;3 and 2;6, Naomi's distribution of situation types in the progressive (Figure 9-3) is not different from what adults do (at 1;9, $\chi^2 = 3.3$, $p = 0.19$; at 2;3, $\chi^2 = 3.88$, $p = 0.14$; at 2;6, $\chi^2 = 7.99$, $p = 0.02$). At 2;0, the marked combinations (states and telic events) had to be added up in order to apply a statistical test. Although this yielded a non-significant difference with Fisher's Exact test ($p = 0.12$), it is remarkable that there are no states in Naomi's data. The sample at 3;0 is significantly different from the adult sample, mainly due to a far greater proportion of telic events (63%) in the progressive ($\chi^2 = 20.47$, $p < .001$).

The results for Nina are presented in Figure 9-4. At age 2;0 the marked combinations (with states and telic events) had to be combined in order to be able to apply a statistical test: Fisher's Exact test did not yield a significant difference with the adults ($p = 0.81$). It is however remarkable that Nina does not use the progressive with telic events at all. At 2;3 the distribution in Nina's progressives is significantly different from the adult sample ($\chi^2 = 34.38$, $p < .001$) in that her proportion of telic events is larger (74%) and of activities and states smaller. At 2;6 states and telic event were taken as one category; then, there was no significant difference ($p = 0.77$) with the adult-adult distribution. At 3;0 there was no significant difference either ($\chi^2 = 3.13$, $p = 0.20$).

Figure 9-5 provides the results for Abe. At 2;6 the unmarked categories had to be combined which yielded a significant difference from what adults do (Fisher's Exact, $p < .001$): the proportion of telic events is larger (80%) and there are fewer states (none at all) and activities. From age 3;0 the proportions of situation types in Abe's progressives are similar to the adult sample.

To summarize, these data show that the association between activities and the progressive in child language is never stronger than in adult language. Where children, however, do differ from adult language is that there is at least one sample for each child in which telic events form the largest part. Furthermore, the samples of Naomi at 2;0, Nina at 2;3 and Abe at 2;6 contain no or hardly any states and the language of Nina at 2;0 does not contain a single telic situation.

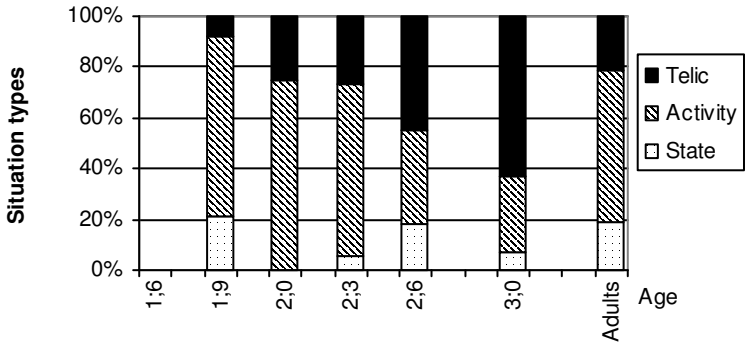

Figure 9-3. Naomi's use of progressive: proportions of different situation types (at 1;6, *N* =0; at 1;9, *N* =37; at 2;0, *N* =32; at 2;3, *N* =37; at 2;6, *N* =39; at 3;0, *N* =30)

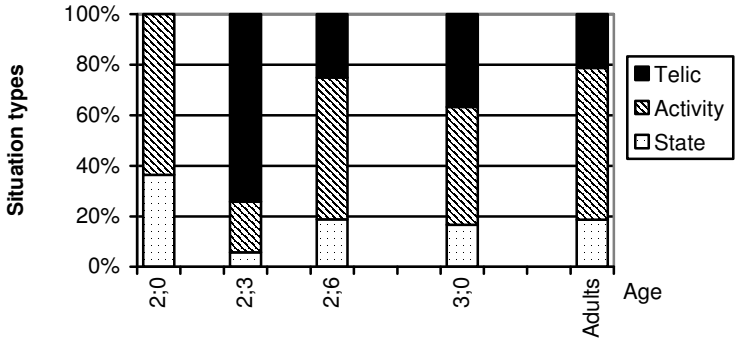

Figure 9-4. Nina's use of progressive: proportions of different situation types (at 2;0, *N* =11; at 2;3, *N* = 35; at 2;6, *N* =16; at 3;0, *N* = 30)

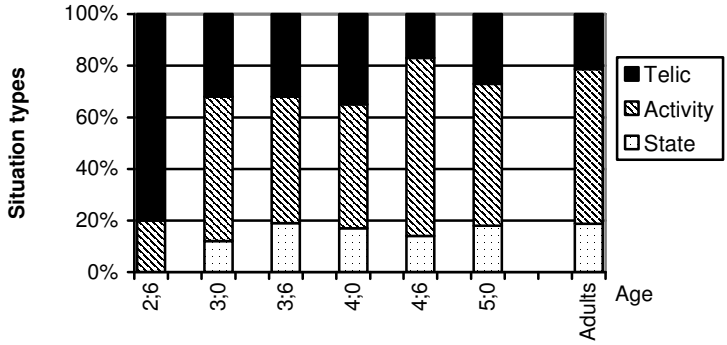

Figure 9-5. Abe's use of progressive: proportions of different situation types (at 2;6, *N* = 25; at 3;0, *N* = 34; at 3;6, *N* = 41; at 4;0, *N* = 29; at 3;6, *N* = 42; at 5;0, *N* = 49)

9.3.2.2 Simple past

In Figure 9-6 to Figure 9-8 the proportions of situation types in the past tense are presented. The column on the right presents the distribution in the adults' conversations, already presented in Figure 9-2. The distribution at the adult stage is 59% with telic events, 12% with activities and 29% with states. The unmarked use of the past tense is thus with telic events.

Naomi's use of the simple past is presented in Figure 9-6. At 2;0 the expected cell frequencies were too low to apply a statistical test, but the proportion of telic events is large (80%, N = 10). For all the other samples Fisher's Exact test could be applied when the marked situation types (states and activities) were taken as one category. Contrary to expectations based on the literature, there were no significant differences found between Naomi's distribution and the adult distribution: the association between past tense and telic events is strong, but not stronger than in the adult sample. However, within the group of marked combinations, the proportion of states of Naomi's past tense forms is always small.

Nina's use of past forms is presented in Figure 9-7. At age 2;0 and 2;3 no statistical test could be applied because of the low expected frequencies. There were no states and activities at all. The association between past and telic events is here thus 100%, which is in accordance with results reported in the literature. It should be noted, however, that at 2;0, the only past forms that Nina used was eleven times *gave*; at 2;3 Nina uses only two tokens: *mashed* and *fell down*. This suggests that the past tense is by no means productive at these ages. At 2;6, states and activities had to be combined in order to apply the Fisher's Exact test. This yields a near significant difference ($p = 0.01$): the proportion of telic events in Nina's language (93%) is larger than in the adult sample. At age 3;0 there is no significant difference ($\chi^2 = 5.44$, $p < .07$).

Abe's use of the past is presented in to Figure 9-8. At 2;6 the proportion of states is smaller and of telic events larger (82%) than in the adult sample ($\chi^2 = 9.86$, $p < .01$), which is in accordance with the literature. At 3;0 there is no significant difference. Contrary to expectations, at 3;6 the proportion of activities is larger (27%) and of telic events smaller (57%) than in the adult sample ($\chi^2 = 17.22$, $p < .001$) and also at 4;0, the proportion of activities (24%) is larger than in the adult sample ($\chi^2 = 9.31$, $p < .01$). This was not expected on the basis of the literature. At 4;6 and 5;0 there are no differences between Abe's speech and the adult sample.

To sum up, the data show that the associations between past tense and telic events is not specific for child language, but the association in child language seems to be stronger for all children up to age 2;6. This confirms earlier findings. Note, however, that the number of tokens and types is small which suggests that the past inflection is not yet productively used. Finally, there are a

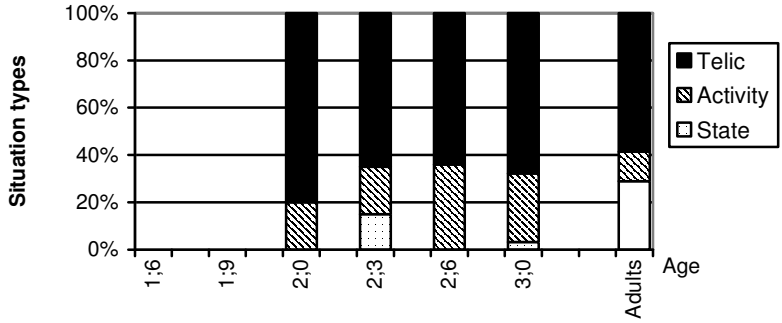

Figure 9-6. Naomi's use of simple past: proportions of different situation types (at 1;6, *N* =0; at 1;9, *N* =0; at 2;0, *N* =10; at 2;3, *N* =20; at 2;6, *N* =25; at 3;0, *N* =31)

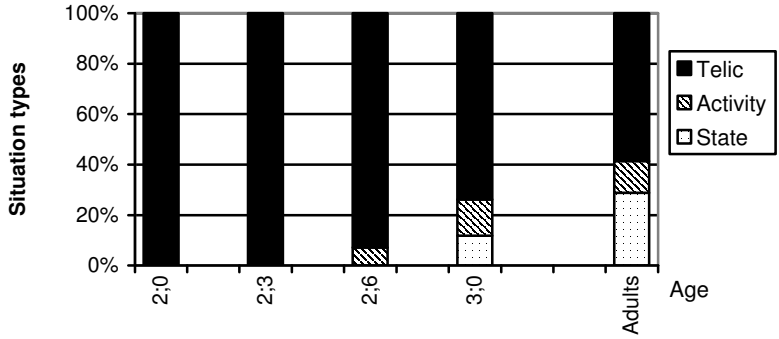

Figure 9-7. Nina's use of simple past: proportions of different situation types (at 2;0, *N* =11; at 2;3, *N* = 2; at 2;6, *N* =14; at 3;0, *N* = 42)

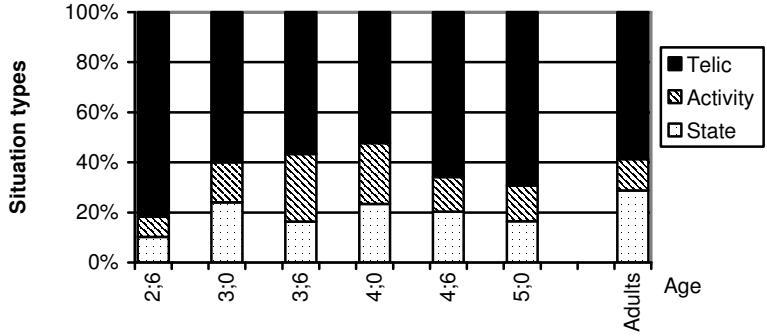

Figure 9-8. Abe's use of simple past: proportions of different situation types (at 2;6, *N* =49; at 3;0, *N* =100; at 3;6, *N* =129; at 4;0, *N* =128; at 3;6, *N* =158; at 5;0, *N* =129)

few samples (Abe at 3;6 and 4;0 and the samples of Naomi) in which the proportion of activities is remarkably large. In all child samples the proportion of states is smaller than in the adult sample.

9.3.2.3 Simple present

In Figure 9-9 to Figure 9-11 the proportions of situation type for the simple present are presented. The column on the right presents the distribution in the adult sample. In the adult data, the present tense combines with telic events in 17% of the cases, with activities in 8% and with states in 75% of all cases.

For Naomi's data at 1;9 (N = 3) and 2;0, (N = 1) (Figure 9-9) no statistical test could be applied, since the expected frequencies are too small. At 2;3, when marked situation types are combined, Fisher's Exact yields a significant difference ($p < .001$): the proportion of states is larger than in the adult sample (98%). At 2;6 there is no significant difference ($\chi^2 = 3.34$, $p = 0.19$). At 3;0 the difference is significant ($\chi^2 = 12.05$, $p < .01$) in that Naomi's proportion of states is larger and of telic events smaller than in the adult sample.

At age 2;0, Nina does not use a single form of the simple present (Figure 9-10). At 2;3, activities and telic events have to be combined. Fisher's Exact test does not yield a significant difference between Nina and the adult sample ($p = .05$). At age 2;6 Nina's language differs significantly ($\chi^2 = 10.04$, $p < .01$) from the adult sample in that her proportions of activities and telic events are smaller and of states larger (92%). At 3;0, there is no significant difference.

At 2;6, Abe's data (to Figure 9-11) are significantly different from the adult sample ($\chi^2 = 19.03$, $p < .001$): Abe's proportion of states is larger (95%) and of activities and telic events smaller. There is also a significant difference between Abe 4;0 and the adult sample ($\chi^2 = 9.73$, $p < .01$): once more Abe uses more states (88%) and fewer activities and telic events than the adults. The other samples (3;0, 3;6, 4;6, 5;0) do not differ from the adults.

In sum, the data show that the association between simple present and states is in general stronger in early child language than in adult language. Between the ages of 2;6 and 4;0 the association gets weaker and reaches the adult level.

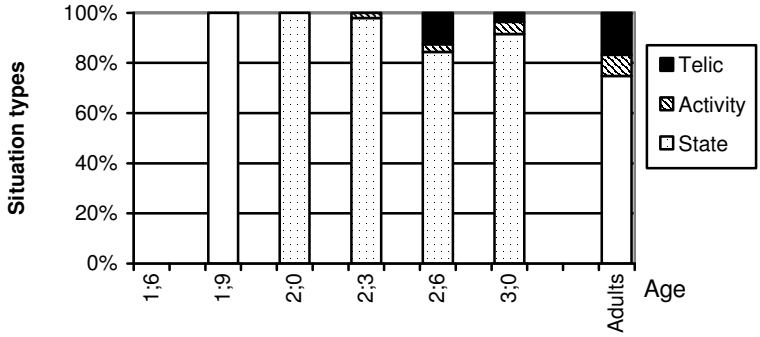

Figure 9-9. Naomi's use of simple present: proportions of different situation types (at 1;6, *N* =0; at 1;9, *N* =3; at 2;0, *N* =1; at 2;3, *N* =50; at 2;6, *N* =64; at 3;0, *N* =83)

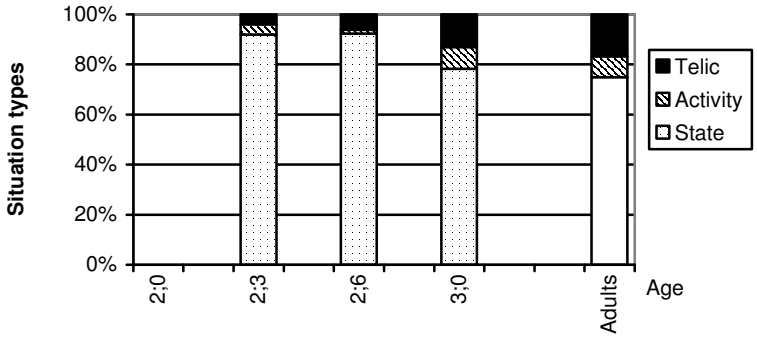

Figure 9-10. Nina's use of simple present: proportions of different situation types (at 2;0, *N* =0; at 2;3, *N* =25; at 2;6, *N* =65; at 3;0, *N* =46)

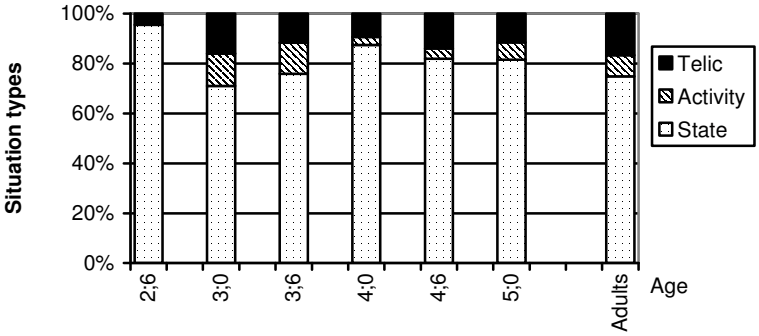

Figure 9-11. Abe's use of simple present: proportions of different situation types (at 2;6, *N* =88; at 3;0, *N* =100; at 3;6, *N* =145; at 4;0, *N* =128; at 4;6, *N* =121; at 5;0, *N* = 44)

9.3.2.4 Conclusion

The results from the children's data show that there is a difference between the associations of morphology and situation types in adult and child English. The earliest samples on the association between progressive and activities is not significantly stronger than in adult-adult language. However, the children's usage differs on one count: in at least one sample of each child the association between the progressive and telic events is strong. This result is unexpected from the reports in the literature. Furthermore the association between progressive and states is very weak in at least one sample of each child. Secondly, the association in early child language between past and telic events is stronger in child language than in adult English, which is in accordance with the reports in the literature. Furthermore, the proportion of states in the simple past is remarkably small and the proportion of activities is sometimes larger than in the adult samples. Thirdly, the association between present and states is stronger in child than in adult language and only gradually weakens. The question thus arises why children differ from adults on these points: why are there differences in distribution?

9.3.3 Distribution in the input

In this section the association between situation types and progressive aspect and past and present tense will be examined in the input language to Nina and Abe. Is the distribution in the input different from the distribution in adult language and does it account for the patterns found in child language, more specifically: a strong association between progressive aspect and telic events in a few samples, a strong association between past tense and telic events and between present tense and states? The distribution in the input samples is compared to the adult distribution by using the χ^2-test, or, if the expected cell frequencies are too low, the Fisher's Exact test. In those cases the marked categories are combined into one category. The input is studied with larger intervals than the child samples.

9.3.3.1 Progressive

Figure 9-12 and Figure 9-13 present the results for the progressive. The results for the child and the input in one sample are presented in columns next to each other at each age. The rightmost column displays the distribution in the adult-adult conversations.

First, the distributions in the input and in the adult sample are compared. The input to Nina at age 2;0 is similar to the distribution in the adult sample (Figure 9-12). At 2;3 the input is significantly different from the adult sample ($\chi^2 = 15.46$, $p < .001$) in that the proportion of telic events is larger (34%) and

of states smaller (3%). In the other samples the input is comparable to the adult sample. Second, the distributions in the input and in Nina's samples are compared. The difference between the use of the progressive in the input and in Nina's language at 2;0 and at 2;3 could only be computed when the marked combinations (states and telic events) are added up. At 2;0 there is no significant difference. At 2;3 there is a significant difference ($p < .001$), in that the proportion of activities in the input is larger than in Nina's speech and the combined proportion of telic events and states is smaller than in Nina's speech. This difference can be explained by the mother's frequent use of the questions: *what are you doing?* and *who are you hammering?*, that are analyzed as activities. In the other samples, input and child language are comparable.

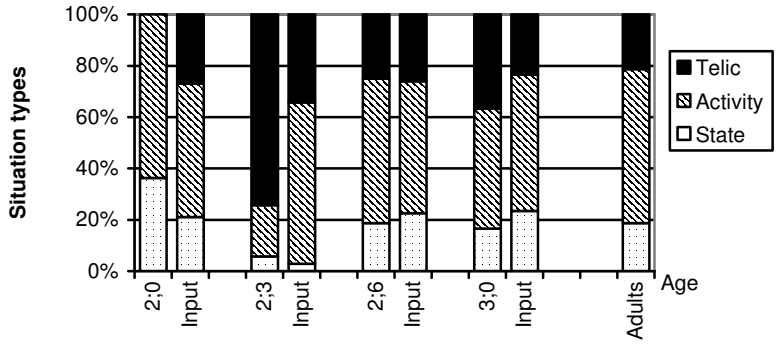

Figure 9-12. Input to Nina: proportion of situation types in progressive (input at 2;0, *N* =52; at 2;3, *N* =102; at 2;6, *N* = 15; at 3;0, *N* =64)

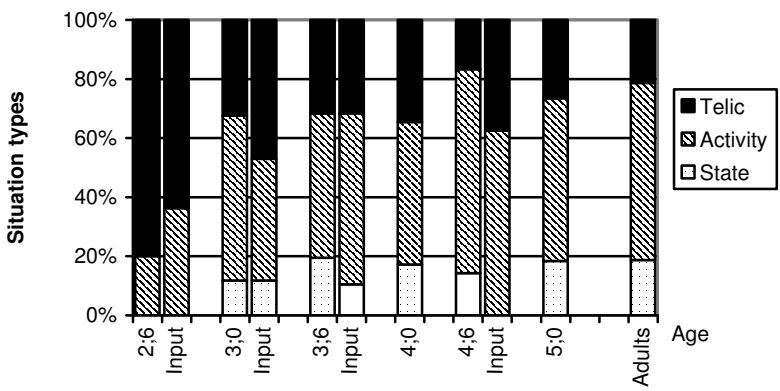

Figure 9-13. Input to Abe: proportion of situation types in progressive (input at 2;6, *N* = 33; At 3;0, *N* = 34; At 3;6, *N* = 19; at 4;6, *N* = 16)

For Abe, the distribution in the input and in the adult-adult sample are first compared. The input to Abe at 2;6 (Figure 9-13) differs significantly from the adult sample ($\chi^2 = 24.11$, $p < .001$) at 2;6 in that the proportion of telic events is larger in the input (64%) than in the adult sample and there are no states at all. The difference between the input at 3;0 and the adult sample is near significance[4] ($\chi^2 = 8.96$, $p = 0.011$) because of a larger proportion of telic events in the input (47%). There are no further differences between the input and the adult sample. Second, the distribution in the input and in Abe's speech is compared. It appears that there are no significant differences between Abe's language and the input.

In sum, the distribution in the input can to a large extent account for the patterns of use of the progressive in the child samples. The input differs in similar ways from the adult-adult conversation as the child language does: the association between telic events and the progressive is stronger in the input than in adult-adult language and the association between states and the progressive is in a few samples weaker. The correlation between input and child language is high: for Abe there are no differences at all and for Nina only in the beginning. At 2;3 the proportion of telic events in Nina's language is larger and of activities smaller than in the input, but this can be explained by the repeated questions of the mother.

9.3.3.2 Simple past

Figure 9-14 and Figure 9-15 present the distributions of situation types in the simple past. First, the distributions in the input samples to Nina (Figure 9-14) are compared to the adult sample. At age 2;0 the proportion of telic events in the input is larger and of states smaller than in the adult sample, but the distinction is not significant[3] ($\chi^2 = 8.37$, $p = 0.015$). At age 2;6 and 3;0 the distributions are significantly different ($\chi^2 = 20.33$, $p < .001$; $\chi^2 = 27.16$, $p < .001$), in that in the input the proportions of activities are larger (28%, 25%) than in the adult sample (12%) and the proportions of states smaller (10%, 18%) than in the adult sample (29%).

Secondly, the distribution in the input and in Nina's speech was compared. At 2;0 and 2;6, the difference could not be calculated as the expected frequencies were too low for Nina's speech. The previous section showed that in the sample at 2;6, Nina's proportion of telic events is very high compared to the adult-adult sample. The same pattern appears in the input at 2;0, but has disappeared in the input at 2;6 and 3;0. At 3;0, the states and activities were

[4] As discussed in 9.3.2, $\alpha = 0.01$.

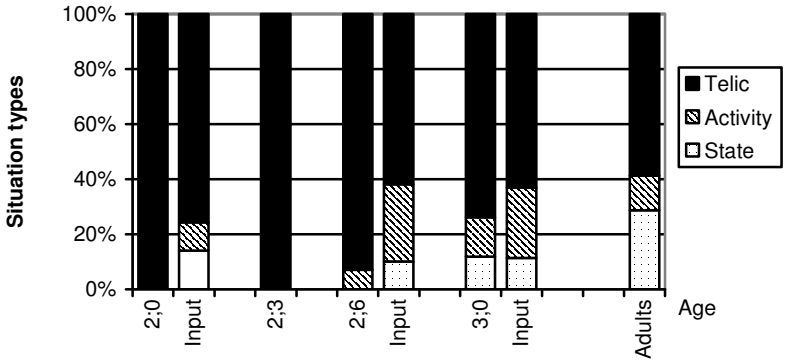

Figure 9-14. Input to Nina: proportions of situation types in simple past (input at 2;0, *N* =78; at 2;6, *N* = 89; at 3;0, *N* = 184)

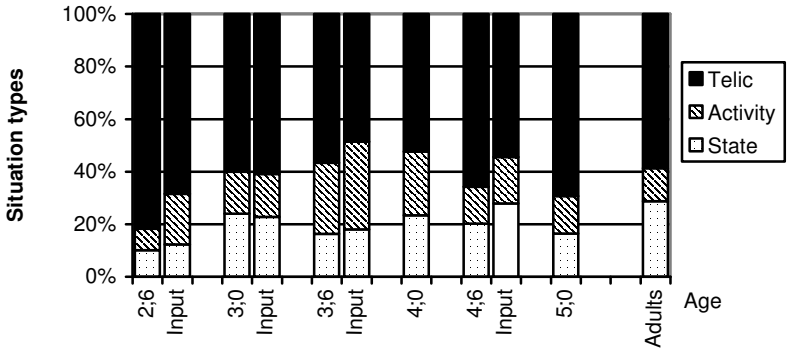

Figure 9-15. Input to Abe: proportions of situation types in simple past (input at 2;6, *N* = 57; At 3;0, *N* = 92; at 3;6, *N* = 72; at 4;6, *N* = 68)

combined; Fisher's Exact test did not yield a significant difference between input and child language (p = 0.19).

When the input to Abe is compared to the adult-adult distribution (Figure 9-15), there is a significant difference at 3;6 ($\chi^2 = 18.84$, $p < .001$) in that the proportion of activities is larger in the input (33%) than in the adult sample (12%). The other samples show no differences. When the input is compared to Abe's language, there are no significant differences between Abe's language and the input language.

To sum up, the distribution in the input can account partly for the distribution in child language. The association between past tense and telic events is stronger in the early input (Nina at 2;0). In many input samples the

proportion of states is smaller and/or the proportion of activities larger than in the adult sample (Nina at 2;6 and 3;0, Abe at 2;6 and 3;6). This was also the case in child language (although not always in the same samples). The correlation between input and child language is high: for the samples for which it could be calculated, there are no significant differences between the child's speech and the input.

9.3.3.3 Simple present

The proportions of event types in the simple present are presented in Figure 9-16 for the input to Nina and Figure 9-17 for the input to Abe.

The input to Nina is first compared to the adult sample. In the input sample at 2;0 the proportions of activities (2%) and telic events (7%) are smaller than in the adult sample and the proportion of states is larger ($\chi^2 = 11.96$, $p < .01$). At 2;6 there are no significant differences between the distribution in the input and the adult sample ($\chi^2 = 0.46$, $p = 0.79$. At 3;0, although the proportion of activities is larger in the input than in the adult sample it does not lead to a significant difference ($\chi^2 = 0.46$, $p = 0.79$; at 3;0, $\chi^2 = 7.71$, $p = .02$).

The input to Nina is also compared to Nina's speech. At 2;0, Nina does not yet use present tense forms. At 2;6, the proportion of states in Nina's speech (92%) is a bit larger than in the input (77%), but this difference is not significant ($\chi^2 = 7.38$, $p = .025$). At 3;0 there is also no difference between input and child ($\chi^2 = 1.92$, $p = .38$).

The input to Abe is first compared to the adult sample. There appear to be no significant differences at all ages. When the input is compared to the speech of Abe, there is a significant difference only at 2;6. The activities and telic events had to be combined in order to apply Fisher's Exact test ($p < .001$). The proportion of states is larger in Abe's speech (95%) than in the input (79%): in contrast to the input, no present tenses are combined with activities in Abe's speech and only a few telic events.

In sum, the distribution in the input partly accounts for the distribution in the child language. In the early sample (input to Nina at 2;0) the association between states and simple present is stronger in the input than in the adult sample. From age 2;6, both in the input to Nina and to Abe, the association between states and simple present is equal to the association in the adult sample. Child language and input are very similar, although Abe 2;6 differs from the input in that the association between states and simple present is stronger in child language than in the input. The same pattern is observable in the present tenses of Nina at 2;6, but this is not significantly different from the input.

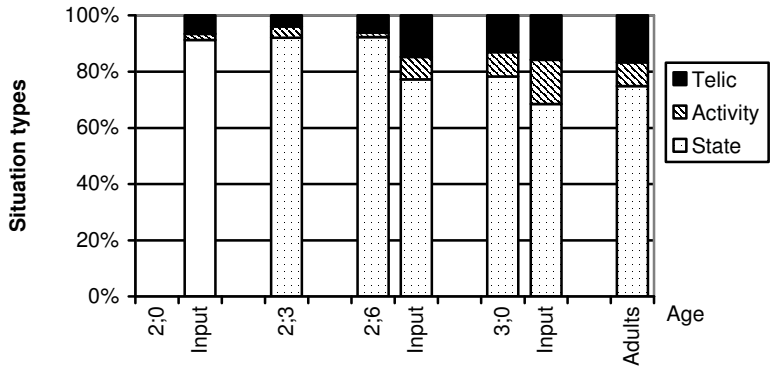

Figure 9-16. Input to Nina: proportions of situation types in the simple present (input at 2;0, *N* = 91; at 2;6, *N* = 189; at 3;0, *N* = 165)

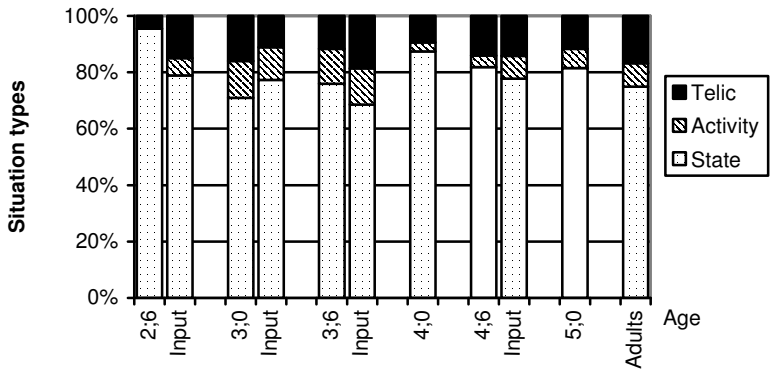

Figure 9-17. Input to Abe: proportions of situation types in the simple present (input at 2;6, *N* = 114; At 3;0, *N* = 163; at 3;6, *N* = 118; at 4;6, *N* = 99)

9.3.3.4 Conclusion

The examination of the input data shows that parents adapt their speech when talking to young children. The associations between tense/aspect morphology and situation type differ from what adults do when they speak to adults. In the speech to young children there is a stronger association between progressive and telic events, a stronger association between past tense and telic events and a stronger association between present tense and states. Furthermore, the associations between progressives and states and between past tense and states are weaker than in adult-adult language, and the associations between past tense and activities are stronger in the input than in adult-adult language.

The distribution of situation types over morphology in the input is the language that children hear. It is the basis on which they build up their own language. The fact that the distribution of situation types in child language is skewed compared to adult-adult conversations is therefore not remarkable insofar as it is similar to the distribution in the input. The results show that the correlation between input and child language is strong, and that the distribution in the input can account to a large extent for the distribution in child language: the strong association between progressive and telic events in a few samples, the strong association between telic events and past tense, the small proportion of states and relatively large proportion of activities in the past tense. There are, however, a few differences that cannot be accounted for by the input: although the association in the input to young children between past and telic events and between present and states is stronger than in adult-adult language, these associations are even stronger in child language.

It seems a logical consequence that the distribution in child language will differ from adult language when the language addressed to children is also different. Nevertheless, the questions remain why parents adjust their language directed to children and why the patterns in child language are more different from the adult distribution than the patterns in the input.

9.4 EXPLANATIONS

Several explanations have been formulated as the basis for the strong associations in child language between tense/aspect morphology and situation type. One of the explanations is the distribution in the input. Section 9.3.3 has shown that the input can indeed account for the greater part for the distribution in child language. However, although the association between situations types and morphology in child directed speech is skewed compared to adult-adult speech, the association in child language is skewed even more. An explanation needs therefore to account for the differences between child-directed and adult-directed speech and between input and child language. First, the Aspect Before Tense Hypothesis and the Prototype Account will be evaluated. In 9.4.3 an alternative hypothesis is proposed, the Discourse Topic Hypothesis.

9.4.1 Aspect Before Tense Hypothesis

The Aspect Before Tense Hypothesis claims that tense and aspect morphology at the early stages do not encode tense or aspect, but rather situation type. The observed patterns are then a consequence of cognitive limitations of the child who does not yet have a concept of temporal relations. Inflection is thus

redundant in the early stage: it marks what is already inherently present in the semantics of the verb and its arguments.

If inflection indeed functions as a marker for situation type, the system in the child language should be consistent: one inflection for one class of situation types, one form for one function. However, as the child data show, the progressive is used from the start for different situation types and the same holds for the past in Naomi's and Abe's speech and the present in Nina's and Abe's speech. Furthermore, during development, there is never complete regularity. The same inflection can occur with different situation types and the same situation type can occur with different inflections. The findings go against an absolute version of the Aspect Before Tense Hypothesis.

Shirai & Andersen (1995: 746) state that the Aspect Before Tense Hypothesis could be viewed either as an absolute statement—only telic verbs receive past inflections—or as a tendency—past inflection is predominantly used with telic verbs. The less stringent version, however, entails that the child would apply different strategies at the same stage: whenever past inflection is used with telic verbs, the child encodes resultant state or telicity, but what does the child do whenever the inflection is used with atelic verbs? Would the child then apply a different strategy, for example: encode tense or encode nothing? In other words, if we accept a less stringent version of the Aspect Before Tense Hypothesis, we would also have to accept that a child might have different semantic representations for the same morpheme that are dependent on the class of verbs with which it combines: in combination with the unmarked situation type, the morpheme marks situation type, whereas in combination with the marked situation type, it marks something else. This position seems very undesirable. A further disadvantage of this hypothesis is that it does not answer the question how and why a child would start to reanalyze the morphemes as tense/aspect markers instead of situation type markers. And why would children grammatically encode situation type, although adult languages across the world in general lack grammatical encoding of situation types? What is more, the findings in the previous sections are consistent with alternative explanations: the inflection could be part of an unanalyzed item, or, even though it occurs predominantly with one situation type, the inflection could nevertheless mark tense and aspect. There is no independent motivation that favors the encoding of situation type. A final objection to the Aspect Before Tense Hypothesis is that it cannot account for the patterns in the input. The distribution in the input is also skewed and presumably not because of a non-normative use of the inflections so why would parents change their language in this way?

9.4.2 Prototype Account

The Prototype Account claims that children on the basis of distributional analysis create semantic representations of tense-aspect morphology that are restricted to the prototype of the morphological category. According to Li & Shirai (2000: 62-63) children acquire unanalyzed verbs during the first stage of language learning, on a verb-by-verb basis. Lexical representations during this stage consist of memories of past experiences. During the second stage, children notice repeated similarities in the form-function mapping. They become aware of the fact that there are ontologically distinct types of situations. In the third stage children learn to map linguistic forms to these different situations: since parents for the majority use *–ing* to comment on ongoing activities, the child will create a prototypical semantic representation for the morpheme *–ing*, that is restricted to activities and semelfactive verbs, or in other words, to verbs that are characterized by the features [+dynamic, -telic]. The general meaning that *-ing* denotes would be 'Action in Progress' (2000: 66). Li & Shirai assume that:

> children, on the basis of the comprehension of verb forms prior to active production, have already created a restricted semantic representation of morphological forms, even though their early morphology may appear as if it were entirely driven by lexical learning. (2000: 64)

The Prototype Account is, however, not in every respect compatible with the data. According to Li & Shirai's prototype of the progressive children are expected to rarely use *-ing* for telic events neither with durative (accomplishment) nor with punctual (achievement) situations. The proportion of telic events is, however, high in Nina at 2;3, Abe at 2;6, Naomi at 2;6 and 3;0 and also in the input to Nina at 2;3, and to Abe at 2;6 and 3;0.

Moreover, from a prototype view, the first inflected verbs in the input or the first inflected verbs used by the child must be prototypical examples of the situation types. However, in the earliest sample of Nina (2;0) and the input to Nina at this age, the progressives are not very prototypical. First, in the input, the verbs used with a progressive are not all prototypical activities. Of all the progressives used in the input, 54% of all tokens (N = 52) is classified as [+dynamic, -telic], but 46% it [+telic] or [–dynamic]. Of all the types used with a progressive in the input to Nina, eleven are classified as [+dynamic, -telic] whereas thirteen are either [-dynamic] or [+telic]. Second, in the speech of Nina, the first verbs with produced with the progressive do not all refer to "prototypical" activities, i.e., to events with clear internal variation that need a constant input of energy. The verbs that Nina uses with progressive inflection at 2;0 are *hold (something)* (N = 4), *sleep* (N = 4), *move (something)* (N = 1), *cry* (N = 1) and *walk* (N = 1). Only *move* and *walk* would count as prototypical examples of activities. It is therefore highly implausible that the child works from a

(restricted) semantic representation 'action in progress' for the progressive when the first examples in her own production are not prototypically dynamic.

The main objection to the Prototype Account, however, lies in the following assumption:

> If children's semantic representation is restricted to this characterization, then **whatever does not fit this characterization will not be given progressive marking at the early stage.** (P. Li & Shirai 2000: 67, emphasis mine)

And, with respect to the prototype of the past, which is [+telic, +punctual, +result] according to Shirai & Andersen (1995):

> As is typical of the prototype to non-prototype development, **the restriction to prototype past (…) was gradually relaxed** and at a later stage children started using the past tense for verbs lacking one of these features. (P. Li & Shirai 2000: 68, emphasis mine)

Both citations suggest that children might want to encode a certain verb with the progressive or the past, but do not do so because their semantic representations exclude the possibility of that specific combination. This implies that the semantic representations of children are rigid, and that the boundaries are immovable. Nevertheless, the Prototype Account explicitly does not claim that the prototypical semantic representation leads to absolute skewing, but only to tendencies. The question then remains why children use non-prototypical combinations from early on. Like the Defective Tense Hypothesis, the Prototype Account does not explain why parents would adjust their association between morphology and situation type when talking to children.

9.4.3 Discourse Topic Hypothesis

9.4.3.1 Introduction

Neither the Aspect Before Tense Hypothesis nor the Prototype Account explains why parents change the way they talk when they talk to their children. Nor can they account for the findings in child language, that is that associations between morphology and situation type appear to be less regular or prototypical than would be expected on the basis of either hypothesis.

I propose an alternative approach, the Discourse Topic Hypothesis, that relies on the communicative and cognitive development of children. It can account for the differences between the distribution in adult language, in child language and in input to children.

First of all I assume that the acquisition of verbs and their inflection is lexically based. It proceeds on a verb-by-verb basis, by learning which constructions are appropriate for which contexts (Lieven et al. 1997; Pine,

Lieven, & Rowland 1998; Tomasello 1992). Children will acquire first what are the most frequent **uses** of specific verb-morpheme combinations. As soon as children start using finite or inflected forms, the more experience children have with certain forms, either in production or in reception, the earlier these forms will be acquired. For example, when children more often hear *you are naughty* than *you are being naughty*, they will first acquire *are naughty* and not *being naughty*. Similarly, when children more often hear *I'm running* in the context of the speaker running than *I run* (*the marathon*) in the context of the speaker describing his hobby, they will first acquire *running* to refer to an ongoing event and not *run* to refer to a habit or hobby. Finally, when children more often hear *broken* than *breaking* they will first acquire *broken* to refer to a resultant state and not *breaking* to refer to the ongoing event of breaking something. What children will gradually grasp is the effect one creates when adding different inflections to a verb stem. For example, when the ending *-ing* is used the situation is understood as ongoing, without its boundaries being entailed. The progressive does not mean 'action in progress'; it effectuates the presentation of an event as in progress. The same verb without this ending *-ing*, in the simple present form, yields a different interpretation, namely, reference to a habitual activity.

Although I agree with the Prototype Account to a certain extent, I differ from this approach in that according to my view there are no prototypical **meanings** of a morpheme (= semantic representations) such as there are prototypical members of classes, but there are prototypical **uses** of morphemes (= contexts of use)[5]. The unmarked uses are the combinations that are most relevant and frequent in communication, the "natural combinations" as described in the introduction to Part III. In English, it is for example relevant to present a dynamic situation or a temporary state as ongoing, because it can also be non-ongoing. With respect to a state, it is less relevant to mark ongoingness since a state is inherently without boundaries and the addressee can infer that it is ongoing at speech time when only a present tense is used. It is only relevant to present a state as ongoing by using a progressive when the speaker wants to stress that the state is temporary and controlled, for example *being mean* vs. *be mean* (C. S. Smith 1991). Events that are punctual are more likely to have already ended at the moment when one comments on it, so that it will be combined with a present tense or progressive only occasionally. Furthermore, when a change of state has occurred in the real world, this may be very relevant to language users: the natural combination to comment on this is then a past tense and a telic event. Therefore, a combination very relevant to

[5] This does not mean that a morpheme has no semantics, only that it has no prototypical semantics. The semantics of a form are similar in each context, but the resultant interpretation, the implications of the form, may be determined by the context and may occur more or less frequently for this form.

communication is between telic events and past tenses, since it not only indicates that the event was actual at a period in time prior to utterance time, but it also entails that the end-state has been reached and that a certain change in the real world has taken place. In contrast, if states and activities are marked by a past, it indicates that the specific state or activity held at a moment in the past, but no resultant effect is implied. These combinations often serve as background information, when talking about events that did involve changes of states.

Certain combinations of morphology and situation type are thus unmarked, i.e., they occur frequently, whereas other combinations are more marked or even semantically odd. This is determined, on the one hand, by the conceptual representation of the real world situation that a verb and its arguments refer to and, on the other hand, by the conceptual representation of the effect produced by grammatical elements. The relevance of particular combinations between morphology and situation type is, however, dependent on the general discourse topic. I will argue that for the discourse topics that young children talk about, the unmarked combinations of tense/aspect morphology and situation type are particularly relevant.

9.4.3.2 Relevant combinations

Which combinations of tense/aspect and situation type are relevant for which discourse topics? For the point I want to make, it suffices to discuss the use of the progressive, simple past, and simple present in relation to the following general discourse topics:

- Talking about the here-and-now
- Describing past events
- Giving general comments on the world, such as generic and habitual statements, social rules, laws etcetera.

Firstly, when speakers of English wish to talk about the here-and-now, to describe observable events or states, whether visible, audible or sensible, they need the following combinations (see 6.2):

- Simple present tense for describing permanent states;
- Progressive for describing temporary states (position verbs, *hold*, *wait*, etc.), activities and telic events that have not yet ended;
- Simple past tense for describing a situation that has just ended (immediate past).

With respect to the last point, situations that have just ended are mostly relevant to communication when they have created a change in the world that is relevant to the here-and-now: these are described by telic events. Furthermore, eye-catching events may take place that only last a moment in time so that they have already ended before one can talk about it. These events could be considered as belonging to the topic time[6] of the here-and-now, as they are very salient and interesting to the speaker just before the moment of speaking, but the shortness of duration makes that they can only be referred to by a past tense. They took place before the moment of speaking. Notice that both these combinations result in the combination of a past tense with a telic event, either non-punctual but with a result relevant to the moment of speaking or punctual, with or without a clear result. Talking about the here-and-now thus makes use above all of unmarked combinations of tense/aspect morphology and situation type.

Secondly, when speakers of English want to describe an event that took place in the (more remote) past, the following combinations are relevant:

- Simple past tense for describing a permanent state;
- Simple past tense for describing temporary states (position verbs, *wear*, *hold* etc.), activities and telic events that are included in topic time;
- Past progressive for temporary states (position verbs, *wear*, *hold* etc.), activities and telic events that overlap topic time.

The speaker needs a sophisticated use of simple and progressive past in order to construct the order of events that he wants, to indicate simultaneity, anteriority or posteriority between different (parts of) events of the past. Of course other forms, like the past, present and future perfect, play a part in describing past events, but they are not needed to make my point. The use of present tense forms for describing past events to create a vivid narrative style is also not pursued further here.

Thirdly, when speakers of English want to give general comments on the world as it is, they need:

- Simple present tense for states, activities and telic events.

Conditional clauses are also an important means to formulate a general statement about the world, but they are not included in this discussion.

To sum up, in the setting of talking about the here-and-now, a speaker of English needs the unmarked combinations of tense/aspect morphology and

[6] Topic time is the time span about which the speaker asserts something (cf. 3.4.2).

situation type and the progressive for telic events that have not yet ended. In the settings of talking about past events and talking about the world as it is, a speaker of English not only needs the unmarked, but also the marked combinations of tense/aspect morphology and situation type.

9.4.3.3 Children's development

Assuming that children at first either mainly wish or are able to communicate about the here- and-now (R. Brown & Bellugi 1964), they will at first only or mainly make use of the unmarked combinations of tense/aspect morphology and situation type, the combinations that also predominate adult-adult speech (cf. 9.3.1). Those are the only forms they need for talking about the here-and-now and therefore the only forms they acquire. Depending on their general cognitive development children will increasingly be able, need or wish to talk about past events that they remember[7] and they will increasingly contemplate about and comment on the world. It is a chicken and egg question whether cognitive development is responsible for the topics that children talk about with their parents or whether the experience with and communication about different topics influences cognitive development. They are probably strongly intertwined ((Bowerman & Levinson 2001b; J. R. Johnston 1985).

Children do not exclude marked combinations on semantic grounds or because of grammatical rules. Because of the discourse topics children talk about—which is related to their cognitive development—children less often need to use marked combinations. Unmarked combinations cover the concepts that the child wants to talk about. Since parents adapt the topics they talk about to the cognitive level of their children, the input language will show similar distributions as the child language: only the unmarked combinations are used. However, the communicative wishes of parents may be slightly ahead of the child's capacities: they start to talk about past events, to make statements about the world as it is, before the child is actively doing so, hence using more marked combinations than the child.

9.5 DISCOURSE TOPICS

In order to find out whether the discourse topics of children indeed develop from only talking about the here-and-now to talking about past events and talking about the world as it is, a qualitative analysis is carried out on the data of Nina and Abe and the input to them. Furthermore, the data of Sachs (1983) on

[7] Talking about objects or events not in the here-and-now is labeled "displacement" by Hockett (1960). The tendency of children to rely less and less on the here-and-now in speaking and understanding is called decontextualization by Bates (1979).

the use of past inflection by Naomi and her parents is used. In what contexts do children use their progressives, past and present tense forms? What do the parents do in the input? And what happens in adult-adult conversations?

9.5.1 Use of progressive

Speakers of English need the progressive when they want to talk about the here-and-now about observable events that are temporary states, activities or not-ended telic events (see 6.2.2). These are the unmarked uses of the progressive. They also need the progressive when they want to describe past events; the past progressive in combination with a temporary state, activity or telic situation yields the reading that the situation overlaps topic time. This use is marked. In what contexts do parents, children and adults use their progressive forms?

9.5.1.1 Progressive for talking about the here-and-now

The children and their parents very frequently use the progressive for talking about the here-and-now: they continuously describe what the child is doing herself or what a sibling, a pet, a toy figure, or a figure on a picture is doing. In the input, the progressive is in the beginning only used for talking about the here-and-now. It is used with all the appropriate situation types, depending on the activities the child is involved in. See the examples from the input language to Nina at 2;0 in (2):

(2)	He's holding something in his hand	(state)
	What is the king wearing on his head?	(state)
	Who's sleeping?	(activity)
	You're drawing with your finger?	(activity)
	Are you closing the door?	(telic)
	You're turning his head around?	(telic)
	What are you drawing?	(telic)
	Are you putting the stethoscope on your ear?	(telic)
		(Input to Nina at 2;0)

The children also use the progressive for talking about the here-and-now from the start. They use the progressive spontaneously in all relevant combinations, depending on their activities with temporary states, with activities and with telic events that have not yet ended (3):

(3)	Little girl waiting	(state: picture)
	Her not eating	(activity: picture)

Her drinking	(activity: picture)	
I making train for you	(telic: own action)	
bear going San Francisco.	(telic: playing)	
I putting it in the plate.	(telic: own action)	
Climbing up on the tree.	(telic: picture)	(Nina, 2;3)

The main difference between the child's speech and the input to Nina are not the types of combinations that occur, but the fact that Nina mainly uses declarative utterances, whereas the mother mainly uses interrogatives. This difference is not further relevant.

The frequency with which children and their parents use the progressive for talking about observable events contrasts strongly with the rare examples from adults talking among themselves. In the adult corpus, examples in which the progressive is used for talking about the here-and-now are hard to find. A few examples are presented in (4) :[8]

(4) But she must only -- What is m- ... blowing out of there?
(Lynne, SBCSAE)
What's everybody waiting for? You guys are supposed to go home now.
(Marilyn, SBCSAE)
Oh, you're kidding . (Lenore, SBCSAE)

As opposed to children and their parents, describing their own or other's activities is something adults among themselves hardly ever do. The present progressives of adults are generally used to describe situations that are ongoing but not observable, such as habitual or general states, see (5) and (6), or they are used in narratives about past events that are told in the historic present, see (7):

(5) I mean I kinda hate to feel like I'm taking .. charge, but I guess that's what I'm needing to do. (Phil, SBCSAE)

(6) WEN: She was there with the baby.
MAR: What's she doing? Is she working yet, or still at home?
(Marci, SBCSAE)

(7) We're pulling up and I see this girl, who I'd never seen before.
(Marilyn, SBCSAE)

[8] Examples taken from the SBCSAE are presented in a simplified way for matters of readability.

9.5.1.2 Progressive for describing past events

After the stage in child language and input language in which the progressive is only used for describing observable events in the here-and-now, the progressive is used for describing past events by using a past copula (8.4.2, 8.4.3). It does not only indicate that the situation took place prior to utterance time, but also that it overlaps topic time. This use of the progressive only comes in gradually. It occurs first in the input, but very infrequently. Only in the later samples the children use the progressive for describing past events, without their parents having initiated the topic. The first use of a progressive for describing a past event in Nina's samples occurs in the input. Although Nina at first responds adequately to her mother's initiation of the topic of the past event, she loses interest quickly. See (8):

(8) MOT: You saw a big fish there?
CHI: On me [//] on the water.
MOT: In the water?
CHI: Yup [= yes].
MOT: What were they doing?
Comments: Nina loses interest in talking about the aquarium. She goes over and looks in her box of doll house furnishings. She is looking for some pots and other equipment to cook and eat with.
MOT: What were the fish doing?
CHI: Where's my pot? (Nina, 2;3)

In the input, the progressive is already used for describing past events, while in the child speech it is not. Only several months later, at age 3;0, Nina uses a progressive for describing a past event for the first time. Twice, the mother takes the initiative of talking about a past event and twice Nina talks about a past event on her own initiative. See (9) and (10) for an example of each:

(9) Situation: Looking at photographs.
MOT: What's this on the floor?
CHI: A mat.
MOT: Oh # what were we doing on that mat?
CHI: Eating?
MOT: Oh.
MOT: The grownups were eating on the table or on the floor?
CHI: On the floor.
CHI: And kids were eating on the table.
MOT: I see. (Nina, 3;0)

(10) CHI: The doggie's sharing it.
CHI: He bite his tongue while he was eating.
CHI: And so he's gonna have a little rest with his blanket on.
(Nina, 3;0)

The same pattern occurs in Abe's data. In the input to Abe at 2;6, the progressive is occasionally used for describing (immediate) past events, whereas Abe does not yet use it for this purpose:

(11) CHI: Mama # what happen?
MOT: I was showing Dad my owie. (Abe, 2;6)

(12) CHI: Don't go please please don't go.
FAT: I was just teasing. We're not going anywhere. (Abe, 2;6)

Although Abe uses the progressive from the beginning (2;6) to talk about observable events, the first time that he uses the progressive for talking about (immediate) past events is at age 3;0. See (13) and (14):

(13) FAT: What did you say?
CHI: Nothing, I was talking by myself. (Abe, 3;0)

(14) CHI: Pretty soon a big spaceship will crash on your head.
FAT: On my head?
FAT: I hope not. Oh # I'm so scared help!
CHI: I was teasing. It will not crash on your head.
FAT: Oh what a relief. (Abe, 3;0)

In the same sample, Abe uses the progressive and simple past in a sophisticated way for describing the sequence of more remote past events. See (15):

(15) Remember when a long time ago (...) while you were playing ball with a striped ball mommy maked ... cutted a hole out of that trash thing then then I was playing basketball and then the basketball got brokened.
(Abe, 3;0)

Adults conversing among themselves rather often use the progressive for describing a past event. Some examples of adult use of past progressives are presented in (16), referring to more remote past, and in (17), referring to immediate past:

(16) And you know, he was trying to make it sound like, same old complaint, same old everything. (Phil, SBCSAE)
When I was living there for the couple of years, it was [//] the rainy season was all off. (Pete, SBCSAE)
And I said "well yeah, in fact I do mind" cause I thought the lemon tree was dying. (Marilyn, SBCSAE)

(17) MIL: Is there somebody downstairs, playing? [....]
PET: It was out there, or kind of coming in from some place. (Pete, SBCSAE)

Of all the progressives in the adult sample, 28% is a past progressive. Of all the progressives that the children use and that are used in the input, the percentage of progressives used for describing a past event are much lower up to at least age 3;0, as shown in Table 9-1.

Table 9-1. Percentage of past progressives (of all progressives)

Age	Naomi	Nina	Input	Abe	Input
1;6	0				
1;9	0				
2;0	0	0	0		
2;3	5	0	5		
2;6	0	0	2	0	6
3;0	0	9	13	15	9
3;6				32	53
4;0				17	-
4;6				24	13
5;0				29	-

9.5.1.3 Summary

In child language and input to children, progressives are mainly used for describing observable events in the here-and-now. In adult-adult conversation on the contrary the progressive is only occasionally used for describing observable events. The combinations that are needed for talking about the here-and-now can account for the distribution of situation types over the progressive in the early child samples and the input. The favorite activities of children and their parents determine what they will speak about most. The large proportion of telic events in the child language and input is in fact a matter of

coincidence: in the particular samples the child or a third person is involved in many telic events, such as drawing, writing, building or making something; going somewhere; putting something somewhere; opening or closing things; climbing up on things, etcetera. Since everything the child does is mentioned in the early stages, many durative telic events are used with the progressive. Adults may also be involved in those type of activities, but they hardly ever describe what they are doing. When they use a present progressive, they are often describing events that are not observable.

When children grow older, they gradually use the progressive more often to describe past events. An increase in use is first noticeable in the input and is followed later by the child. Adults use the progressive for describing past events fairly frequently.

9.5.2 Use of simple past

A speaker of English needs the simple past in order to describe events that have just happened in the immediate past or that have a clear result in the present (6.2.3.1). These contexts are considered as belonging to the here-and-now: either the event itself is observed, but ended at the moment one may comment on it or the result of the event is observable.

The past is furthermore used frequently to describe more remote past events, not in the here-and-now. For the first purpose, the past is most relevant in combination with telic events that have just been completed. In particular telic, punctual situations happen so quickly that one can only talk about them when they have already ended. Moreover, telic events lead to a change of state, the result of which may be very relevant to the present. For the purpose of talking about past time, the past tense form can be combined with all situation types, but also predominates with telic events.

9.5.2.1 Simple past for talking about the here-and-now

In child language and in the input, the past is in the beginning mainly used for talking about observable events. In the input, from the beginning, past forms are used for describing observable events in the immediate past. See (18)-(20):

(18) Situation: Nina bumps into her mother
CHI: Sorry.
MOT: Did you bump into me? (Input to Nina at 2;0)

(19) Situation: noise of toys falling off Nina's chair
CHI: A toys down.
MOT: All the toys fell off the chair, didn't they?
(Input to Nina at 2;0)

(20) Situation: elastic string of Nina's birthday hat snaps and hurts her. Nina cries.
MOT: Oh, did the elastic hurt you?
CHI: Yeah [= yes]. (Input to Nina at 2;0)

According to Sachs (1983), Naomi started using past tense forms at 1;10. Until 2;2, they were only used to refer to observable events of the immediate past. Examples are presented in (21):

(21) I throwed it (Naomi, 2;0)
Georgie fell down? (Naomi, 2;0)

Abe also uses the past tense from his first available sample at 2;6 for describing observable events. See (22)-(25):

(22) FAT: Ok # hold on.
CHI: I falled down.
FAT: You sure did. You sure are a ticklish Batman. (Abe, 2;6)

(23) Uhhuh Momma # come see this ladder # I made. (Abe, 2;6)

(24) Oh Mom # my daddy doesn't want to! He said no. (Abe, 2;6)

(25) MOT: Abe # do you want to help me do dishes?
FAT: Ok # hold on.
CHI: Uhhuh # I'll put it in
CHI: I got a thing in there
CHI: It dropped!
MOT: Uhhuh it fell into the water now I'll be able to wash it.
(Abe, 2;6)

Nina's use of past forms starts unexpectedly. The sample at 2;0 contains a short fragment in which Nina uses *gave* eleven times. It is the only past form she uses in the sample and it is only used in the context of talking about who gave which present to her at her birthday, the day before the recording. Mother and child talk about this, while looking at or playing with the presents. Part of this conversation is presented in (26):

(26) MOT: Who sent the picture of the lion to Nina?
CHI: Miss # miss gave it.
CHI: Mrs. Wood.

MOT: Not Mrs. Wood # nonna.
CHI: Nonna gave it.
Situation: Nina is looking at the picture of the horse.
CHI: Betta # Betta gave it.
MOT: Betta gave you the picture of the horse.
CHI: Nonna gave a horse.
MOT: No # Nonna gave the picture of the lion to Nina.
CHI: yeah [= yes]. (Nina, 2;0)

Although the 'giving' happened in the earlier past, the birthday presents are in the here-and-now and Nina only seems to classify the presents with respect to the giver, instead of referring to the past event of giving the present to Nina. This fragment is therefore not a clear example of talking about past events.

Despite the unexpected use of the past in the first sample, the other samples show that Nina mainly uses the past for describing the here-and-now and not for describing past events. In the sample at 2;3, both forms Nina uses describe events that have just happened. At 2;6, of all the past forms (N = 14), eight describe an observable event (mainly 'falling'), four are used for describing a past event and two are unclear. At 3;0, the distribution is the other way around: of all the past forms (N = 43), only 12 are used for describing an observable event, while 27 are used for describing a past event and four are unclear.

As opposed to children and their parents, adults talking to adults hardly ever use past tenses for talking about observable events. There are some examples in the data, but they are scarce. See (27):

(27) Oops, sorry. ... Did I get you? (Marilyn, SBCSAE)
Did you notice the room got deathly silent when Kendie mentioned marriage? (Kevin, SBCSAE)
Bit your teeth, hunh? (Darryl, SBCSAE)

According to Sachs (1983: 17), adults mainly report something that has just happened to another adult because the addressee has not noticed the event, like *you dropped your scarf*, whereas in child directed speech the past is often used for commenting on or asking about an activity the child has just performed. The examples in the adult data of this study show that adults also use the past in order to check what has just happened.

9.5.2.2 Simple past for describing past events

From the beginning the past in the input is frequently used for talking about the here-and-now. However, from early on, parents use the simple past now

and then for talking about more remote past events. At first, the children often do not respond in a pragmatically adequate way. See (28):

(28) CHI: Oh # poor lamb.
MOT: What happened to the lamb?
CHI: Uh # take him.
Situation: hands the lamb to her mother. (Nina, 2;0)

Sometimes children do respond in a pragmatically adequate way, but not in a formally adequate way. See (29):

(29) MOT: And what happened to your dolly?
CHI: Bite that.
CHI: That.
MOT: Did the dog bite your dolly?
CHI: Yeah [= yes].
MOT: And what happened to the dress?
CHI: Here.
MOT: Did the dress get torn by the dog?
CHI: Yeah [= yes].
MOT: Bad dog.
CHI: Bad dog. (Nina, 2;0)

These findings are in accordance with Sachs (1983: 18-20) who also reports talking about past events by Naomi's parents to Naomi from 1;10. Often, Naomi responded to these initiatives with unrelated responses or with imitations. Naomi herself starts using the past to refer to events that have happened on the same day at 2;2. At 2;8 she begins to make spontaneous reference to past experiences. Until then Naomi hardly ever expressed the meaning "earlier past" on her own initiative (1983: 19). Of the 253 past references in Naomi's speech up to 2;5, only twice, at 2;2 and at 2;5, does Naomi spontaneously mention an event in the past.

The same patterns can be found in Nina's and Abe's speech. Although they use past forms for describing past events from quite early on, they use it infrequently and mainly in response to their parents. See (30) for an example:

(30) CHI: I have a band aid.
MOT: Why # what happened?
CHI: A hurt # hurt me.
MOT: When did you hurt yourself?
CHI: When me hurt meself.

MOT: When did you hurt yourself? yesterday?
CHI: Yup.
MOT: Who put the band aid on?
CHI: Gail did. (Nina, 2;6)

Only occasionally, the children talk about past events on their own initiative. See (31)-(33) for some illustrations:

(31) MOT: Oh # Gail has a swimming pool # doesn't she?
Situation: Gail is a baby-sitter of Nina's. Nina had fallen into her large swimming pool several months ago.
CHI: I fell in it.
MOT: Did you fall in Gail's swimming pool?
CHI: Yup [= yes]. (Nina, 2;6)

(32) MOT: Uhhuh # the fingerpaint's all dry
CHI: And it's all dried out Daddy # we going Dick and Carol's house.
FAT: Uhhuh.
CHI: Amara broke my poster Daddy # Amara came here and broke my poster. (Abe, 2;6)

(33) Remember a long time ago when Mommy was also at school? We played with this and it got brokeded and then the top came and then the marble comed out and then we played with it right?
(Abe, 3;0)

As opposed to children and their parents, adults among themselves mainly use the past tense forms for communicating about past events. They talk about past events frequently and extensively, as shown in (34) and (35):

(34) KVN: You guys won't believe what happened to us in the parking lot of the mall the other day.
WEN: Oh. by the Goodwill store.
KVN: ...Some guy came out and he_ he was, he was trying to sell us cologne.
WEN: No, he wasn't trying to sell us cologne,
KVN: Well it_ __ No=, I guess he was trying to like, lure us to a place where they would sell, like, imitation cologne, but he said, it's not imitation, because,

KVN: because it's= made by the same people, but it's put in different bottles? (Kevin, SBCSAE)

(35) They've gone .. to a church down south, a little tiny one? And when Edna told me about it, it was because they sort of wanted to go to a smaller congregation. But when they announced it in church and we prayed for them it was because, they, um, they were gonna go out, because they felt called. So, I don't know what the real story is, but, it sounded kinda neat. (Marci, SBCSAE)

9.5.2.3 Summary

At first, both in the input and in child language, past tense forms are mainly used for talking about the here-and-now, for describing events that have just ended. In this setting, the most relevant combination is with telic events, the unmarked combination. Parents also start rather early using the past for describing past events but in that stage, the responses of children are often not yet pragmatically or formally appropriate. Gradually, children start using the past inflection spontaneously and more correctly for describing past events. The distribution of the two contexts of use is however not the same as in adult-adult conversation. In adult-adult conversation the past is predominantly used to talk about past events, whereas in child language and in the input the past is for a long time mainly used to describe observable events.

The exploration of the contexts of use of past tense forms shows that the development of discourse topics can indeed account for the distribution of past tense morphology and situation type. Since it is most relevant to mark telic events that have just been completed in the setting of talking about the here-and-now, this combination highly prevails in the younger samples of children. Only when talking about past events becomes more frequent, there is more opportunity to use the unmarked combinations. Since parents already start mentioning past events before the children do, the skewing in the input data is less great than in the child data.

One point to note is that the proportion of past in combination with states in both child and input language was small compared to the adults. This could be explained by the fact that the fragments about past events in child language and input are not as elaborated as they are in adult-adult conversations. Since states often function as background information about the settings or emotional responses in describing past events, they might just be less relevant for the communication between children and their parents in the early stages (cf. Berman & Slobin 1994). In the beginning the past events are often shared memories about dynamic situations the child has participated in or state-

changes that have taken place. In contrast, adults also describe the mental states they were in.

9.5.3 Use of simple present

Speakers of English need the simple present when they want to describe a state that holds in the here-and-now and when they want to give general comments on the world as it is. The first use is unmarked and combines with states. The second use is marked, and combines also with activities and telic events.

9.5.3.1 Simple present for talking about the here-and-now

In the input, the simple present is from the beginning used for talking about the here-and-now. See (36) and (37):

(36) MOT: He's a nice little lamb.
CHI: Got one ear.
CHI: Got one ear.
MOT: He has one ear? (Input to Nina at 2;0)

(37) You want Mommy to have the chair on her hand? (Input to Nina at 2;0)
I think he's a dog. (Input to Nina at 2;0)
That looks like cereal to me. (Input to Nina at 2;0)

The first forms of the simple present in Nina's speech are attested in her sample at 2;3. All forms are used for talking about the here-and-now. The examples in (38) are all spontaneously used by Nina:

(38) I want applesauce
You want more?
I need the bottle
I think dolly's thirsty.
I've a honey book. (Nina, 2;3)

Abe and his parents show a similar pattern: the simple present forms are from the start used to describe states that hold in the here-and-now.

Adults talking to adults also use the simple present for describing the here-and-now, but less frequently than children and their parents. See (39) for some examples in the adult-adult conversations:

(39) No I I don't want to hear anything out of a book with, .. chapter called heaven and hell. (Darryl, SBCSAE)
I have the ideal makings for garlic bread. Right here, right.... Well actually I have Trader Joe's, <VOX whipped garlic bread spread VOX>. (Marilyn, SBCSAE)
I got fishy hands. (Marilyn, SBCSAE)

9.5.3.2 Simple present for commenting on the world

The simple present can also be used for making general statements about the world. For this purpose, besides the combinations with states, combinations with activities and telic events are relevant. In the input the simple present is from the beginning occasionally used for making general statements about the world. The child does not respond to it in a pragmatically adequate way (40):

(40) MOT: Want me to make the nurse sit down?
CHI: Yeah.
MOT: How do I make the nurse sit down?
Situation: Nina looking at the book "sleeping beauty". She calls sleeping beauty "goldy."
CHI: Goldy. (Nina, 2;0)

It is at 2;6, in the context of scaffolding, that Nina produces a simple present for the first time that is used for making a general statement about the world (41):

(41) MOT: What do you do when you swim? Do you splash a lot?
CHI: Yeah
MOT: You do? Do you get wet?
CHI: yup, I get ... I don't. (Nina, 2;6)

Only at 3;0 Nina herself takes the initiative to make a general statement about the world by using a simple present (42).

(42) CHI: Don't you make the dog fall down.
MOT: I didn't mean to knock him over.
CHI: Cause he cries every day when you push him down.
(Nina, 3;0)

Abe also uses the simple present for making a general statement for the first time at age 3;0 (43).

(43) I didn't know grandmas smoke cigarettes. (Abe, 3;0)

In the later samples there are many examples in which the present is used for making general statements about the world (44).

(44) How do bees grow their babies? (Abe, 3;6)
Mommy # I have a good thing to catch mosquitoes. You get a pin, a sharp pin and then you put it in the mosquitoes then you kill the mosquitoes. (Abe, 3;6)

Adults as opposed to young children and parents talking to young children, frequently use the simple present to make claims about the world as it is. Therefore, they need the marked combinations more often than children and their parents. These remarks are often constructed in a conditional clause. See (45).

(45) Sometimes if you get one that's been thawed out a little bit, they start really stinking and stuff. Oh, it's the grossest thing. (Lynn, SBCSAE)
Why do these cans, .. get so warped. Only the --.. Only the Sam's Club cans .. get so warped. (Marilyn, SBCSAE)
You know, you ask someone why they're interested in electronics, and they can probably tell you. (Darryl, SBCSAE)

9.5.3.3 Summary

At first, children only use the present tense for talking about the here-and-now. Only later on, children start commenting on the world and only in this context, the marked combinations of tense and situation type appear. Parents adjust their language to the children's cognitive level, thus showing at first a stronger association between states and present tense than in adult-adult conversation. Parents start using the present tense for commenting on the world when talking to their children before their children use the present tense for this purpose. As a result, the association between present tense and states in the input is weaker than in child language. Adults talking among themselves use the present tense much more often for making general comments on the world than children and their parents do, so that the association with states in adult-adult language is the least strong.

9.5.4 Conclusion

The qualitative analysis of the discourse topics in child language, input and adult-adult data supports the Discourse Topic Hypothesis. At first, children and their parents mainly converse about the here-and-now, about observable events and events that have just happened. As a consequence they only use unmarked combinations of tense/aspect morphology and situation types. The activities the children are involved in determine which combinations are used.

Talking about past events develops later on. Although a few past forms in the early samples are already used by the child for describing past events, the frequency is low and in most cases it is the parent who takes the initiative and helps the child to talk about the earlier past by way of scaffolding. Only later on, the child starts talking about past events more frequently and spontaneously. The description of past events is often short and concerns shared memories. This makes the use of states in the past for presenting background information less relevant. Furthermore, young children have not yet mastered the sophisticated sequencing of (parts of) events in the past. This explains the late appearance of the past progressive: activities and temporary states in the past progressive are often used for describing simultaneity between different situations in the past. Children's descriptions of past events are, however, not so elaborate in the beginning.

Finally, children start making general statements about the world as it is. Only then are the marked combinations of present inflection with activities and telic events needed. In the beginning it is the parent who takes the initiative to talk about the world in general statements and by way of scaffolding, the child is able to respond adequately. Around age 3;0 children start commenting on the world spontaneously.

In contrast to children and their parents, adults among themselves only occasionally talk about the here-and-now. They mainly converse about past events or the world as it is. This explains why they need the marked combinations more often than the children and their parents. However, even in the more sophisticated contexts of use, the unmarked combinations prevail, so that also in the adult stage of English, there is a strong association between certain situation types and tense/ aspect.

9.6 DISCUSSION AND CONCLUSION

With respect to the semantic interpretation of the early tense and aspect forms in child English, it was necessary to investigate whether these forms perhaps mark situation type, instead of tense or aspect, such as suggested in the literature. If this were the case, then the early grammatical expressions could not be interpreted as operators. A detailed study of the associations between

situation type and progressive, past tense and present tense, revealed that there is no evidence that supports the interpretation of these morphemes as expressing situation type.

On the basis of a comparison between adult-adult language, child language and input to the children it was established that in general the association between past and telic events and between present and states was stronger in the input and even stronger in child language than in adult English. For the progressive it was found that the association between progressive and activities was not stronger in the input and in child language than in adult-adult language but the association between progressive and telic events was remarkably high in the input and in child language at certain points.

Both the Aspect Before Tense Hypothesis and the Prototype Account predict that children would have a regular system in the beginning, but the findings are not compatible with this expectation. From the start, children do not restrict their use of tense/aspect morphology to certain situation types: they immediately make different combinations that are also possible in adult English, however, these combinations occur less often. There is thus no need to assume that children work from a different semantic representation or rule for tense/aspect morphology. The distribution in the input seems to account to a large extent for the distribution of tense/aspect morphology and situation type in child language. A lexically-based development in the beginning can best explain the irregularities found in the combinations of tense-aspect morphology and situation type in child language. A further argument against the Aspect Before Tense Hypothesis and the Prototype Account is that neither of these hypotheses explains why the distribution in the input is skewed compared to adult-adult conversation but less skewed than the distribution in child language.

The Discourse Topic Hypothesis claims that the discourse topic is of influence to the distribution of tense/aspect morphology and situation type. When talking about observable events, the unmarked combinations—progressive and temporal states / activities / not ended telic events; present tense and states; past tense and telic events—are most relevant. When talking about past events or when commenting on the world, marked combinations are also relevant, although the unmarked combinations still dominate. Assuming that children and their parents at first mainly converse about the here-and-now, they at first only need the unmarked combinations.

Independent evidence for the Discourse Topic Hypothesis was collected by a qualitative analysis of what children talk about on their own initiative, what parents talk about to their children and what adults talk about among themselves. It was shown that children in the early samples mainly or only talk about the here-and-now, about observable events. Their parents do so equally, but they also talk about past events now and then and sometimes about the

world as it is. They bring up conversation topics that are slightly ahead of the topics their children talk about themselves. By contrast, adults in interaction with adults rarely talk about observable events: they mainly talk about past events or about the world as it is. Accordingly, different distributions of tense/aspect morphology and situation types are needed and used by children, parents talking to their children and adults talking to adults. When they grow older, children and their parents increasingly talk about past events and about the world as it is. As a consequence, they need more marked combinations and thus the patterns of association between tense-aspect morphology and situation type gradually become adultlike.

I assume that the different distributions of discourse topics in child and adult conversations are a direct result of the cognitive capacities of children compared to adults: their knowledge of the world, their theory of mind, their memory, their understanding of the concept of time, etcetera. However, since to date the development of these capacities is still only marginally understood, (Kuhn & Siegler 2000) a study of the exact relations between cognitive capacities and discourse topics is beyond the scope of this thesis.

This study showed the importance of investigating not only child language or input, but also the final stage (adult-adult conversation). First, the markedness of certain combinations of morphology and situation type appeared to be specific for child English only to a small extent. Furthermore, it appears to be useful to investigate which linguistic constructions and combinations are needed for what discourse topics. On the basis of the development of discourse topics of children and their parents, the distributional patterns in child language and input can be accounted for.

Whether the early tense/aspect forms can be interpreted as having adultlike semantics, such as claimed by some in the literature (e.g. Behrens 1993; C. S. Smith 1980; Smoczynska 1985; Weist et al. 1984), will be evaluated in Chapter 10. There, on the basis of crosslinguistic data on the acquisition of grammatical TMA expressions it will be possible to abstract away from language-specific patterns and make more general claims about the functions of TMA forms in child languages.

Chapter 10

Acquisition of TMA across Languages

10.1 INTRODUCTION

In Chapter 8 it was shown that FG makes relevant predictions for the acquisition of TMA forms in American English. Firstly, hypothesis 6 was supported (8.5-8.7):

H6: The acquisition order of TMA operators follows the order of the Scope Hierarchy, π1-operator ⊂ π2-operator ⊂ π3-operator. Because of increasing complexity and decreasing communicative need, the acquisition order of TMA expressions is π1-operators before or at the same time as π2-operators, and π2-operators before or at the same time as π3-operators.

The qualitative and quantitative analyses of spontaneous speech showed that π1-operators are acquired at the same time as or before π2-operators and at a faster rate. π3-Operators are acquired last. This means that English children do not go through a stage in which π2-operators are present, but π1-operators are not, or in which π3-operators are present, but π2- and π1-operators are not. This is in accordance with the Scope Hierarchy which predicts that there is an implicational relation between the presence of operators, such that π1-operators are implied by π2-operators and that these in turn are implied by π3-operators (H3, 5.4.3). As set out in 5.4.6 the rationale behind H6 is that modifying a smaller part of the clause is a less complex communicative function and semantically less abstract than modifying a large part of the clause. If children acquire least complex functions and most concrete semantics first, operators with scope over the predicate are acquired with more ease than operators with scope over the predication or over the proposition.

Secondly, some support was found for H7:

H7: At any stage in language acquisition, a single expression can only cover adjacent regions in semantic space. As a result, a polysemous or portmanteau expression will only have semantic functions with similar or adjacent scopes.

As argued in 5.4.3 it is to be expected that polysemous expressions reflect semantic relatedness of meanings. This should hold for adult languages (H3b) as well as for any stage of child language (H7). H7 boils down to the prediction that there will be no expression in any stage of child language that can function both as a π1- and as a π3-operator, without also functioning as a π2-operator.

Although the data on English supported the hypotheses, an implicational hierarchy, such as the Scope Hierarchy, should not only account for the acquisition of one specific language, but for the acquisition of every language (see 1.4). Is the acquisition pattern of TMA expressions in English language-specific or is there a universal acquisition order of these expressions? Typologically different languages need to be compared in order to make generalizations possible. Therefore, in this chapter H6 and H7 will be tested across languages. The acquisition data of TMA expressions in 24 languages will be explored. In the discussion of the data, it is important to keep in mind the predicted acquisition order. In Figure 10-1 H6 is restated in terms of the acquisition order of semantic domains. Provided that grammatical markers of the distinguished domains are present in a specific language, the hypothesis predicts that one or more semantic functions of the leftmost domains should be acquired before one or more semantic functions of the domains in the middle, which in turn should be acquired before one or more semantic functions of the rightmost domains.

π1		**π2**		**π3**
Aspect Property quantification Participant-oriented modality	<	Tense Irrealis Event quantification Event-oriented modality	<	Evidentiality Proposition-oriented modality

Figure 10-1. Predicted acquisition order for semantic domains

Children should not necessarily acquire **all** operators with narrow scope (π1) before all operators with medial scope (π2), or all operators with medial scope before all operators with wide scope (π3), but they are expected to start out with π1-operators, since they modify the smallest part of the clause. After children have found out how to modify the predicate, at least by one π1-operator, they will learn to modify a larger part of the clause, the predication, and they will start acquiring π2-operators. Finally, children will learn to modify the complete proposition by using π3-operators.

This chapter is organized as follows. In 10.2 the methodology of this study will be discussed. In 10.3 an extensive overview of the data on TMA acquisition

in different languages is presented. The first discussion is in general restricted to the acquisition of different TMA **forms**. An intermediate conclusion of these data is presented in 10.4. However, as already set out in 9.1, the Scope Hierarchy is relevant for the linguistic encoding of specific communicative **functions**: modification of the predicate, the predication or the proposition. It is therefore important to examine what the function is of TMA forms in child language, and not only whether the forms are used productively, for it can be the case that the forms are used productively but with non-adultlike meanings. In Chapter 9 it was argued that early tense aspect forms in English should not be interpreted as marking situation type (as claimed by the Aspect Before Tense Hypothesis and the Prototype Account). The development of discourse topics appeared to provide an adequate explanation for the different distributions in adult-adult language, input to the children and child language. However, if children's tense and aspect forms do not mark situation type, this does not necessarily imply that they have adultlike meanings. For English, it was shown that the conversations of children are at first limited to the context of the here-and-now. Only if children's TMA forms in this context function correspondingly to the adult stage, can we speak of adultlike use. Therefore, in 10.5, the focus will be on the **function** with which the early TMA forms are used across languages. This discussion will show that there are many crosslinguistic similarities in the acquisition order of TMA functions.

10.2 METHODOLOGY

10.2.1 Data collection

The crosslinguistic study of the acquisition of TMA systems is based on studies reported in the literature. Ideally, the same languages studied in Chapter 7 would have been further analyzed here, but for most of these languages, there are no studies on the acquisition of TMA. Information was found on the acquisition of TMA in 24 languages from 13 language families[1], including Altaic, Australian, Bantu, Eskimo-Aleut, Finn-Oegric, Indo-European, Japanese, Kartvelian, Korean, Mayan, Semitic, Sino-Tibetan and Trans-New Guinea. An overview of the languages is presented in Appendix F. The only two languages that overlap with the languages in Chapter 7 are West Greenlandic (or Inuit) and Cantonese. The sample in this chapter is biased towards Indo-European languages, because most studies on first language acquisition concern Indo-European languages. However, the different language

[1] I tried to include all languages for which information was available on the acquisition of TMA. Undoubtedly, I have missed some sources.

branches within the Indo-European family show quite different TMA systems (see 10.3.6).

The available information sources on the acquisition of the different languages are far from uniform. First of all, there is considerable variation in the amount of detail presented for each language ranging from a few remarks and restricted descriptions of the acquisition of TMA to in-depth investigations on a specific semantic domain or morphological form.[2] The number of children studied for the different languages ranges from only one to more than 50. Furthermore, the data on which the acquisition order is based are very diverse. Most studies are based on spontaneous longitudinal data, but some studies are based on cross-sectional data or experimental findings.

Further important differences concern the productivity criteria used in the studies. As discussed in the introduction to Part III, establishing the order of acquisition depends largely on the criteria used to determine when a form or function is acquired. In Chapter 8 I applied several criteria for productivity: relative frequency, variation in use and contrastive use (see 8.2). For the crosslinguistic study, I had to use less strict criteria, since many studies do not explicitly discuss the productivity criteria applied. Language acquisition is very often described based on first emergence of forms or (absolute) frequency of use. The information that is based on these criteria is considered not very reliable, since the first forms and the most frequent forms are likely to be rote-learned and unproductive. Some authors of the literature studied, however, have applied stricter criteria. For example, a few authors use the criterion of Pizzuto & Caselli (1994: 156) who state that a morpheme is acquired 'when (a) the same verb root appeared in at least two distinct inflected forms, and (b) the same inflection was used with at least two different verbs.' This is considered a reliable criterion, at least in this strict form. Some authors changed the criterion to an either/or criterion, which of course substantially lowers the threshold for acquisition. The studies reported in Bittner, Dressler & Kilani-Schoch (2003b) all take the establishment of mini-paradigms as an important cue to productivity. A mini-paradigm is defined as 'corresponding to a non-isolated set of minimally three phonologically unambiguous and inflectional forms of the same lemma produced spontaneously in contrasting syntactic or situative contexts' (Bittner et al. 2003a: xvi). Gillis (2003: 192) in this same volume adds that the contrasting context should be interpreted as contrasting **lexical** contexts. As argued in 8.2, contrastive use of TMA expressions is also a reliable criterion for acquisition.

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[2] It was impossible to consult all the available literature for each language. I concentrated mainly on studies that present an overview of the acquisition of a specific language (the chapters in Slobin) or that specifically deal with the acquisition of TMA or verbal morphology on the basis of longitudinal data.

The most important point of variation in the research studied was the main focus of the study. Some researchers concentrated on the acquisition of the adult **forms**, without discussing the **functions** of these forms in child language. Others not only described the acquisition of form, but also tried to interpret the functions of the forms in child language. In some cases, this leads to explicit claims that certain morphemes do or do not have adultlike semantics. For example, a claim that is often encountered in the literature is that early past tense forms do not yet mark past tense in an adultlike way, since past forms are only used to describe events in the immediate past. Instead of marking past time, the form is reported to mark 'completedness'. In the discussion of the data, any information will be reported that the researchers present on the contexts of use of the forms or the semantic interpretation they give of the forms in child language. If there is no information on the function of the forms in child language, this will be explicitly reported. Although I have concluded in Chapter 9 that children do not use early tense and aspect forms to encode situation type, many researchers claim that there is an association between tense and aspect forms and situation type in child language. This will be reported for the relevant languages, not to create the impression that the forms would encode situation type, but rather as background information on the contexts of use of the tense and aspect forms in child language.

10.2.2 Classification of TMA

In order to be able to compare the acquisition order of TMA expressions across languages, these expressions have to be classified in a uniform way. As different researchers use different labels for similar functions, the forms had to be reanalyzed and classified with respect to their semantic function and scope according to the analysis of TMA discussed in Part I. The precise definitions of semantic domains and functions that are applied throughout this thesis were presented in Chapters 3 and 4 and also used in the classification of forms in Chapter 7. Here, I only present an overview of the semantic functions under consideration in Table 10-1, distinguished according to their scope.

For most languages, the classification of the TMA expressions in each language is based on the definitions and translations provided by the researcher(s) of the acquisitional data. I did not consult specific reference grammars on the languages. If the descriptions of the TMA expressions were insufficient to classify a marker in specific terms, such as progressive or permission, it was classified more generally, for example as an operator of aspect or an operator of event quantification.

Table 10-1. Classification of TMA domains and specific semantic functions according to scope

TMA Domain + *specific semantic functions*	**Scope over**
Aspect *prospective, ingressive (inchoative), continuative, progressive, egressive / completive, imperfective, perfective, perfect*	
Property quantification *iterative, intensity, semelfactive*	Predicate (π1)
Participant-oriented modality potentiality: *ability, root-possibility, permission* disposition: *volition, desirability* weak necessity: *weak root-necessity, weak obligation* necessity: *internal need, root-necessity, obligation*	
Tense *past, present, future, non-past, non-future,* (± *specification of temporal distance*)	
Event quantification *habitual, frequentative, repetitive, distributive*	
Event-oriented modality potentiality: *root-possibility, permission, epistemic possibility* disposition: *desirability, (future)* weak necessity: *weak root-necessity, weak obligation, probability* necessity: *root-necessity, obligation*, *epistemic necessity (negative)*	Predication (π2)
Irrealis *hypothetical, counterfactual*	
Proposition-oriented modality potentiality: *uncertainty, permission* disposition: *prediction, desirability* weak necessity: *weak certainty, weak obligation* necessity: *certainty, obligation*	Proposition (π3)
Evidentiality *sensory evidence, inference, hearsay, etc.*	

10.3 THE DATA

The languages included in the study will be discussed under the names of their language family, in alphabetical order. In the discussion of the acquisition of TMA in each individual language, first some general information is given on the language. A short overview of the TMA expressions in the adult stage of the

language is discussed in as far as these expressions are relevant to the data on acquisition. In order to make the approach to the different languages more uniform, the TMA expressions are classified according to the FG analysis of the TMA domain. Like in the crosslinguistic analysis in Chapter 7, the interpretation of the grams is based on the definition and translation presented by the authors (cf. 7.3.2). Secondly, the acquisition of the TMA system is discussed. The data on which the acquisition order is based and the productivity criteria applied are described. If the researchers have provided information about the semantics of the forms in child language, their view will also be presented. Note that in the first discussion of the data, I will strictly report the interpretation of the researcher, not my own interpretation. Thirdly, for each language the reported acquisition order will be compared to the predicted order in H6. If only the acquisition of forms is discussed, then the acquisition order of forms is compared to H6. If researchers have discussed the functions too and claim that specific forms have non-adultlike functions in child language, then H6 is tested on the functions described by the researcher. Since many studies have described the acquisition of tense and/or aspect, but rather few the acquisition of modality, evidentiality, quantification and irrealis, it will often be necessary to concentrate on the acquisition order of a restricted set of TMA expressions.

10.3.1 Altaic: Turkish

Turkish is a language of the Altaic family, spoken in Turkey. It is an agglutinative language with several suffixes for marking TMA. The relevant TMA expressions are presented in Table 10-2. The leftmost column presents the TMA expression; the middle column presents the definition or labels provided by the author and the rightmost column presents the FG classification according to the analysis of TMA as in Table 10-1. Turkish has markers for tense and aspect and also for participant-oriented modality and evidentiality. The different inflections can be combined for example to create a past progressive, V-*Iyor-dI*, or a future in the past, V-*AcAk-dI*.

The morpheme *–mIş* in Turkish is polysemous (Aksu-Koç 1988: 22-24): it functions as an aspectual, a temporal and an evidential marker. As an aspectual marker, it indicates a resultant state, and marks resultative or perfect aspect. It combines with past (V-*mIş-DI*) and future (V-*mIş* X-*AcAk*) to mark past and future perfect. Second, *–mIş* expresses past tense of indirect experience. The function of past tense marker is naturally related to the aspectual meaning: a process or event can only have a resultant state if it is in its entirety located earlier on the time line. The past tense interpretation has an additional

Table 10-2. Relevant TMA expressions in Turkish (based on Aksu-Koç 1988: 17-21)

Form	Author's definition	FG classification
-dI	Past of direct experience	Past (π2) + evidentiality (π3)
-mIş	Perfect Past of indirect experience, Quotative, hearsay	Perfect (π1) Past (π2) + evidentiality (π3) Evidentiality (π3)
-Iyor	Progressive, ongoingness of event Present tense	Progressive (π1) / Present (π2)
-Ir	Indefinite present, habitual, generic statements.	Habitual (π2)
-(y)AcAk	Future	Future (π2)
-yA	Optative; desire and intention	Participant-oriented modality (π1)

evidential feature in that it also indicates that the process is not witnessed, i.e., the past event is not consciously experienced by the speaker, but obtained by other information. It functions in opposition with the past marker *–dI*, which implies that the speaker witnessed the past event.[3] Finally, *–mIş* can be used to express quotative or hearsay. This use is linked to the evidential function of a nonwitnessed event: the evidence for the occurrence of the event can be an observable poststate, but it can also be hearsay. In the quotative function, the end state is not observed and there are no temporal reference constraints anymore. It is possible to combine different functions of *–mIş*, as in V-*mIş–mIş*, which is an evidential perfect. It is, however, impossible to combine the past of direct experience with the evidential marker, *V-*dI-mIş*.

The acquisition of Turkish TMA expressions is studied by Aksu-Koç (1988; 1998) Aksu-Koç & Slobin (1985) and Aksu-Koç & Ketrez (2003). In all these studies contrastive use of forms is taken as the criterion for acquisition and the functions of forms in the child's language are explicitly discussed. All studies sketch a similar pattern of development, so that they will be discussed together.

A child acquiring Turkish starts out with bare verbs, without any suffixes for TMA. Already in the one-word stage, children start using inflection to distinguish between modalized and nonmodalized utterances: modalized utterances are the imperative or infinitive forms, used as directives, and

[3] A connection between a perfect and an inferential marker also occurs in Bulgarian, Georgian and Estonian (Comrie 1976), in Lhasa Tibetan (DeLancey 1986), Chinese Pidgin Russian (Nichols 1986) and West Greenlandic (Fortescue & Lennert Olsen 1992).

occasionally inflected verbs or auxiliaries to express intention. Nonmodalized utterances are indicative forms, sometimes inflected. The first productive inflections around 1;6 are *-dI* (past tense, direct experience), followed at 1;7 by *-Iyor* (progressive) and *–yA* (desire/intention). These forms are at first only used in restricted contexts. Aksu-Koç (1988: 74) argues that the meaning of *-dI* at this stage is 'completion' rather than deictic tense. It is mostly used in combination with change of state verbs referring to observable end states at the time of speech. In very few cases *-dI* was used with activity or stative verbs, for example in the context of playing, when the child acted out an activity in an instant, that would have duration in reality. For example, the child would take a toy pot to the mouth of the doll and back and comment, *bu ye-di* 'this ate'. The use of *–dI* is not yet restricted to contexts of witnessed events and is also used to characterize non-witnessed changes of objects, where *–mIş* should be used, illustrated by example (1) (ex. 27 in Aksu-Koç 1988: 87):

(1) Situation: picture of apple fallen from a tree.
ADL: *Bu nasıl bir elma?*
'what kind of an apple is this?'
CHI: *In-di* (child at 2;0)
Descend-PAST.DIREXP
'(it) came down'

The marker *–yA* is in this stage used to indicate intention; it is used to plan immediate activity. The progressive marker *–Iyor* is predominantly used in combination with activity verbs, and to a lesser extent with stative verbs. It is used to refer to ongoing activities or states in the immediate context. It is sometimes used with change of state verbs, mainly in negative statements, when the child meets resistance in carrying out an action, like taking out or inserting an object. The marker is comparable to the present progressive, but for the child it seems to mark 'ongoingness' only and not present tense. Aksu-Koç claims that in this first stage, *–dI* and *–Iyor* mark 'completed' versus 'ongoing' events rather than past versus present tense, because the predominant contexts of reference are change of state in opposition to states and activities. Children's utterances are all limited to the here-and-now, to immediate past and immediate future. There is no contrastive use yet: the progressive is not yet combined with past or future tense and there is no opposition between present, past and future tense for specific lemmas (1988: 178).

Around 2;0, children start using the future tense *–AcAk* spontaneously, although before this age a few instances are attested. The future tense is, just like *–yA*, initially restricted to refer to immediate intentions. About a month later, the inferential past marker *–mIş* becomes to be used spontaneously. The

first uses are with stative verbs, making reference to present states (rather than resultant states), whereas *–dI* is used in reference to completed dynamic actions. The opposition between *–dI* and *–mIş* in this stage is the combination with dynamic or stative verbs, respectively; *–mIş* is not restricted to nonwitnessed events, and *–dI* is not restricted to witnessed events. From age 2;0 onward, *–dI*, *–Iyor* and *–AcAk* gradually acquire deictic tense function. The past marker *–dI* is gradually used more frequently for non-immediate past, although immediate past reference prevails at least up to 2;6. For *-Iyor*, contrastive use arises with past and future tense and the present tense notion of this marker becomes part of the semantics. The different markers come to be used contrastively on the same lemmas. Finally, around 2;2, habitual *–Ir* is acquired. It expresses mainly normative or potential behavior. Unfortunately the acquisition of the modal markers *–mAlI* (obligation), *–AbIl* (possibility and ability) and conditional (*–sI)* is not discussed in the studies.

As the morpheme *–mIş* can be used with different scopes, the acquisition order of its multiple functions is an excellent test of the hypothesis: the morphophonological complexity is equal, but the linguistic functions differ in complexity and the semantics in abstractness. From the longitudinal data in Aksu-Koç (1988: 103) it appears that first *–mI*ş is only used to express a state, not necessarily resultant. The next development is that *–mI*ş gets used as a marker of resultant state (both witnessed and nonwitnessed), with the focus on end state (in contrast to *–dI* that focuses on the process of an agent). From this use the more general perfect use develops. This use leads to the inferential past: the resultant state must follow from a past event. Since there already is a past tense marker, *–dI*, now direct and indirect evidence have to be acquired as part of semantics. This development is investigated by experiments: 60 children between 3;0 and 6;4 had to perform comprehension and production tests. Only between 3;6 and 4;6 children begin to grasp the evidential contrast between past tense markers *–dI* and *–mI*ş (Aksu-Koç 1988: 134). The hearsay function of *-mI*ş comes in last.

In conclusion, the acquisition of TMA in Turkish supports H6 and H7: first there is an opposition between completed events (*–dI*), ongoing states and events (progressive, *–Iyor*) and immediate intention (*–yA*). This corresponds to an aspectual distinction (π1). Later, deictic tense (π2) and habituality (π2) also become marked consistently. Finally, evidential contrasts (π3) are acquired. The acquisition order of the different functions of *–mI*ş exactly reflects the predicted order: aspect (π1) appears before the meaning of tense (π2) which appears before the meaning of evidentiality (π3). In each stage of child Turkish, this expression has meanings with adjacent scope, as predicted by H7.

10.3.2 Australian: Warlpiri

Warlpiri is a Pama-Nyungan language, spoken in Central Australia. Pama-Nyungan languages form one of the largest families of the Australian languages. Warlpiri is an agglutinative language. It has a temporal distinction in past and non-past, in opposition to irrealis, which is expressed by inflection. The inflection can be used by itself, but further specification of TMA may be added in a clitic cluster, consisting of a propositional particle, a sentential particle, an aspect marker, a subject and/or an object/oblique marker, expressed in this order. The cluster is not obligatory and only expressed when (one or more of) the corresponding categories are present. It may appear before or after the verb, depending on the syllable-length of the cluster. The relevant TMA expressions are presented in Table 10-3.

The past tense suffix is, without further modification 'synonymous with perfect aspect' (Bavin 1992: 313). An imperfective auxiliary may be added to raise a past imperfective meaning, compare (2) and (3) from Bavin (1992: 314):

Table 10-3. Relevant TMA expressions in Warlpiri (based on Bavin 1992: 313-15, 18, 33)

Form	Author's definition or translation	FG classification
Non-past inflection	Immediate future, 'going to'	Prospective (π1) + future (π2)
+ *ka*	Imperfective present	Imperfective (π1) + present (π2)
+ *kapi/kapu*	Future	Future (π2)
+ *kajika*	Potential / 'might'	Epistemic possibility (π2) / uncertainty (π3)
Past inflection	Past perfective	Perfective (π1) + past (π2)
+ *lpa*	Past imperfective	Imperfective (π1) + past (π2)
+ *kala*	Past habitual	Past (π2) + habitual (π2)
Irrealis inflection	Irrealis	Irrealis (π2)
Nganta	'supposedly', 'reportedly'	Evidentiality (π3)
Kari	Direct evidence	Evidentiality (π3)
Waja	'certainly'	Certainty (π3)

(2) *Nya- ngu*
see- PAST
'He/she/it saw her/him/it.'
[default interpretation is 3rd person object and subject)

(3) *Nya- ngu- ḷpa- rna- ngku*
See- PAST- IPFV- 1SG.SUBJ- 2SG.OBJ
'I was looking at you.'

The non-past inflection by itself marks 'immediate future', is glossed as 'going to' and therefore analyzed as future tense (π2) and prospective aspect (π1); non-past inflection in combination with the imperfective aspect auxiliary *–ka* marks present tense; in combination with the future auxiliary it marks future tense, etcetera. Warlpiri has a variety of particles: propositional particles indicate the speaker's attitude or evidentiality such as *nganta* for 'supposedly', 'reportedly' or *kari* for direct evidence.

The acquisition of Warlpiri is examined by Bavin (1992), based on cross-sectional data between 2;0 and 4;11. Bavin does not explicitly state the criteria used for establishing the acquisition order. She provides clear information about the contexts of use of the forms by the children. At age 2;0, about 50% of the verbs used has imperative inflection. Past and non-past inflection are also used, without errors, 'to mark viewpoint aspect': the past inflection for marking 'the end point of an action', the non-past inflection for showing 'ongoing activity in the immediate context' (1992: 327, 32). Up to 3;0, this is the predominant function of past and non-past inflection.

In the recordings at 2;8, the non-past imperfective auxiliary *-ka* is used a few times, but not yet consistently. It is for example used in initial position, which is not correct in adult Warlpiri, consider (4) (Bavin 1992: 330):

(4) *ka-rna nga-rni* (child at 2;8)
IPFV-1SG.SUBJ eat-NONPAST
'I am eating'.

The distinction between past versus non-past inflection still expresses the distinction between immediately completed events and ongoing activities. Past tense inflection primarily combines with telic verbs, like 'died', 'found', 'dropped', 'broke' and 'shot': non-past inflection mainly occurs with atelic verbs, like 'stand', 'kiss', 'run'. Children use the forms contrastively: for example, one of the children uses 'carry-NONPAST' for describing an ongoing act of carrying and 'carry-PAST' to refer to this same act at the moment it is completed. Furthermore, the particle *nganta* is used frequently; this is an

evidential marker, but it is apparently not used with the same semantic load as in adult language (Bavin, personal communication).

Around 2;11 children seem to contrast the non-past verb with and without *ka* for creating the distinction between present imperfective (π2/π1) and prospective / immediate future (π1/π2) for intended events. By 3;0, the future tense (π2) auxiliary *kapi/kapu* comes in and from about this age tense is marked consistently. It is only at 3;5 that spontaneous talk about (remote) past events is evidenced, but Bavin warns that this does not imply 'that the child has not developed time concepts before that age' (1992: 326).

From 3;10, the past imperfective form *lpa* is used and it becomes more frequently between 4;0 and 5;0, indicating that the child is now capable of taking an internal perspective on an event with a reference time other than speech time. At about age 6 the past imperfective clauses are used for backgrounding. The past habitual form *kala* appears much later. Unfortunately, there is no information on the acquisition of the potential marker *kajika* and the other particles.

The acquisition of Warlpiri supports the predicted acquisition order. The past and non-past inflections are used aspectually (π1) up to 3;0, to distinguish between completed and ongoing events. Around 2;11, the difference with immediate intention (prospective/immediate future) is also marked consistently. Only after 3;0 is tense (π2) marked consistently and after 4;0 aspectual distinctions in the past are acquired. Although one of the evidential markers is attested early (before consistent tense marking), it does not yet express evidentiality (π3).

10.3.3 Bantu: Sesotho

Sesotho is a southern Bantu language that belongs to the Sotho language group; it is mainly spoken in Lesotho and South Africa. Sesotho has a complex system of TMA, with optional tense/aspect prefixes (auxiliaries) and an optional perfect suffix. Each tense/aspect has its own negative form. There are only preliminary findings available on the acquisition of TMA in Sesotho. Demuth (1992) examined tense and aspect marking in one child between 2 and 3 years. She presents no information on the acquisition criteria nor on the contexts of use of the forms. Table 10-4 immediately presents the acquisition of TMA forms.

The first (adult) TMA expressions are used from 2;1, for aspect (π1) and tense (π2). In the data at 2;2 and 2;4, no new TMA expressions are used, but at 2;5 some new TMA expressions have emerged for tense, aspect and participant-oriented modality (π1), see Table 10-4. From 2;6, the narrative past

Table 10-4. Acquisition of TMA expressions in Sesotho by one child (based on Demuth 1992: 620, personal communication)

Age	Form	Author's definition or translation	FG classification
2;1	*(a)-*	Simple present/present progressive	Present (π2)
	tla-	Future I: 'will'	Future (π2)
	tl'o/tlilo-	Future II: 'coming to'	Prospective (π1)
	il'o-	Future III: 'going to' / 'about to'	Prospective (π1) / immediate future (π2)
	-il-	Perfect: 'have –ed', '-ed'	Perfective (π1) / past (π2)
2;5	*ntse*	Continuous: 'is –ing'	Progressive (π1)
	ne	Past continuous: 'was –ing'	Past (π2) + progressive (π1)
	ka	Potential: 'can'	Ability (π1)
	tsoa	Recent past: 'have just come from -ing'	Recent past (π2)
2;6	*-a*	Narrative past	Past (π2)
3;0	*ilé*	Punctual past	Past (π2)

marker *–a* is used, a form that occurs in narrative contexts once the tense has been set. Finally, from 3;0 the punctual past tense marker *ilé* is used. Up to age 3;0 the past perfect (*ne* + *ile*) is not yet used.

In short, these findings show that at least from 2;1, both aspect and tense expressions are used. It is unknown whether the functions of these forms are adultlike in the child's language. Aspectual distinctions in the past occur later: the past progressive occurs fairly early, whereas the past perfect is acquired late. The data are not in conflict with the predicted acquisition order, but they are also not detailed enough to count as hard evidence in support of the hypothesis.

10.3.4 Eskimo-Aleut: West Greenlandic

West Greenlandic (or Inuktitut) is an Inuit language of the Eskimo-Aleut family. It is mainly spoken in Greenland. West Greenlandic is a polysynthetic language that is extremely productive in applying bound affixes. Over 400 derivational and over 300 inflectional morphemes are productively used in adult

Table 10-5. Acquisition of TMA expressions in West Greenlandic (based on Fortescue & Lennert Olsen 1992)

Age	Form	Author's definition or translation	FG classification
2;2	*ler*	Prospective, 'be about to'	Prospective (π1)
	nikuu	Experiential perfect, 'have done'	Perfect (π1)
	ssa	Obligation, 'should'	Weak obligation (π1)
3;1	*reer*	Perfective , 'already'	Perfective (π1)
	niar	'be going to'	Prospective (π1)
	ssa	1s.Future, intention	Disposition (π1)
	sar / tar	Habitual / repetitive	Habitual / frequentative (π2)
3;4	*ruma*	Volition, 'want to'	Volition (π1)
	naveer	'can no longer'	Ability (π1)
	sinnaa	'can'	Ability π1
	nikuu	Experiential perfect, 'have done',	Past (π2)
	niar	Intended / inevitable future, 'be going to'	Future (π2)
	ssa	Future, intention	Future (π2)
	qqig	Repetition, 'again'	Repetitive (π2)
4;7	*rusuq*	'want to'	Volition (π1)
	sima	'apparently'	Evidentiality (π3)
	gooq	Quotative, 'it is said',	Evidentiality (π3)
5;2	*qattaar*	'repeatedly'	Iterative (π1)

language (Fortescue & Lennert Olsen 1992: 115). The inflections in the adult stage that concern TMA are presented in Appendix G, since West Greenlandic formed part of the adult GRAMCATS sample discussed in Chapter 7, here under the name of Inuit.

The acquisition of West Greenlandic is examined by Fortescue & Lennert Olsen (1992), mainly based on cross-sectional data at 2;2, 3;1, 3;4, 4;7, 5;2 (*N* = 1). As the intervals in age between the children are rather large, they are assumed here to represent successive stages of language development. For each

recorded child, a list of productive morphemes is presented, although the authors stress that the lists are probably conservative and do not reflect the children's abilities fully because the recording sessions were not extensive. The criterion for productivity in the study of Fortescue & Lennert Olsen (1992: 138-39) is that a child has to use a morpheme on at least two stems or that an affix is used on a stem that occurs elsewhere with another affix. Around 2;3, a West Greenlandic child already uses about 40 inflectional endings and 25 derivational affixes (p.112). Only the morphemes that concern TMA are here presented in Table 10-5.

The first child, recorded at 2;2, mainly spoke about the here-and-now and used the indicative to describe actions taking place at speech time (p.142). The first TMA morphemes are all expressions with narrow scope: prospective, perfect and obligation. The morpheme *ssa* is used in adult West Greenlandic for future tense and for expressing obligation, but at 2;2, it is used only for expressing obligation, also in combination with negation 'must not'. The form *nikuu*, in adult West Greenlandic used for perfect (π1) and for past tense (π2), is first only used to express perfect.

The second child, recorded at 3;1, had difficulty describing things that happened in the past as opposed to the present (p.151). He is cognitively able to refer to past events as he uses the causative mood once (which is adultlike) for referring to a past action: 'I sang it like this', uttered upon finishing singing a song. However, in general he is not able yet to relate past events to speech time by using a past tense affix (p.154). Like the first child, the second child uses aspectual suffixes and participant-oriented modality. The future marker *ssa* is now used for expressing intention of first person 'I will', which functions mainly like a narrow scope marker. The marker *niar* that can express prospective and future tense is only used for prospective (π1) at this age. The habitual or frequentative *sar/tar* is also used.

The third child, recorded at 3;4, 'was clearly better able to express purely temporal relations' (Fortescue & Lennert Olsen 1992: 167) He still mainly uses aspect operators and participant-oriented modality (both narrow scope operators), but tense markers are now also clearly present, just as an expression of event quantification. He uses for example *nikuu* for marking past tense (whereas it was first only used for marking perfect) and *niar* and *ssa* as real future tense markers. Note that *ssa* was used by the youngest child only for expressing the modal sense 'must' (π1), by the second child for expressing intention of first person 'I will' (π1/π2), and by this child as a real future tense marker (π2) (p.167). This development mirrors the diachronic development of future tense markers (discussed in 7.2.3) from modal marker, to expressing intention of first person to real future tense marker.

The fourth child, recorded at 4;7, mainly adds new distinctions within the participant-oriented modality domain. She is also the first child that uses operators with wide scope productively. She distinguishes between *nikuu* and *sima*: *nikuu* expresses experiential perfect 'have –ed' (some time in the past) which is classified as a tense marker by Fortescue & Lennert Olsen, but may also be used aspectually. As well as *nikuu*, *sima* can be used for perfect aspect but also for epistemic modality 'apparently'. This child consistently uses *nikuu* for the experiential past or perfect and *sima* for epistemic modality. *Sima* is not used as an aspectual marker (Fortescue & Lennert Olsen 1992: 189-90). It is not used with narrow scope, but immediately with wide scope.

Finally, the child recorded at 5;2 used more constituents in a clause, but his use of two-or three-affix word forms was limited compared to the fourth child. The only new affix he uses compared to the previous children is a marker of iteration (property quantification, π1) *qattaar*.

If the lists of morphemes for each individual child are taken to represent the general development of the TMA system in West Greenlandic, then the order of acquisition of TMA morphemes in West Greenlandic is in accordance with the predicted order in H6. At the beginning, mainly operators of aspect and participant-oriented modality, are used, both operators with narrow scope (π1). Then, some event quantification and tense markers (π2) come in. In a later stage evidential markers with wide scope (π3) are used. The development of different uses of *nikuu*, *niar*, and *ssa* is also in accordance with the predicted developmental path: first they are used with the meaning of aspect or participant-oriented modality and only later in the use of expressing tense.

In general, the acquisition of West Greenlandic supports the hypothesis. There is no stage in which the acquired TMA system has π2-operators but no π1-operators, or π3-operators, but no π2-operators. However, there are some details that are not directly expected, i.e., that the marker *sima* is used from the start as an evidential marker (π3) and not first as an aspectual marker (π1). This may be explained by the fact that its aspectual use is already covered by another marker *nikuu* that the children acquire at an earlier age. What goes against H7 is that West Greenlandic has an expression that functions both as a π1-operator (perfect) and as a π3-operator (evidentiality), but not as a π2-operator. At a certain stage, children will use this marker with both narrow and wide scope, but not with medial scope (like in adult West Greenlandic). A final detail that is counter to expectation is that, within the domain of quantification, operators with medial scope (habitual, repetitive, frequentative) appear before operators with narrow scope (iterative). For this, I have no explanation.

10.3.5 Finn-Oegric: Finnish

Finnish is a Finno-Oegric language, mainly spoken in Finland. It is an agglutinative language with an extensive case system. The order of suffixes on the verb and the categories expressed are presented in (5), with the usually unmarked categories between brackets (Toivainen 1997):

(5)

V –	DERIVATIVE –	VOICE –	MODALITY –	TENSE –	PERSON
	(neutral)	(active)	(indicative)	(non-past)	(3SG)
	reflexive	passive	imperative	past	etc.
	frequentative		conditional	non-past neg.	
	etc.		potential	past negative	

The relevant TMA expressions are presented in Table 10-6. The negative forms are constructed by an auxiliary *e-* with person/number inflection followed by the negative form for the main verb, i.e., the past participle for past tense, and the 2nd person imperative for non-past tense.

The construction for marking obligation in Finnish is very complex. The subject has to occur in the genitive case and the verb is constructed from the auxiliary *olla* 'be' and the main verb in the passive present participle, consider (6) (from Toivainen 1997: 110):

(6)

minu-n	*on*	*noste-tta-va*	*kaikki*
I-GEN	be: PRS:3SG	lift-PASS-PRS.PART	all

'I have to lift everything up.'

Table 10-6. Relevant TMA expressions in Finnish (based on Toivainen 1997: 104, 10)

Form	Author's definition	FG classification
-ø/ass.	Non-past	Non-past (π2)
-i	Past	Past (π2)
e-P/N + V-*ø*/ass.	Negative non-past	Non-past (π2)
e-P/N + V-*nut*/*nyt*	Negative past	Past (π2)
-isi	Conditional	Irrealis (π2)
ol-la 'be' + V-*nut*/*nyt*	Perfect	Perfect (π1)
ol-la + V-*tta-va*	Obligation	Obligation (π1)

Notes. ass. = assimilation to preceding vowel or following consonant; P/N = person /number inflection

The acquisition of Finnish is examined in Toivainen (1980; 1997) and Laalo (2003). Toivainen collected data of 25 children between 1;0 and 4;4, from on average eight 15-minute interviews with each child. The acquisition order was based on the first use of the particular forms in the interview. The age of acquisition reported was based on the average age at which the children first used the affix. See Figure 10-2:

Non-past (3p) 1;8	<	Neg. non-past Past (3p) 1;11	<	Non-past (1p) 2;2	<	Perfect (3p) 2;4	<	
Non-past (2p) Past (1p) Neg.past, 2;7	<	Perfect (1/2p) 2;9	<	Irrealis 2;10	<	Obligation Pluperfect 2;7 - > 3;0		

Figure 10-2. Order of acquisition of TMA expressions in Finnish (based on Toivainen 1980: 44, 181)

The first verb form, imperatives and non-past indicatives, combine with different lemmas. Only the basic form of the indicative is used at this age, which is the third person singular, a form used in child-directed speech also for first and second person. It is used for referring to present or immediate future events in the child's surroundings or to the child itself (Toivainen 1980: 44-46, 183). The past tense 3S, usually refers to the immediate past: *men-i* go-PAST (=it went, it has gone), or to a process that is still continuing during the moment of speaking or even in the immediate future. For example, *tein kauppaa* expressed 'I was making a shop', when the child is only just building it at that moment. Only a few children use the past tense form sometimes to refer to real past events. It is thus not used adultlike, but it is in clear opposition to the present tense forms (p.66-71, 183). It is not discussed at what age the past tense form is used adultlike. The first negative forms often occur without a main verb, like 'doesn't/didn't' in English.

When the perfect comes in, it denotes, in contrast to the past tense, an event which is more distant in the past but its effect is to be seen in the present moment (p.187). The pluperfect is sporadically used from 2;7 but it is not yet acquired fully, i.e., by all 25 children, at age 3;0. The complex construction for expressing obligation is attested only at 2;7 in one of Toivainen's children. However, according to Laalo (2003: 337) the less complex construction with the verb *saa* 'gets' in the negative construction *ei saa* is used to express 'must not' at 1;8 already.

Laalo (2003) investigated first contrastive uses in the longitudinal and diary data of two children (1;7-2;1). Like in the study of Toivainen, the first verbs are the 2S imperative and 3S present indicative. The early past tense forms are formulaic: *tippu* 'fell' is typically used when food or toys have fallen on the floor and *loppu* 'end(ed)' when the food has all been eaten up (p.330). First contrastive uses are between past and present tense forms. One of the children contrasts a past tense with a present for the first time at 1;7, when playing with toy animals, saying *puskee* /pukkee/ 'butts' and *puski* /pukki/ 'butted' (p.332). The other child contrasts the past and present tense even at age 1;6. He uses *tippu* 'fell down' versus *tippuu* 'falling down', 'when porridge was continuously dropping from a spoon onto the tablecloth' (p.339). This child soon uses the opposition 3S indicative present and past frequently and at age 1;7 he has many two-member miniparadigms consisting of the 3S present and past tense forms: 'throws'/ 'threw', 'falls'/'fell', 'puts'/'put', 'is sleeping'/'slept', 'is'/'was', 'covers'/'covered', 'butts'/'butted', 'strips'/'stripped', 'takes away'/'took away' (p.334). At 1;8, 22 lemmas are used contrastively of which especially the use of 'remembers' vs. 'remembered' seems precocious (p.335). Also at the age of 1;8, the first contrastive use with a past participle occurs: 'eat' is used in the present, the past and as a past participle 'eaten' (p.338).

In Finnish, past and present tense forms are thus acquired remarkably early, before other forms. Slightly later, perfect aspect is used. Although the adult complex expression for obligation appears late in child language, a more simple expression to denote obligation is used very early. Irrealis expressions occur only at 2;10. This order of acquisition does not support the hypothesis, in that the early use of past and present tense forms is counter to expectation. However, the use of these forms is not yet adultlike in that they are limited to referring to past events in the immediate past.

10.3.6 Indo-European

10.3.6.1 Baltic: Lithuanian

Lithuanian is a Baltic language, closely related to the family of Slavic languages. It is a synthetic language with verb inflection for mood and tense. There is a three-way mood distinction between indicative, conditional and imperative and a three-way tense distinction between present, past and future. Besides inflectional marking of tense, there are periphrastic (compound) tenses with many different participles, but unfortunately, their function in adult Lithuanian is not discussed. Aspectual distinctions between imperfective and perfective are marked by pre- and suffixes. However, the opposition between perfective and imperfective verbs is not systematic and is considered semi-grammatical as the

lexical meaning may be modified by prefixation, for example *dėti* 'put', *pa-dėti* 'put down' or 'help'. There is also a habitual or frequentative past, but it does not occur in early child language (Wójcik 2003: 401-03, 19, fn 3).

The acquisition of Lithuanian in one child is described in Wójcik (2003).The child was recorded between 1;7 and 2;5, but Wójcik's analysis concentrates on the first contrastive use of inflections between the age of 1;7-1;10. It appears that the child tends to leave out prefixes or to use fillers instead. At 1;7, the child uses present and imperative forms. The verb *mokėti*, 'can' is the only verb used with different person endings in the present tense (1sg, 2sg, 3sg/pl). At 1;8, infinitives appear and at 1;9, the first uses of future, past and participles occur. At this age the suppletive forms of *būti* 'be' are used contrastively, the negative form *yra*, the third person present *nėra*, the third person future *bus* and the third person past *buvo*. Several verbs are used with different person inflections, including the verb *norėti* 'want', but there are no temporal contrasts yet for non-suppletive verbs. At 1;10 conditionals emerge but they are very rare and restricted to third person. At this age, the first regular tense oppositions occur: 'walk/go' and 'fall' are used in present, future and past tense, 'sleep', 'go (by a vehicle)', 'build/put on' and 'put' in present and future tense, and 'peel' is used in future and past tense. Periphrastic constructions with participles (compound tenses) were not productive yet at the end of the recordings (2;5).

In sum, the acquisition of Lithuanian is partly in accordance with the hypothesis: participant-oriented modality ('can' and 'want') is acquired as one of the first TMA-expressions, although it is not clear whether these verbs are lexical verbs or auxiliaries. What is not expected from the hypothesis is that tense distinctions are acquired so early; already at 1;10 several verb lemmas are used contrastively with different tense inflections. At that same age, aspectual prefixes and compound tense forms are not yet used productively. Unfortunately, there is no information available on the contexts in which children use the forms or for what purpose. It is thus unknown whether children use their TMA forms with adultlike functions.

10.3.6.2 Germanic: Dutch, German, Swedish

The languages of the Germanic subbranch of the Indo-European family, including English, belong to the best-studied languages in the world. TMA expressions in different Germanic languages are very similar. Table 10-7 presents the most important TMA expressions for English, Dutch, German and Swedish. All Germanic languages have inflectional past and non-past markers; there is a substantial group of relatively frequent verbs that have irregular past and past participle forms. The use of simple past tense forms varies across languages: in English, it is the default form for expressing past

time, whereas in German its use is mainly restricted to modal verbs and copula. The different semantics are indicated by the symbols # and * in Table 10-7.

The perfect or resultative construction 'have' or 'be' + past participle is present in all languages, but its semantics differ. In English and Scandinavian languages it is aspectual, expressing the post-state of an event; in Dutch, it has aspectual functions, but it can also be used purely temporally; in German, called the Perfekt, it has become the default expression for past tense, although in combination with telic verbs it still has a resultative or perfect interpretation. Swedish has two different participles: one in *–d* that combines with *vara* 'be' called the perfective participle and one in *–t* that combines with *har* 'have', called the supine. The former is used to indicate resultative, the latter to indicate perfect.

Progressive aspect is only obligatorily expressed in English, by *be –ing*. In contexts where English uses the progressive, all other Germanic languages can use the simple present or an optional progressive construction if the speaker wants to stress that the event is ongoing. The future tense is in all languages expressed by an auxiliary. English and Dutch have a construction 'go' +

Table 10-7. Relevant TMA expressions in four Germanic languages

English	Dutch	German	Swedish	FG Classification
-ed	*-te/-de*	*-te*	*-de*	Past (π2)
-ø/s	*-ø/-t /-en*	*-ø/-s/-t /-en/-t*	*-r*	Present (π2)
be/have + –ed#	*zijn/hebben + ge-V-t*#/*	*sein/ haben + ge-V-t*#/*	*vara + V–d*# *har + V–t*#	Resultative (π1) + perfect#(π1) or past* (π2)
will + INF*	*zullen* + INF*	*werden* + INF*	*skola* + INF#	Prospective# (π1) or future (π2) + prediction (π3)*
going to + INF#	*gaan* + INF #/*	-	*kommer (att)* + INF*	Prospective# (π1) Future* (π2)
be –ing	*zijn aan het / zit/sta/lig te* + INF	*sein am* + INF	*håller på / sitter / ligger och* + *V*-FIN	Progressive (π1)
wanna	*wil*	*will / mag*	*vill*	Disposition (π1)
must	*moet*	*müss*	*måste*	Entailment (π1/π2/π3)
may#	*mag*	*darf*	*får*	Potentiality (π1/π2, π3#)
can	*kan*	*kann*	*kan*	Potentiality (π1/π2/π3)

infinitive, but the uses are rather different. In English it functions as a real prospective aspect marker, without any selection restrictions. The Dutch expression can function either aspectually, for marking inchoative or prospective, or as a future tense marker, restricted to nonstative verbs. In Swedish, the construction *skola* + infinitive has intentional or prospective use, whereas the periphrastic construction *kommer* (*att*) + infinitive is used as a pure future marker (predictive future).

All Germanic languages have different types of modality, expressed by auxiliaries, which in some languages (Dutch, German) also function as lexical verbs. They can function with different scopes. English is the only language that has 'new' emerging modals like *wanna*, *gonna* and *hafta*.

Developmental orders in Germanic languages that would support the hypothesis would be the acquisition of aspect before tense and the acquisition of participant-oriented modality before other types of modality and before tense. This was in fact the attested order of acquisition in English in Chapter 8. English is not further discussed in this chapter, as it was fully covered in Chapter 8.

Dutch

The TMA expressions in Dutch were presented in Table 10-7. There is a considerable number of studies on the acquisition of Dutch that cannot all be discussed here. I restrict the discussion to a few major studies based on longitudinal data. An overview of the acquisition of Dutch is described in De Houwer & Gillis (1998). It is based on longitudinal (more than 30 subjects) and cross-sectional data from children between 1;0 and 3;11. The first stage of the acquisition of Dutch verbs is characterized by a preponderance of lexical verbs as root infinitives, as in (7) and (8) (adapted from Blom 2003: 240, 242):

(7) Situation: Peter (2;0.28) wants to have his dog
Peter woef hebb-en
Peter dog have-INF
'Peter have dog.'

(8) Situation: Abel (2;7.15) is drawing a hand
Ik een hand teken-en
I a hand draw-INF
'I draw a hand.'

Unlike lexical verbs, copula, auxiliaries and modal verbs are immediately acquired in finite form, which is similar to the acquisition of German. They come in around age 2;0 and are at first used without an infinitive. At the same age, present tense singular forms (*-ø* and *-t*) and bare past participles (without the auxiliary *hebben* 'have') are used.

Although much is known about the acquisition of forms in Dutch, the contexts of use have not been very well investigated and it is not clear at what age Dutch children acquire tense distinctions. The first finite main verbs are for the majority in the present tense and do not contrast to past verbs. The perfect construction in adult Dutch has aspectual and temporal use, referring either to a present state that results from a previous event (perfect), or referring to an entire event in the past (perfective past). According to Haeserijn et al. (1997: 12) the exact distinction with the simple past form in Dutch is not very well examined, but it is probably a distinction in imperfective and perfective viewpoint. The simple past relates the event to a specific moment in the past, but may also be used for habitual past. It is mainly imperfective in aspect or neutral. The perfect construction is used for single events in the past or for past events that are not linked to a specific moment and is mainly perfective in aspect. Children use the bare past participle rather frequently but the contexts of use are not very well investigated. The simple past form occurs rarely with lexical verbs before the age of 4;0 and is used mainly in contexts of pretend play to indicate irrealis. Future reference seems to occur before past reference: already between 2;0 and 2;6 the construction *gaan* + infinitive is used for prospective/inchoative or future meaning. Complex verb phrases occur around 2;6: past participles are now mostly accompanied by an auxiliary and modals occur in combination with an infinitive form. The use of the future auxiliary *zullen* is rare under age 4;0 and the past perfect is acquired after 4;0.

Gillis (2003) carried out a study on contrastive use of verb forms in Dutch in the speech of one girl. The first occurrence of verb forms for this girl follows the order: bare stem (1;5) < infinitive (1;6) < present tense *-t* (1;9) < past tense (1;10) < past participle (2;1) < present tense plural (2;4). Around 2;0 the present tense *-t* for the third person singular and the past participle occur with an increasing number of verbs: at 2;5 the past participle occurs with the greatest variation in lemmas (nearly 20), although the infinitive form occurs in about 70 different lemmas. The bare stem and present tense *-t* occur with slightly fewer lemmas and the simple past tense occurs with less than five different lemmas. The first modal verb is already used at 1;5: *kan niet* 'can't'; it is the only modal up to 1;10 and only at 2;0 it is used in combination with an infinitive verb *kan* + *bijten* 'can bite'. At 1;10 *willen* 'want' is the second modal that comes to be used, at 2;0 the copula *zijn* appears and at 2;1 the auxiliaries *gaan*, *moeten*, *hebben* and *zijn* are used frequently in combination with an infinitive verb. The first

TMA contrast is between present versus present perfect/past participle from 2;1, two months ahead of the contrast between present and past tense (2;3).

The work of Rozendaal (2001) gives insight into the use of past tense forms,. She examined the correlation between lexical aspect and past reference in Dutch and found out that there is a strong correlation both in input and in child language between perfect forms and telic situation types (57% in the input, 75% in child language), whereas other verb types combine with telic verbs in 29% (input) and 32% (child language) of the cases. The situation for the simple past is very different. It is often used with (modal) auxiliaries and with *zijn* 'be' and *hebben* 'have', both in the input (52% of all tokens) and in child speech (71%). Of the lexical verbs with simple past marking, 68% is atelic in the input, and 76% in the children's speech. There is thus a clear distinction in the use of the perfect and the simple past form: the former is mainly used for describing telic events in a perfective way, the latter mainly used for atelic events, in an imperfective or aspectually neutral way.

Blom (2003) investigated the use of Root Infinitives (RIs) in child Dutch. It was found that temporal reference for RIs was free, that is, the utterances could refer to past, present and future events, although the percentage of past references was less than 5%. Further, the majority, approximately 75% of all RIs, had a modal interpretation. The modal senses involved in these constructions are all participant-oriented.

> Modal RIs nearly always expressed intentions, dynamic necessity (wishes and desires) or deontic necessity (commands). With their modal P[eriphrastic] V[erb]s, all children introduce dynamic and deontic possibility, denoting abilities and permission, respectively. (Blom 2003: 197)

Hoekstra & Jordens (1994, cited in Blom 2003: 151) found in the data of one girl at 1;10 and 1;11 the modal expressions *magnie* 'may not', *kannie* 'cannot', *nee* 'no' / 'want not', *minne* 'want' and *wil* 'want'. These are all participant-oriented modal uses (π1). The forms seem to be unanalyzed, but are clearly used to express modal notions.

Blom detects an early correlation in early child language between form and lexical aspect. RIs are mainly used with dynamic verbs; only 4-18% of the RIs is stative, whereas 42-63% of the finite main verbs is stative. Of the first finite forms 75% is an auxiliary (without an infinitive) like *kan* 'can', *wil* 'want', *moet* 'must', *mag* 'may', *gaat* 'goes', *komt* 'comes' or *is* 'is' and only 25% is a lexical verb (*past* 'fits', *zie* 'see', *zingt* 'sings', *rink* 'jumps', *heet* 'is called', *hoor* 'hear', *valt* 'falls', *zit* 'sits', *eet* 'eats'. The first finite verbs are rote learned, and do not yet show signs of productive inflection. A similar pattern occurs in the input: 89% of the finite verbs is stative and only 3% of the infinitives.

According to Blom's analysis (2003: 201-2, 33) Dutch children acquire the aspectual contrast between completed and non-completed first around 2;0 and

express the former with past participles and the second with RIs. Second, from circa 2;4, they acquire the contrast between realis and irrealis: realis is expressed with present tense verbs for ongoing events and irrealis is expressed with periphrastic verb constructions for referring to possible or necessary future events. Although there is inflection yet, according to Blom, it only marks person/number, but not yet tense. All simple past forms are highly frequent, irregular verbs, such as *wou* 'wanted', *was* 'was', *deed* 'did', *had* 'had', *ging* 'went', *zat* 'sat'. Finally, after about 2;9, the contrast between past and non-past is acquired, the former expressed by the present tense inflection, the latter by the simple past, both on verbs in second position.

To recapitulate, although the **forms** for present tense and perfect aspect are acquired around the same time, the acquisition of Dutch TMA **functions** supports the hypothesis that aspect is acquired before tense. First of all, the past participle used to express perfect aspect or perfective past (π1 and π2) is acquired before the pure past marker for past time reference (π2), and the aspectual/temporal construction *gaan* + infinitive used to express inchoative or prospective and future (π1 and π2) is acquired before the construction *zullen* + infinitive for future time reference (π2) and prediction (π3). These forms are used in contrast to the non-past inflection, which is mainly used to refer to ongoing events or situations. According to the functional analysis of Blom, which is in agreement with the other sources, the first semantic distinctions that children make seem to be aspectual (completed versus non-completed, π1), the next distinction is between realis and irrealis (π2) and the final distinction is between past and non-past tense (π2). Furthermore, there is evidence that modal verbs occur early on, initially in participant-oriented use (π1), modifying the predicate, only later in epistemic use (π2/π3) (there is no information available at what age epistemic modality in Dutch is expressed).

German

The TMA expressions of German are presented in Table 10-7. An overview of the acquisition of German is described in Mills (1985). It is mainly based on diary data. Like in Dutch, the first stage of German is characterized by frequent use of root infinitives. Finite verbs are restricted to formulaic utterances such as *schmeck-t* from *es schmeckt* 'it tastes good', in answer to the frequent adult question on presenting food: *schmeckt's*? 'does it taste good?'. In the two-word stage most verbs are still in the infinitive form, although present tense forms and past participles are sometimes used. Auxiliaries and modal verbs are occasionally used at this stage. Gradually, the use of finite verbs becomes more frequent, auxiliaries and modal verbs are used more often and the regular form of the past participle is overgeneralized to irregular verbs. The simple past appears later than the past participle/perfect construction, and also here,

regular inflection is overgeneralized to irregular verbs. Around age 3;0 the auxiliary is used in the Perfekt construction (*haben* 'have' + past participle) and the future tense *werden* + infinitive begins to be used.

A study particularly dedicated to the acquisition of temporal reference in German is Behrens (1993). This study explores the relation between the development of the concepts of time and the linguistic encoding of time. Behrens (1993: 51-52) concentrates on four questions:

1. What is the order of emergence of tenses?
2. Do children refer to non-here-and-now situations before the onset of productive tense inflection?
3. Do infinitival and noninfinitival forms encode a semantic contrast?
4. Is the use of first past markers conceptually or semantically restricted?

These questions are investigated in the longitudinal data of four children and diary data of three other children. Overgeneralization and morphological contrast between single verbs are taken as criteria for productivity, since they show that a child is building up inflectional paradigms. Modal, main and copular verbs are analyzed separately to see whether there is a difference.

Behrens' findings are in line with Mills (1985): before the age of 2;0, children go through a nonfinite phase with mainly infinitives[4] or bare stems. There are a few finite verbs that are restricted to specific lemmas: children use unanalyzed constructions. In the next phase, from about 2;0, children start using main verbs in the present tense or as past participle, and modal verbs and copulas in finite form. The emergence of copula with nonverbal predicates is one of the clearest indications that finiteness develops. Children use more than one form per verb now, but the acquisition of finiteness is a gradual process: for a long period, finite and nonfinite forms co-exist. Around age 2;6, children acquire the auxiliary for the Perfekt, the past copula and the simple past tense. Later constructions are the pluperfect, the future and the subjunctive. These are structurally not more complex, but they are infrequent in the input and not of great importance when talking about the here-and-now.

In sum, the acquisition order of verb forms depends on the type of verbs. For main verbs the order is: nonfinite < present tense / past participle < Perfekt (with auxiliary) < preterite < Pluperfekt / future < subjunctive/passive. For modal verbs and copula the acquisition order is: present < preterite < Perfekt < Pluperfekt / future < subjunctive/passive. For main verbs, the complex past tense is thus acquired before the simple past, whereas for modal verbs and copula the simple past is acquired before the complex past. This

[4] Except for one boy who is a holistic learner. He starts out with finite unanalyzed constructions.

reflects the distribution in the input: main verbs are mainly marked for past tense by the Perfekt, whereas modal verbs and copula are by default marked by the simple past. The absence of root-infinitive use of modals and copula also reflects the pattern in the input: they rarely occur as infinitives.

Behrens also investigated children's reference to the non here-and-now, specifically to absent objects and to non-ongoing events, in order to explore the development of the concept of time. At a very early age, children show anticipation of forthcoming events based on their knowledge of standardized routines. One of the children, for example, opens her mouth at age 0;4 when a spoon comes close in anticipation of food. The expression of intention and commands may also be considered as reference to immediate future events, since it is the expression of a present desire that the event will be fulfilled in the near future. It can therefore be viewed as the root for future tense marking (Harner 1982, cited in Behrens 1993: 123). From 1;2, children express commands and intentions; they use object names and adjectives in a volitional function, they use words for expressing the wish for recurrence, such as *weiter* 'further', *andere* 'another', *mehr* 'more', *mal* 'again'. Children also use adverbs or particles to encode the right boundary, i.e. the end of an event, if they want the event to be finished or completed. Examples of adverbs are *so* and *alle*, 'all gone, finished' and isolated particles that encode resultativity or a change of state, such as X *rein*, X *an*, X *zu*, X *aus* 'in, on, close, out'.

Also in the one-word stage, memory of past events occurs. Children talk about past events, but they do not yet encode it linguistically. These uses are mainly in scaffolded contexts, when being asked about it, but they also talk about past events spontaneously. Behrens (1993: 120) provides a convincing example from the Stern diary data (here in (9)) where the father provides a scaffolded temporal frame in which the child semantically refers to previous (c, d) and subsequent events (b, e, f, g, h, i), without mastery of linguistic means for marking them:

(9) Situation: Hilde (2;0.19) enters the room to say 'good night' to her father (= FAT). He interrupts his work and asks: 'What do you want to say to me?'

a. HIL: *Nacht* 'night'
   FAT: *Wo gehst du hin?* 'Where are you going to?'
b. HIL: *Bett* 'Bed'
   FAT: *Wo bist du gewesen?* 'Where have you been?
c. HIL: *Ba* 'For a walk'
   FAT: *Wo hast du "Ba" gespielt?* 'Where did you play 'walk'?
d. HIL: *Pielen Sand* 'play sand'

	FAT:	*Was wird die Mama jetzt machen?*
		'What is Mom going to do now?'
e.	HIL:	*Anzieh* 'dress'[= undress me']
	FAT:	*Und was noch mehr?* 'And what else?'
f.	HIL:	*Rumpel rumpel* [i.e., drying off after washing]
g.	HIL:	[then Hilde demands] *Papa thun* 'daddy do'
		[= daddy shall wash her]
	FAT:	*Und dann?* 'and then?'
h.	HIL:	*Waschen* 'wash'
	FAT:	*Wohin soll Dich Papa setzen? Auf die - ?*
		'Where shall Daddy put you? Onto the -'
i.	HIL:	*Wickelemode* 'baby's dressing table'

Behrens (1993: 127)shows that children have a variety of non-here-and-now references before tense marking is productive, mostly 'closely tied to experience' with 'the present moment as vantage point'. She demonstrates that 'children have a rudimentary temporal orientation'; they remember prior events and use their knowledge about event sequences to anticipate. This clearly shows that children have cognitive representations of past and future events, before marking it linguistically. Hence, cognition is not a sufficient condition for language development, as cognitive abilities for temporal reference precede linguistic encoding of it with a considerable time gap.

As for the semantic function of infinitival and non-infinitival forms, it appears that infinitives are used for all types of reference. They are temporally neutral and do not locate the event on the time line. Finite forms in contrast are used in an adultlike way from the start. Rather than a change in the relation between form and function, there is an increase in grammaticality during language acquisition. Between 1;9 and 2;7, a child expresses intention and commands and refers to simultaneous, anterior, future and non-actual events; the types and proportion of reference domains do not clearly change over age, but target forms steadily replace non-target forms. When a new form is acquired, existing form-function relationships continue to exist and the child enlarges her formal repertoire to express temporal notions. There is no one-to-one relation between form and function: reference to simultaneous events, for example, is made by infinitives, and present tense of modal and main verbs. Immediate future is referred to by infinitives, imperative, and present tense of main and modal verbs.

The question remains with respect to the use of past tense markers whether they are conceptually or semantically restricted. Behrens (p.169-78) concludes that children have a preference for combining past tense with telic events (which often yields a perfect or resultative meaning) and that the use of past

tense to refer to states and activities increases with age. However, children never restrict the past tense to telic verbs or to resultative events; their past forms also refer to remote past and non-actual events (fantasies, stories). Therefore, the correlation of past tense and telic, resultative events could be the result of children's interest in these topics, rather than a semantic restriction or conceptual constraint. 'The proximal and often causal relation between past event and present moment may help the child to identify the function of past tenses.' (p.178). According to Behrens, the past participles (and later the Perfekt) are thus used aspectually and temporally from the beginning. The acquisition of the auxiliary in the Perfekt construction is the completion of the morphological system, rather than the acquisition of a newly available temporal concept (Behrens 1993: 169, 76, 85).

The emergence of contrastive use of German verb forms is examined in Bittner (2003) in the longitudinal data of two children (1;6-2;2). The development is similar to the description in Mills (1985). First contrastive uses occur around 1;11 between the infinitive, the present tense *–t*, the bare stem (for imperative or 1p present) and the past participle. Around 2;0 there is overgeneralization of *–t* (the suffix for the past participle) in contexts related to an outside perspective or perfectivity (Bittner 2003: 75). Bittner doubts whether this can actually be overgeneralization of the past participle form because the children have only used a few target regular forms of the past participle.

From 1;8 and 1;11 the two children use modal auxiliaries, at first without infinitives. At 2;0 they both use several modal auxiliaries in different forms (*muss/ müssen* 'have to', *soll/sollen* 'shall', *darf* 'allowed to', *kann* 'can', *mag/möchte* 'like/would like' and *will/wollen/wollte* 'want') and they rather frequently combine modal auxiliaries with infinitives. Around the same age, both children have started to use different forms of the copula *sein*. One child has already used *ist*, *sind*, *war*, *waren*, 'is, are, was, were' and at 2;0 *sein* 'be' and the other child *ist*, *bin* (1p), *sind* and *war*. This second child is already using the present forms of *sein* consistently, however 'no recurrent use of the past tense forms is attested in her data' (2003: 66).

Although by 2;2 inflections have become more frequent and are combined with more different verbs, most verbs (60%) only occur in one form and root infinitives are still frequent. Bittner concludes that 'the children have not yet established the target categories of the present tense paradigm. What has probably been established is the relation of certain verb forms to very general or basic perceptual features, i.e. pregrammatic form-meaning relations.' (2003: 73)

Bittner assumes that the first verb forms are rote-learned and stored as separate linguistic items. This probably continues for new lemmas and new verb forms for a long time but simultaneously:

> the most frequent inflectional types are analysed and mapped according to perceptual features from which grammatical oppositions start to dissociate (…) the child accumulates forms of the type it was becoming familiar with by rote-learning' and the mapping of forms to contexts and situations becomes more easy the more instances are already stored. (Bittner 2003: 79-80)

In conclusion, it is debatable whether the predicted order of acquisition, π1-operators < π2-operators < π3-operators, is completely supported by the acquisitional data on German. It depends on the interpretation of the early present tense and, in particular, the past participle forms. From Behrens' viewpoint, the forms are aspectual **and** temporal from the start, whereas Bittner claims that the participles express perfectivity (perfective aspect). Modal verbs appear around the same time and express participant-oriented (π1) notions at first. There are no reports on the acquisition of epistemic modality (π2, π3) but they do not seem to occur in the speech of young children.

Swedish

The TMA expressions in Swedish were presented in Table 10-7. An overview of the acquisition of Nordic or Scandinavian languages[5] is presented in Plunkett & Strömqvist (1992). I concentrate on their data presented on Swedish, mainly based on the longitudinal data of two children and on earlier research on Swedish language acquisition. The longitudinal data show that the present and the past participle emerge around 1;10 and the past tense a few months later around 2;0. Plunkett & Strömqvist (1992) remark that generally in Mainland Scandinavian languages (Danish, Norwegian and Swedish), the first verb inflection is the present tense suffix, slightly before the past participle which in turn emerges considerably earlier than the past tense suffix. They claim (1992: 475) that the past participle encodes resultative aspect, which makes this form 'more relevant to the current situation than the past'.

In Swedish, the generic pronoun *man* emerges first in modal contexts such as possibility *man kan*… ('one can…'), obligation *man måste*… ('one has to…'), prohibition *man får inte*… ('one must not'), and in conditional contexts such as *om man skär*… ('if one cuts…') (Plunkett & Strömqvist 1992: 478). These uses express norms and values of social society, in FG classified as deontic event-oriented modality (π2). Unfortunately, Plunkett & Strömqvist do not report at what age these constructions occur and they also do not present information on the acquisition of other modal expressions and future reference.

A study specifically oriented towards the acquisition of tense in Swedish is Christensen (2003). The proposed model of the acquisition of tense was already discussed in the introduction to Part III. The main point was that Christensen

[5] Scandinavian is the subbranch of Germanic languages to which Swedish belongs.

assumes that the temporal information conveyed in the grammatical tense system is vague and incomplete. The speaker specifies the exact temporal reference point deictically, anaphorically or explicitly. Deictic specification rests on deictic or pragmatic factors present in the discourse space and is extra-linguistic. Later on, the child acquires linguistic forms to specify the temporal location, by anaphoric specification in a temporal clause and by explicit time adverbials (see the examples in the introduction to Part III).

Christensen examined the acquisition of TMA in extensive diary studies of two boys. The acquisition of verbs starts with a root infinitive stage that lasts from about 1;6 up to 2;1. Between 2;0 and 2;3 inflected forms come in: the children now use infinitives, nonfinite supines (past participle, see Table 10-7), finite present and past tense. Slightly later modals without an infinitive—with an implied main predicate—are also used, mainly *kan inte* 'cannot' and *vill inte* 'don't want'. Between 2;2 and 2;5 children start using modals with subordinate infinitives: *kan* and *vill* are acquired before *ska*. Between 2;4 and 2;7 the full perfect, with correct use of the auxiliary is acquired. The order of acquisition according to Christensen is: infinitive < present/supine/past < modals without INF < present copula < *kan* / *vill* + INF < intentional future (*ska* + INF) < full perfect (*har* + SUP).

In the root infinitive stage (1;6-2;1), the (temporal) relation between the utterance and the referential event or situation is not linguistically marked and can only be pragmatically deduced. The root infinitives are, however, used to refer to three different relations between utterance and time of the event. First, the most frequent reference is to an intentional, deontic or immediate future: the child refers to something he wants to do himself or he wants someone else to do. Second, the child refers to an ongoing activity. Third, the child refers to a past event that is recent or remote, resultative or non-resultative. In this stage, a child also refers to current states, however not by root infinitives but by nonverbal predicates without a copula or by modals. On the basis of distinct temporal references, Christensen (2003: 45) claims that there are semantic tense categories yet that precede formal tense categories.

When inflections first are used (2;0-2;3) reference to intentional/deontic future (= prospective) is linked to *ska* + INF or to the imperative. Children refer to ongoing activities by the simple present, as in adult Swedish. Current states are described by a nonverbal predicate in combination with a copula, by state verbs in the present tense, or, most frequently, by modal verbs (like in adult Swedish). The present tense is not yet used for future tense reference or for marking habitual or generic situations. Reference to past events is marked by the supine or the past tense and there is some differentiation in use. The root supine, and later the full perfect, is used for resultative past, typically with an accomplishment or achievement verb.

> The event referred to can be recent or remote, but its most characteristic property is that it has a stable and obvious result or outcome (or more general: a post state) which remains at the time of speech, for instance as a property of quality in an object or person, which has undergone the resultative event in the past (…). (Christensen 2003: 49)

An example of resultative past is presented in (10) (ex. 40, 2003: 50):

(10) Situation: H (2;0) talking about a toy motorbike, which has been outside in the snow and now is wet, standing in the bathtub to get dry.

cykel,	*duffît*	
cykel	dusch-it	(target form: duscha-t)
bike	take.a.shower- SUP	

This example shows that:

> H can derive an earlier event from a current post state. The bike is wet, standing in the bathtub to get dry. But he draws the jocular conclusion that it has been taking a shower, though he himself had been playing with the bike in the snow. (Christensen 2003: 50)

The perfect is typically used when a previous event has caused a certain result. It is most frequent when the event that lead up to the result was observed, but also when it was not observed. An example of a visible poststate or result of which the preceding event in the remote past is inferred and not observed is presented in (11) (ex. 48, 2003: 51):

(11) Situation: B (2;3) sees that there is new gravel on the playground

Nån	*a:*	*latt*	*gus*	*dä* (B at 2;3)
Någon	ha-r	lag-t	grus	där
Someone	has-PRS	put-SUP	gravel	there

Only in a few cases is the perfect used with atelic events, such as 'mummy has been sleeping', when the child's mother has been taking a nap during the day.

Children use the simple past tense also to describe poststates, like in adult Swedish, and in this use, the communicative difference with the perfect is minimal. The simple past marker is, however, also used in specific cases: when the event is in the remote past, clearly unbounded (atelic) or nonresultative, then the past tense is the only possible marker. Recent past events—within the same pragmatic situation, before the time of speech, but within wider discourse space—that are nonresultative are also primarily marked by the simple past, consider (12) (ex. 53, 2003: 53):

(12) Situation: a bell on a toy train has given a short ring.

de	*vingade*	(B at 2;1)
det	ringa-de	(target form: ring-de)
it	ring- PAST	

When an event is located in the remote past—the day before the utterance or earlier—in adult Swedish, the temporal location is normally anaphorically or explicitly specified. The children in Christensen's data, however, have not mastered these types of temporal specification before about 2;6, although they do refer to remote past events, either by a root infinitive of by the simple past, consider (13) (ex. 62, 2003: 55):

(13) Situation: B (2;3) sees a blanket that he and H. have used the day before when they were pretending to be ghosts.

vi	*lekte*	*spöke*
vi	lek-te	spöke
we	play- PAST	ghost

Past tense forms are at this age not yet combined with stative verbs. Christensen (2003) claims that:

> Utterances with reference to the remote past are normally triggered—and made interpretable—by extra-linguistic factors, for example a similarity, regarding an object, person, or the place etc., between the situation at the time of speech and some preceding situation. (…) In [(13)] a certain object which was involved in the remote past activity triggers the utterance. The conclusion must be that remote past at this stage is deictically specified. The pragmatic connection between the situation at the time of speech and some past event makes the utterance temporally interpretable—but only to an interlocutor who shares the past experience with the child. The child has no means to establish the connection between 'now' and 'then' linguistically. (p. 55-56)

According to Christensen (p.56) the child's lack of linguistic specification of temporal location of remote events 'delimits his ability to freely speak of previous events and situations.' In my view, however, the child is at this age not yet concerned with temporal location—he does not have the ability to infer what information his interlocutor needs to understand him—and the restricted reference to remote past events is a consequence of his limited memory that depends on clear triggers rather than on his limited linguistic capacities.)

Children now also refer to potential or nonfactual situations, the meaning of it coming close to habitual or generic meaning. These utterances in general contain the generic pronoun *man* 'one, you', as in (14) (ex. 35, 2003: 48):

(14) Situation: all sentences uttered on the same occasion, while H (2;1) is examining the washing machine.

Man kan	*tycka*	*knappen;*	*man kan*	*skua*	*dä;*
Man kan	trycka	knapp-en;	man kan	skruva	där;
You can.PRS	push.INF	button- DEF;	You can.PRS	screw.INF	there;

man kan	*öppna,*	*tänga*
man kan	öppna,	stänga
You can.PRS	open.INF,	close.INF

Utterances like (14) occur before the simple present is used for expressing generic or habitual states. Their meaning is similar to participant-external event-oriented modality (π2) discussed in 4.2.3.1 and 4.2.3.2. There is hardly any information in the literature on the acquisition of event-oriented modality (π2) but these data on Swedish suggest that this meaning occurs slightly later than the meaning of participant-oriented modality (π1) but before epistemic uses (event- or proposition-oriented (π2 or π3).

During the basic stage, that ends around 2;6/2;7 children learn to match grammatical forms and the basic temporal types. After this stage, children learn to specify the temporal location anaphorically and explicitly. They develop the capacities to order events in a chronological sequence and to relate different events in a narrative. The first uses of explicit temporal specification emerge, by adverbs that directly relate to the utterance time such as *nu* 'now' and *snart* 'soon', *sen* ' later' and *igen* 'again'. Children start using explicit specification for remote past events, but at first in a very vague and imprecise way. The first adverbial that exceeds the here-and-now is *igår* 'yesterday'. It comes in around 2;4 and is first used to establish a nonspecific point in the remote past, so often not 'yesterday' at all. The location in time is still very inexact and needs a lot of mutual knowledge to be understood.

Anaphoric specification emanates from two juxtaposed clauses, in which the one clause is temporally related to the other instead of to the time of speech, consider (15) (ex. 66, 2003: 60):

(15) Situation: B (2;5) pointing at the cupboard, meaning that he wants to go inside it when he has finished his meal.

ja	*ka*	*gå*	*in dä*	*ja*	*ätit*
Jag	ska	gå	in där	jag	ät-it
I	will.PRS	go.INF	in there	I	eat-SUP

These juxtaposed clauses are precursors to adult matrix clauses with a subordinate *when*-clause (*när*). They appear first at 2;7 and are quite frequent around 3;4. (ex. 69, 2003: 60):

(16) Situation: H (2;10) talking to his mother, while looking in an advertisement for toys, where he can see a Barbie-doll.

sån	*hade*	*du*	*nä(r)*	*du*	*va(r)*	*liten*
sådan	ha-de	du	när	du	var	liten
such	have-PAST	you	when	you	be-PAST	little

When the *when*-clauses emerge, the child becomes able to relate events or states to each other linguistically and he can now introduce temporally remote topics in the conversation in such a way that his interlocutor can identify them. The temporal specification is much more exact than the early use of adverbs like 'yesterday'. It is in the *when*-clauses that the present is first used to express future—'Will you work daddy when we sleep?' (B 3;3)—and to express generic situations—'Do the knights spill on their clothes when they eat?' (B 3;3) (ex. 71 and 72, 2003: 60). Explicit and anaphoric specification are acquired between 2;6 and 3;0. This information is important to 10.5.2.2, when the universal acquisition of the semantics of tense and aspect will be discussed further.

During the elaborated stage new forms come in. The past form of the intentional future and of the perfect are now acquired—*skullle* 'would/was going to', and *hade -t* 'had -ed'—as well as the periphrastic, predictional future. More complex combinations also arise, such as 'would have bought' and 'will have bought'. The intentional future in the past is used occasionally from 2;2. The early instances are specified deictically and indicate 'recent past intention', consider (17)-(18) (ex. 75 and 76, 2003: 63):

(17) *ja skulla sl:acka lampan , mamma* (B at 3;0)
'I was going to turn of the lamp, mummy' (while playing in bed his mother throws a quilt over him, which prevents him from reaching the lamp, which he intended to turn off)

(18) *du skulle ta ne pätt, mamma* (B at 3;0)
'you were going to gather the laundry and take it downstairs' (when his mother has gone upstairs to gather some laundry and starts doing something else)

At circa 3;1, this construction is frequent.

Another new form that begins to be used is the periphrastic future expression *kommer att* + INF, that indicates predictional future. The earliest

occurrences resemble prototypical adult uses: the future event is not intentional and the situation referred to is atelic, see (19) (ex. 78, 2003: 64):

(19) Situation: B (3;4) while helping his mother to mow the lawn.

gäset	*komme*	*växa*	*ijen*
gräs-et	komm-er	växa	igen,
grass-DEF	will-PRS	grow-INF	again

The predictional future in the present tense is used frequently only around age 4;8-4;9.

The final form to be acquired is the pluperfect. It appears often in subordinate, mainly relative, clauses, such as at 3;9: 'I have forgotten to draw something on that drawing which I had drawn with sharks.' (when he wants to add something on a drawing that he has already given to his mother) (ex. 79, 2003: 65). The pluperfect is very rare for a long period but becomes frequent around 5;1.

In sum, the acquisition of Swedish supports the hypothesis. Aspect, tense and participant-oriented modality markers are the first to be acquired. Claims differ as to whether the supine (perfect, π1) appears before or simultaneously to the past tense (π2) marker, but the present tense occurs from early on. One of the first oppositions seems to be between ongoing states or activities (encoded by the present tense form) and events that have a clear post-state (perfect). Full use of the present tense markers, including its future reference, generic and habitual use, develops gradually. Intentional future (prospective, π1) is acquired before real, predictional future (π2) and there is evidence that participant-oriented modality (π1) is acquired before event-oriented modality (π2). The acquisition of epistemic modality is not discussed in either of the studies on Swedish.

10.3.6.3 Greek

Modern Greek is a fusional language with a three-way mood opposition between indicative, subjunctive and imperative. Aspect distinctions are made in all moods: nearly all verbs distinguish between a perfective and an imperfective stem. In the indicative mood there is an opposition between past and non-past tense, marked by inflection. Non-past verb forms preceded by the particle *θa* express future tense, hypothetical and inference, whereas non-past verb forms preceded by the particle *na* express modality, such as desire, wish or command. This latter construction is the subjunctive mood. There is a periphrastic (present and past) perfect, composed of the auxiliary *éxo* 'have' and the perfect formant (Stephany 1997: 194). Most frequent and unmarked combinations are the imperfective non-past, the perfective past and the perfective subjunctive. A

marked combination is the imperfective past: this construction is only used when background information is present. The marked combinations of an imperfective stem with a punctual verb expresses iterativity and of a perfective stem with a durative verb inchoative meaning (1997: 195).

The acquisition of Greek is reported in detail by Stephany (1986; 1997). It is mainly based on data of five children at the ages of 1;10, 2;4 and 2;10, on longitudinal data of one child from 2;6-4;0 and on cross-sectional data from 21 children between 2;0 and 4;0. Stephany has no clear criteria of acquisition. She pays attention both to the acquisition of form and function in child language.

By 1;10 all inflections have emerged with the subjunctive for expressing modal functions being more frequent than either the indicative or the imperative. The perfective and imperfective are marked on the verb in 90% of the cases. Non-past indicative forms are restricted to imperfective aspect and occur mainly in combination with stative and atelic verbs referring to ongoing events at speech time. The past indicative forms are restricted to perfective aspect and occur mainly with telic punctual verbs.

Past reference develops in these data from resultative meaning, to immediate past without result, to more remote past time reference and the combination with imperfective aspect. The earliest uses of the past tense forms in the samples at 1;10 are restricted to verbs with perfective aspect, mainly in combination with punctual-telic verbs such as 'open', 'enter', 'fall' and 'put'. The main function of the perfective past tense till 2;10 is a completive, resultative meaning, expressing the present result of an action: the past tense meaning is merely implied as the action leading up to the result is in the past. Stephany offers an example (ex 97, 1997: 290) that according to her is a clear indication of the resultative function of the perfective past: the child should refer to the resultant state of the cutting-event, her scar, which is relevant at speech time. Consider (20):

(20) Situation: Mairi (1;10) pointing to a scar on her finger

íð-e(s)?	*kópik-a.*
see:PFV-PAST:2SG	cut:PFV:PASS-PAST:1SG

'Do you see? I cut myself.'

However, an alternative explanation is equally possible: the scar could be a trigger for the child to tell about the salient cutting-event in the past, in which case the perfective past would refer to past time and not to the resultant state. The correct interpretation is dependent on what the child finds most interesting, either the scar, or the cutting.

Although most perfective past tenses are used to refer to a resultant state, already by 1;10, past tense forms are sometimes used in a nonresultative way,

and refer to immediate past tense events, which is illustrated by (21) (ex. 98a, 1997: 291).

(21) Situation: Spiros (1;10), a few minutes after broom had been put into upright position.

é-pes-e (i)	*(s)kúpa*
AUGM-fall:PFV-PAST:3SG	(the)broom.

'The broom fell down.'

From 2;4 past tense forms may refer to events in more remote past or in fairy tales, illustrated in (22) (ex. 98b, 1997: 291):

(22) Situation: reference is made to an event having happened a few days earlier when Maria (2;4) had washed her doll.

ADL: What did you do to it in the bathroom? (=doll)

MAR:	*é-klin-a*	(target form: *tó-plin-a)*
	AUGM-wash:PFV-PAST:1SG	(it-wash:PFV-PAST:1SG)

'I washed it.'

At 2;10 most speech still applies to the here-and-now and to the realis domain, but some uses of the past tense within narratives appear (1997: 205-06, 90-93). The first imperfective past is attested at 2;4, but it is used sparsely up to 2;10 when still no more than 5% of all past forms are imperfective, mainly in combination with atelic verbs. The past imperfective is first used in its 'durative' meaning and only later in its habitual sense, which occurs before the age of 4;0 only in the context of fairy tales. The frequentative meaning of the past imperfective is acquired even later and is used even less frequently; instead, the perfective form is erroneously used in combination with iterative adverbials like 'every day' (1997: 205-06). Between 2;6 and 3;9 more and more lexemes are used both in perfective and imperfective past. During the 4th or 5th year, children use both aspects of a verb contrastively in the same tense and mood for about 50% of all verb types.

The use of the present perfect does not occur before 2;6; the past perfect appears a several months later around 3;2. At first, the auxiliary *éxo* is variably omitted. In the longitudinal study of Katis (1984, cited in Stephany 1997), at 2;6 the present and pluperfect account for 3,6% of all past forms, whereas at 3;9 they make up 30,6 % of all past forms. The present perfect occurs mainly with telic verbs and at first expresses resultative. It is in competition with the perfective past, which is overused 'for situations the cause of which cannot be referred to'. For referring to resultant states or experience in the remote past,

children seem to consider the past perfect more appropriate than the perfective past (Stephany 1997: 206, 47).

Stephany (1997: 247-49, 99-306) also investigated the development of modality and future. The subjunctive (used to express modality) and future tense are in adult Greek distinguished by the particles *na* and *θa*. In child language, however, these uses are not differentiated at first: children often omit the particles (in 43-88% of all cases at 1;10) or reduce them to *a*. Gradually, children start using *na*, but they still vary it with *a*, and leave out a particle in most cases: the subjunctive verb has both modal prospective and temporal prospective uses. In the samples at 1;10, it is in the majority of cases (78% to 98%) modal: they express the child's wishes or intentions to act ('Spiros is going/wants to read'), obligations of the addressee or a third person ('You shall sit down', 'she shall take me in her arms'), and they are used for asking permission ('May she (=Speaker) take the piggy?'). These utterances imply futurity so that there is no clear-cut distinction with future reference, but they mainly mark modality. More temporal functions arise when the child refers to uncontrolled situations, often with inanimate or third person subjects ('it (=tape recorder) is going to break now'), or in a more remote future sense ('You'll also become a mommy'). Slowly, the future particle *θa* comes in, and more than 50% of all tokens are preceded by a particle, but the non-specialised morpheme *a* is still used and particles are still left out frequently. More and more, children learn to differentiate consistently between *na* and *θa*. At 2;10, the subjects in Stephany's study use a particle in on average 93% of all cases and differentiate between subjunctive and future in 72-97% of all cases.

Other expressions of modality are auxiliaries. From 1;8, *boró*, 'can, be.able, may', is used, most frequently to express inability 'can't' and not yet for expressing permission. It is initially used without a main verb up to about 2;10. The modal auxiliary *prépi* 'must.3SG' occurs around 2;4, much later than *boró* and less frequently. It is used to express obligation. The speaker's wishes are very frequently expressed by the volitive main verb *θélo* 'want', mainly in combination with nouns, but from 2;4 also with object clauses.

A construction that is used early as an indirect directive, expressing social norms or habits is the 3PL non-past indicative, consider (23) (from Stephany 1997: 303):

(23) Situation: Mairi (1;10) when her mother approaches the toy monkey with her foot.

ze (for *δen*)	*váz-un*	*to póδi.*
not: NONMODAL	put: IPFV-NONPAST:3PL	the foot.

'One doesn't put one's foot there.'

This construction raises an impersonal modal interpretation, which resembles event-oriented deontic modality (π2). The modal reading is, however, a matter of implicature, since the same construction can be used for describing people's ordinary behavior such as in 'They call it a nightingale there'. The example indicates that young children have no conceptual problems with event-oriented deontic modality.

The first epistemic modal uses occur around 3;9, consider (24) (from Katis 1984, cited in Stephany 1997: 306):

(24) *bor-í* *ke* *na* *fov-ótane.* (M at 3;9)
may: IPFV-NONPAST:3SG also MOD fear-PASS:IPFV:PAST:3SG
'It is possible that she was frightened.'

Based on the translation, this seems to be an example of objective (event-oriented) epistemic modality (π2).

Christofidou & Stephany (2003) studied the contrastive use of inflection in two children. These children used the subjunctive up to 2;0 only in main clauses, for expressing deontic modality. After 2;0 it is also used in subordinate clauses, with different functions. The first contrasts made by the children are modal (perfective subjunctive and imperative) versus nonmodal (imperfective non-past and perfective past) and imperfective versus perfective. The imperfective non-past typically occurs with atelic durative or stative verbs for ongoing situations, whereas the perfective past most often occurs with telic verbs with a resultative function.

The input of the parents to the children was also compared to children's speech and there appeared to be a close correspondence between type and tokens of TMA categories, although the repertoire used by the adults is more elaborate than that of the children. About two third of the lemmas in the input is restricted to one or two forms, but the other lemmas are used in more than two forms. The input appears to be adapted to the child's linguistic level, although it is more advanced (Christofidou & Stephany 2003: fn.30).

In conclusion, the hypothesized order of acquisition is confirmed by the data on Greek. Imperfective and perfective aspect (π1) are used from the start, although not yet contrastively. The imperfective present forms are restricted to marking ongoing events and states, whereas perfective past forms are predominantly used for marking resultant states and now and then for immediate past reference. Tense distinctions (π2) are at this stage only implicit and seem to be expressed independently of aspect from about 2;4, when imperfective past forms come in. Complex aspect like the perfect and pluperfect occur later. The Imperfective in Greek is first used with the meaning imperfective past (π1/π2) and only later with the meaning past habitual or past

frequentative (π2/π2, event quantification). Participant-oriented modality (π1) is expressed from the early stages (before 2;0) by the subjunctive/future construction and by *boró*. Later, real future tense uses arise (π2). Epistemic modality (π2/π3) occurs much later, after 3;6. By and large the order of acquisition corresponds to the hypothesized order: aspect and participant-oriented modality (π1) < tense (π2) < epistemic modality (π2/π3).

10.3.6.4 Romance: French, Italian and Spanish

The Romance languages French, Italian and Spanish, have very similar TMA systems. The common TMA expressions in the three Romance languages are discussed in this section and presented in Table 10-8. French, Italian and Spanish make a three-way temporal distinction between past, present and future tense. Verbs carry a portmanteau inflection that marks person, number, tense,

Table 10-8. Relevant TMA expressions in three Romance languages

Italian	French	Spanish	FG Classification
inflection *-a/e*	inflection *-ø*	inflection *-a/e*	Present (π2)
inflection *–va*	inflection *-ait*	inflection *-aba/-ía*	Imperfective past[6] (π1 + π2)
-	*avoir* / *être* 'have'/'be' + PPTC	*haber* 'have' + PPTC	Perfect (π1)
avere/essere 'have/be' + PPTC	*avoir* / *être* 'have'/'be' + PPTC	inflection *-(i)ó*	Perfective past[7] (π1 + π2)
andare 'go' + INF*/#	*aller* 'go' + INF*/#	*ir a* 'go to' + INF#	Prospective* (π1) or future# (π2)
inflection *-(er)à*	inflection *-(er)a*	inflection *-(ar)á*	Future (π2)
stare 'be' + PrPTC		*estar* 'be' + PrPTC	Progressive (π1)
potere	*pouvoir*	*poder*	Potentiality (π1/π2/π3)
dovere	*devoir*	*tener que*	Entailment (π1/π2/π3)
volere	*vouloir*	*querer*	Volition (π1)

Note. The inflectional forms presented are the third person singular forms.

[6] The imperfective past forms in Italian, French and Spanish are called Imperfetto, Imparfait and Indefinido, respectively.

[7] The perfective past forms in Italian, French and Spanish are called Passato prossimo, Passé composé and Definido, respectively.

aspect and mood. In spoken language, the perfect construction 'have'/'be' + past participle is a perfect aspect marker in Spanish, has turned into a perfective past marker in Italian and has both functions in French. All three languages have an opposition between imperfective and perfective past tense. In Spanish, the contrast is encoded by inflection; in Italian and French the imperfective past is marked by inflection, and the perfective past by the periphrasis 'have'/'be' + past participle (French, Italian). French and Italian also have an inflectional perfective past form, but these forms have disappeared or are disappearing from the standard spoken languages. The future can be expressed inflectionally or periphrastically, the latter being more common and in general used for expressing 'intention' or prospective, rather than real future tense, although this latter use is also possible in French and Italian (indicated by the symbols # and * in Table 10-8). Spanish and Italian have a progressive construction that is not obligatory; the present tense can also be used to refer to ongoing activities. Modality is expressed by modal auxiliaries or, in Spanish, by periphrastic constructions.

French

The relevant TMA expressions in French are presented in Table 10-8. A past perfect and past in the future may be formed by combining forms, but they are not attested in spontaneous child language. The conditional mood is used in hypothetical and counterfactual statements and there is a subjunctive mood, restricted to subordinate clauses.

An overview of the acquisition of French is given in Clark (1985), based on several diary studies and experimental research. From 2;0, children start using tenses and typically contrast the perfect construction, *avoir/ être* + past participle (Passé Composé), with the present tense. The data on French suggest that children initially rely on verb tense to mark the contour of an event rather than to mark temporal relations per se. First tensed forms are past participles like *fini* 'done, finished' and *parti* 'gone', used for marking results or end-states (perfect aspect, $\pi 1$). From about age 3 the full perfect construction, now denoting perfective past ($\pi 1+\pi 2$), is contrasted with the imperfective past, which is used for background information and ongoing events. At age 3 the periphrastic future is acquired for marking prospective aspect or future tense; the inflectional future tense is acquired later. Future forms are first used in routines, in anticipation of the usual sequence. Note that in other Romance languages the periphrastic future is also acquired before the inflectional future. Later acquisitions in French are conditional and subjunctive moods for expressing irrealis.

The acquisition of tense and aspect in particular is examined by Bronckart & Sinclair (1973): 74 children participated in a production task, divided in age

groups of on average 3;7, 4;7, 5;6, 6;6 and 7;8. An experimenter acted out an action with toys, such as a horse jumping over a fence or a fish swimming. The actions differed, among other things, in having a clear result or not (push a car towards a garage versus swim around) and having duration or not (jump several jumps for 10 seconds versus jump one big jump in one second). Afterwards, the children had to tell what they saw. Note that in adult French this task would require the use of a past tense form, irrespective of the characteristics of the actions.

There appeared to be strong correlations between characteristics of the action and the verb forms used by the children. The actions that obtain a clear result were in the fast majority of cases (78%) described with the Passé Composé. Furthermore, there was a distinction based on duration. Actions with a result that were punctual or nondurative were from the youngest group onwards referred to by the Passé Composé in 90% of the cases, whereas durative actions with a result were in the youngest age group described equally by use of the Passé Composé and the present tense. With age, the use of the present tense for durative actions diminished and the use of the Passé Composé increased. Finally, the children described the events that did not lead to any result mostly with a present tense (76%), even at the age of 6. Some children use the imperfective past from age 6. Bronckart & Sinclair explain these associations as follows:

> If the action gives an immediate result, the use of *passé composé* reaches its maximum because the observer can only focus on the result; if a certain time elapses before the result is obtained, the observer can either focus on the result or on the action process itself. The longer it takes to complete the action, the more probable becomes focusing on the action and the use of *présent*. (Bronckart & Sinclair 1973: 126)

The results show that the distinctions in having a result and having duration were more important to the children than the temporal relation between the event and the moment of speech, because if the temporal relation had been the most important cue, children would have equally used the past tense for the different action types.

> Exclusive attention to the result of an action implies focusing on the 'past' character of an action; conversely, a focus on the process, without attention to the result, projects the action into a kind of perpetual present. For certain types of events, these early, incompatible focuses take on prime importance and lead the child to ignore the relationship of posteriority between enunciation and the termination of the action. (Bronckart & Sinclair 1973: 127)

An important thing to note about the study of Bronckart & Sinclair is that it does not investigate the relation proper between lexical aspect and tense/aspect morphology, i.e., they do not report whether children indeed describe the

events with a clear end result as a telic event. Their study investigates which characteristics of the real world are salient to the child and connected to morphological forms, but not whether there is a relation between event types (linguistic category) and morphological forms. The main conclusion that can be drawn from this study seems to be that French speaking children do not pay attention to temporal relations in the early stages.

Kilani-Schoch (2003) investigated the emergence of the contrastive use of verb forms in two French speaking children. The order of forms according to first emergence and frequency is present indicative singular < infinitive < past participle / imperative < passé composé (<) periphrastic future < simple future / simple past. The early forms of the passé composé or past participle without the auxiliary are mainly restricted to telic lemmas. The forms are extended to stative verbs between 1;8-2;0 and to activity verbs between 1;9-2;2.

The first contrastive uses occur from about 1;8/2;0 and are between the present, the perfective past (past participle) and the infinitive. Contrastive uses between the periphrastic future and present tense become frequent between 1;10 and 2;4. Kilani-Schoch (2003) argues that:

> since French aspectual distinctions are not encoded separately from tense and are tied to the opposition between periphrastic and synthetic tense, aspectual distinctions obviously depend on the mastery of the respective tense subsystem, i.e. the opposition between imparfait (Imperfect as in Latin and the other Romance languages) and passé composé (Compound past). (p.289)

This means that, in her view, aspect in French is necessarily acquired at the same time or later than tense. The function of the forms is acquired later than the forms themselves.

There is little information on the acquisition of modality in French. Clark (1985) reports that one of the ten most frequent verbs in 2-4 year olds is *vouloir* 'want'. A study on the comprehension of modality by children between 4;0 and 12;0 is reported in Piéraut-Le Bonniec (1980, cited in Bascelli & Barbieri 2002) and shows that the understanding of deontic modality around age precedes the understanding of epistemic modality, around age. Deontic modality is participant-or event-oriented ($\pi 1$ or $\pi 2$) whereas epistemic modality is event- or proposition-oriented ($\pi 2$ or $\pi 3$). The ages at which the children understand the forms are, however, very late, at 7;0 (deontic) and 10;0 (epistemic) whereas production data in other languages show that children express at least deontic modal meanings before the age of 2;6 or even before 2;0. It is unknown to me why the age of comprehension is so late in this experiment.

In conclusion, depending on the semantic interpretation of forms in child language, the acquisition of TMA in French does or does not support the hypothesized order. According to the analysis of Clark and Bronckart & Sinclair, early verb forms distinguish between imperfective, perfect and

prospective aspect (π1), and only later on, tense distinctions (π2) are marked. Kilani-Schoch claims that aspect cannot be acquired independently of tense and therefore, aspect is acquired simultaneously or later than tense. There is some evidence that deontic modality (participant-or event-oriented, π1 or π2) is acquired before epistemic modality (event- or proposition-oriented, π2 or π3).

Italian

The relevant TMA-markers in Italian are presented in Table 10-8. The perfect construction, *avere/essere* + past participle, combines with nonstative verbs for marking that an action has been accomplished. The imperfective past is the default past marker with stative verbs, for marking a past state. When the perfective past combines with a stative verb, it can either denote inception—**came** to know—or termination—John loved Mary (but he doesn't love her anymore). The combination of imperfective past and nonstative verbs marks progressive or iterative. There is a conditional inflection for marking hypothetical statements (among others) or polite or tentative modality.

The study of Antinucci & Miller (1976) is one of the first that reported about the use of tense and aspect in young children. Antinucci & Miller investigated past tense forms in longitudinal data of seven Italian children (1;6-2;6) and cross-sectional data of 48 children (2;0-4;4). The past participle occurs from the beginning (ca. 1;6), but the imperfective past begins to be used only around 2;1. A peculiar phenomenon in child Italian is that the past participles of transitive verbs are marked for agreement with the object of the verb, whereas in adult Italian, there is no agreement on the past participle of transitive verbs (unless the object is pronominalized). Antinucci & Miller explain this by assuming that children use the past participle as an adjective that attributes a state to the object, more precisely, the end state of a process or action in which the object was involved. The situation types with which the past participles are used support this: they are mainly used with telic situations with a clear result, very infrequently with telic situations that have no clear result or with activities (dynamic, atelic) and never with states.

> Some present, observable states have a specific characteristic in that they are linked to a preceding event of which they are the result. Change of state verbs (causative or not) describe those situations in which some end-state comes into existence as the result of a process. In these cases, therefore, the past event (process) and the present moment (end-state) are related not simply by an abstract temporal relation but by a more concrete effectual relation. This concrete link is exactly what enables the child to represent the past event once he has access to the present end-state. (Antinucci & Miller 1976: 183)

It thus seems that the function of early past tense forms in child Italian is to encode end-states (of past events), relevant in the here-and-now. From this use

as a perfect aspect marker, the adult perfective past tense meaning develops as a natural implication. Antinucci & Miller remark (1976: 183-84, fn 6) with respect to this development in child language that it reflects the diachronic development of the compound past construction in Italian. Like in child language, the participial past did originally agree with the object of transitive verbs and only later came to mark 'past action'.[8]

In a later stage, between 2;0 and 2;8, the imperfective past, combining with stative and activity verbs, emerges. It occurs almost entirely in contexts of story telling or play. These stories are not past anecdotes and in most cases the stories are not previously told to the child: the children invent the stories online, either stimulated by pictures in a book or when they act out scenes in their play. Antinucci & Miller (1976: 186) found that the imperfective past is at first not used for marking past tense, but for marking pretend world (irrealis) in contrast to real world (realis). The succession of events in story-telling or the repetition of a single event may help the child to establish the notions of past activities. The hypothesized meaning of the imperfective past is supported by the fact that children start the expression of hypothetical and counterfactual not by the conditional mood inflection (adult Italian), but by using the imperfective past form.

Noccetti (2003) investigated the emergence of contrastive use of Italian verb morphology in one child (2;0-2;7). The first verb forms are the present[9] and imperative and a single use of the past participle. Most spontaneous child utterances are used for describing objects and events in the here-and-now. Other utterances, frequently non-spontaneous, refer to 'the non-immediate present, to past events or to 'family-bound' situations, which are meaningless outside the family context since they refer to personal experiences' (Noccetti 2003: 358). This latter type of reference is expressed by past participles and a few imitated imperfect forms. Up to 2;4, verbs occur only in one type. The first person singular present tense is mainly used in questions, the third person singular and plural mainly to describe ongoing actions, the past participle to refer to accomplished actions, such as *rotta* 'broken'.

The first contrastive uses occur at 2;5. Verbs are now used both in present, past participle (with or without auxiliary) and infinitive. Frequency proves to play an important part in this development:

> The verbs which show a high number of types and tokens, in fact, are more likely to occur in different contexts facilitating semantic bootstrapping and are,

[8] Compare this development to the perfect construction in English, that has a similar origin (see 6.3.2).

[9] The study of Pizzuto & Caselli (1994), based on strict productivity criteria for inflectional forms, confirms that the present tense inflection is acquired first.

> therefore, the first to emerge in C[hild]S[peech] and the first to show some forms of their paradigms. (Noccetti 2003: 369-70)

According to Noccetti the verbs *sapere* 'to know', *volere* 'want', *dovere* 'must' and *potere* 'can' are frequent in the input but 'mental and modal verbs (…) are not perceptively salient and do not belong to the early phases of acquisition' (2003: 370).

A study on the comprehension of modality is performed by Bascelli & Barbieri (2002). It elaborates on an experiment by Hirst & Weil (1982) on English. Bascelli & Barbieri investigated the comprehension of *dovere* and *potere* in the forms *deve* 'must', *dovrebbe* 'should', *non deve* 'must not' and *può* 'may', *potrebbe* 'might', and *non può* 'may not'. These verbs have both epistemic and deontic meanings. In the experiment, 192 children took part, divided in four age groups with mean ages of 3;9, 5;2, 6;8 and 8;8. A control group of 60 adults performed the same tests. In the epistemic modality test, the children had to find a Smurf hidden under a cup or a box. Children were given some help in a single and a double sentence condition. In the single-sentence condition one puppet said: 'The Smurf must / may / should / might / must not / may not be under the cup/box'. In the double-sentence condition two puppets each provided a 'helping' statement, using two different auxiliaries, such as 'The Smurf must be under the cup' and 'The Smurf may be under the box.' The children should follow the instruction with the strongest modal. In the deontic modality task, children participated in a game in which they had to win Smurfs: if they lifted the Smurfs' house they won Smurfs, if they lifted Gargomel's house, they lost Smurfs. However, they could not act freely, but had to obey permissions or obligations in deontic statements: you must / may / should / might / must not / may not lift the Smurfs' / Gargomel's house. There was again a single and a double-sentence condition: in the double sentence condition, the children should obey the utterance with the strongest modal, even if this was a disadvantageous action (i.e., loose Smurfs).

The results show that in the epistemic test, the three and five year olds did not differentiate between the modals: they considered all positive statements as reliable information on where to find a Smurf. The three year olds did not yet show any understanding of the negative forms. By the age of six, children distinguish between *deve* and *può* (nescessity and possibility), but the weaker forms *dovrebbe* and *potrebbe* are not yet understood. Eight year olds begin to understand the different degrees of possibility (*può* versus *potrebbe*) and necessity (*deve* versus *dovrebbe*) but it is not yet adultlike.

In the deontic modality test, children of three year old did not yet differentiate between the modals: they performed all orders, independent on whether the order expressed permission or obligation and independent on an advantageous or disadvantageous outcome (gain or loose Smurfs). The five year

olds made a weak contrast between forms: there was a significant difference between the interpretation of the strongest (*devi*, must) and the weakest (*potresti*, might) form. The children do not seem to be able to evaluate their own advantage. Six year olds and eight year olds on the contrary do not obey very often, but prefer to perform the most advantageous action, independent on the order they get. The control group of adults—who performed the test with coins instead of Smurfs—also disobey a disadvantageous order in 40% of the cases. Six year olds still treat *devi* (must) and *puoi* (may) alike, but eight year olds clearly understand the distinction between the four different modals and act as the adults.[10] The experiments show that Italian children understand deontic modality (participant-oriented, π1) very well around age 8 whereas epistemic modality (π2/π3) is still not fully understood by that age. Like in the French experiment of Piérot-LeBonniec (1980), the full comprehension of deontic meanings is reported to occur at a much later age than the production of these meanings in other languages. That there is such a large gap between the findings on spontaneous production data and the comprehension in experiments suggests that the methods of research cannot straightforwardly be compared.

In sum, the first contrast to be encoded seems to be between end-states (past participle, used as perfect aspect, π1) and events in the here-and-now (present tense, π2). In Antinucci & Miller's view, the imperfective past is first used to express irrealis (π2). The experimental data show that participant-oriented modality (π1) is acquired before epistemic modality (π2, π3). These results support the hypothesis that there is no stage in which π2-operators are present but π1-operators are not, or in which π3-operators are present but π2-operators are not. However, the acquisition of π2-operators (present tense) starts around the same time as π1-operators (perfect aspect).

Spanish

The relevant TMA expressions in Spanish are presented in Table 10-8. In contrast to Italian and French, Spanish has a rather frequent progressive marker (*estar* 'to be' + Gerundio/ present participle) that may combine with all tense

[10] The results in this study are in contrast to the experiment in English (Hirst & Weil 1982), in which the comprehension of epistemic modality seemed to precede the comprehension of deontic modality. This is probably the result of a difference in the experimental set-up: in the Italian experiment, contrary to the Hirst & Weil study, the children have to perform an action in response to both tests and not only in response to the epistemic test. A further difference is that the deontic modal verbs in the Italian test are, like the epistemic verbs, addressed to the children and not to a third party, as was done in the tests on English. The deontic and the epistemic test in the Italian experiment are thus more similar so that the outcome is probably a better representation of the children's linguistic competence than in the English experiments.

markers. In addition, there is a subjunctive (inflection) in Spanish, mainly restricted to subordinate clauses, but possible in main clauses to express the imperative or wishes.

The acquisition of Spanish is examined by Mueller-Gathercole, Sebastián, & Soto (1999; 2000) and Aguirre (2003). Earlier research on Spanish (cited in Mueller-Gathercole et al. 1999: 138) has already shown that children by about 2;0 years use the infinitive, imperative (expressed by the subjunctive), present tense, present and past participle and future tense. The first contrastive uses within the field of TMA are between present, past participle and periphrastic future at circa 1;11-2;0. At that age, the perfective past (preterite) and full present perfect are also used, though infrequently. The imperfective past is acquired last.

In Mueller-Gathercole et al. (1999; 2000) research is reported from two children: Maria 1;6-2;6 and Juan 1;8-2;1, who were recorded for half an hour-sessions with intervals of one or two months. These children (2000: 151-52) use already many different verb forms in the first sessions, but every verb lemma is used in only one form. There is thus no contrastive use of verb forms. Furthermore, when contrastive use emerges, different verbs are used in different contrasts:

> The forms for each verb appear to be learned one by one, with no overriding general principle governing which forms are added next. That is, (…) one does not find, for example, that many verbs suddenly emerge in the preterit, or that many verbs suddenly appear in the present participial form, or that many verbs suddenly appear in the first person singular present tense form. (2000: 160)

Given the productivity criterion in this study that a morpheme must be used with at least two verbs and at least one of those verbs must be used with another, different inflection, few of the early inflections are productive. For both children, the first forms that are used productively and contrastively are the infinitive, imperative and 3s.present. For Juan, the first contrast in TMA is at 1;11, when he uses *ir* 'go' contrastively between present (*vamos* and *va*) and periphrastic future (*va a ir*), although the future is not yet productive: *va a ir*, is the only future construction. At 2;1 the distinction between perfective past and present is used for *caer* 'fall', and between past participle and present for *romper* 'break'.

For Maria the first contrast in TMA occurs at 1;10 for *caer* between present and perfective past and for *ir* between present perfect and present. Especially the first contrast should be regarded as non-productive: in all her recordings, Maria uses the perfective past inflection with only three different lemmas. At 2;1 a further contrast is used between 3s.present and 3s.present perfect (for *caer*) and this contrast becomes productive. At 2;3 the imperfective past emerges and at 2;4 the periphrastic future and the progressive.

Mueller-Gathercole and colleagues (1999: 153-58) have also investigated the role of input. The frequency of forms in the input only moderately correlates with acquisition order. Although the mothers frequently use the forms that their children use, such as 3s.present, imperative or infinitive, they also use forms that their children do not yet use, such as 2s.present, present participle/present continuous, present perfect and imperfective past. These latter forms are linguistically more complex and the linguistic complexity seems to influence the acquisition order more than the frequency in the input.

According to Mueller-Gathercole et al. (1999; 2000) contrastive use of inflections occurs relatively late. They claim (2000: 167) that the inflectional system in Spanish is not yet fully productive at 2;6, since there is only a handful of contrasts used productively. A serious problem with this conclusion, however, lies in the methodology of the study. The children are recorded for only half an hour with intervals of one or even two months. From Juan there are only four recordings taken into consideration altogether. From Maria, up to the age of 2;0, there are only recordings at 1;6.3, 1;7.24, 1;10.17 and 2;0. This is a very low frequency, which highly reduces the chance to find contrastive uses of the same lemma before 2;0. In particular for contrastive use, the corpus should be as dense as possible, for only when the conversation is about similar events in different contexts, the same lemmas will be used in different forms. The chance that exactly these contrasting situations occur within the recorded sessions is probably very small; and thus, the child seems to show hardly any contrastive use. Although it is certainly possible that children start out by piecemeal learning—a conclusion more thoroughly supported by denser corpora like the one in Lieven et al. (1997) or Tomasello (1992)—this study on Spanish would not count as very good evidence for it.

Another recent study that looks at contrastive use of inflection in Spanish child language is Aguirre (2003). She examined the spontaneous speech of one boy between 1;7 and 1;11 on the basis of ten recordings between 30-90 minutes. Up to 1;8, the child only uses rote-learned forms: verbs appear in only one form. At 1;9 three lemmas (*ir* 'go', *romper* 'break' and *asustar* 'frighten') are used both in the present tense and the past participle and one lemma *caer* 'fall' in the present (*cae*), past imperfective (*caía*), and past perfective (*cayó*). At 1;10, there are three new lemmas used in the present tense and the past participle; three lemmas are used in the present indicative in contrast to the present subjunctive; one lemma (*coger* 'take') is used in the present indicative and the present participle. The present subjunctive is in this stage only used to express prohibitive illocution. At this age the first present progressive uses emerge and infinitives as complements to the modal verbs *poder* 'can' and *querer* 'want'. These data show contrastive use much earlier and much more frequently than the study of Mueller-Gathercole et al. (1999; 2000), which is probably the direct

result of the length and frequency of the recordings. Up to 1;11, Mueller-Gathercole et al. have collected an hour and a half of speech of Maria. For the same period, Aguirre has recorded 9 hours of speech. The conclusion of Aguirre (2003: 17) is that the acquisition order in Spanish follows the order 3s.present (< imperative) < past participle < 1s.present (< 3s.present subj.) < 3p.present < present participle. I will here accept the conclusion of Aguirre and not the conclusion of Mueller-Gathercole et al. Unfortunately, both studies did not explicitly describe the contexts of use of the TMA forms in child language.

Summarizing, the acquisition of TMA in Spanish starts with the opposition between the present (tense, π2) and the past participle (perfect aspect π1), without the auxiliary. The forms for aspect and tense thus occur from the same age. The periphrastic future for expressing intention emerges somewhat later as well as the progressive, but unlike in English, Spanish uses the present tense as the regular device for referring to ongoing events and the progressive only for stressing ongoingness. The perfective past (Preterit/Definido) is acquired before the imperfective past (Imperfect/Indefinido). Although not systematically studied and discussed, the modal auxiliaries in their participant-oriented use (π1), with or without an explicit main verb, appear to be among the first productive forms (Aguirre 2003). There is thus no stage in which Spanish children have π2-operators but no π1-operators. The function of the early contrasts is, however, not described. There are also no reports on the acquisition of π3-operators in Spanish.

10.3.6.5 Slavic: Polish and Russian

The TMA systems in the two Slavic languages that will be discussed, Polish and Russian, are very similar to each other, but very different from the Germanic and Romance languages. The TMA system of Polish will be discussed in detail; the system in Russian will be discussed only briefly as it resembles the Polish system to a large extent.

Polish

Polish is a West Slavic language and is classified as inflectional or fusional. It has hardly any bare stems: nearly every form of the verb is somehow inflected. There is an obligatory distinction between perfective and imperfective aspect. For most verbs the perfective form is derived from the imperfective by a prefix or suffix, for example *pisać* / *na-pisać* 'to write' (imperfective/perfective), *kop-a-ć* / *kop-nąć* 'to kick' (imperfective/perfective). For some verbs the perfective and imperfective form are equal in morphological complexity; they both consist of a stem and a suffix. The different suffixes, possibly accompanied by stem alternation, indicate the aspectual distinction. There are also prefixes which, besides indicating perfectivity, carry additional meaning more or less like verbal

particles in English: *pod-pisać* 'to sign' (perfective), *wy-pisać* 'to write out' (perfective), *prze-pisać* 'to copy' (perfective), etc. These forms can be made imperfective again by suffixation: *pod-pis-ywa-ć*, *wy-pis-ywa-ć*, so-called secondary imperfectivization. For a few verbs the aspectual pairs are not derived but suppletive, for example *brać* (imperfective) / *wziąć* (perfective) 'to take'.

The meaning of the perfective and imperfective is still contentious. In general the perfective is considered to specify the notion of a complete situation, i.e. a situation that has a beginning, a continuation, and a termination. Contrary to our definition of the imperfective in 3.3.3, the Polish imperfective form is aspectually neutral: it does not specify whether the action is ongoing or not. As a result, both forms are possible if a situation is completed; the perfective is chosen if the speaker wants to stress the property of completion in the situation. If reference is made to a situation that is not completed, then only the imperfective is possible (Smoczynska 1985: 602)

Polish has three tenses: past, present and future. The interaction with aspect is rather complicated and will be illustrated by the verb *pisać/napisać* 'to write' (imperfective / perfective). There are two different verb stems. Stem I is the 'present tense stem' (*pisz-/napisz-*) that occurs in the present tense of imperfective verbs, the future tense of perfective verbs and in imperatives. It will be discussed below. Stem II is the 'infinitive stem' (*pisa-/napisa-*) that occurs in the past tense, the past participle, the infinitive and the conditional. The past tense is formed by stem II, a past suffix, a gender suffix (masculine *-ø*, feminine *-a* or neuter *-o*) and a person/number suffix, consider (25):

(25)	Imperfective past:	*pisa*	*-ł*	-{*ø*/*a*/*o*}	*-m*
		STEMII	-PAST	-{M/F/N}	-1SG
	Perfective past:	*na-pisa*	*-ł*	-{*ø*/*a*/*o*}	*-m*
		STEMII	-PAST	-{M/F/N}	-1SG

The past participle is the same form as (25), but without person/number marking. The conditional form has an extra conditional suffix *–by* in between the gender and person/number suffix: (*na-*)*pisa-ł*-{*ø*/*a*/*o*}*-by-m*.

The present and future tense forms are less straightforward and are dependent on the aspect of the verb. Stem I in combination with an imperfective form yields a present tense, whereas Stem I with a perfective form yields a future tense, consider (26) and (27):

(26)	Imperfective present:	*pisz-ę*	
		STEMI	-1SG

(27) Perfective future: *na- piszę*
STEMI -1SG

There is no present tense for perfective verbs. The future tense for an imperfective verb form is constructed with an auxiliary *będ-* 'will' inflected for person/number and either a past participle or an infinitive, the choice between them being optional, consider (28):

(28) Imperfective future: *będ-ę* *pisa-ł-{ø/a/o}*
AUX-1SG STEMII-PAST-{M/F/N}
Or: *będ-ę* *pisa-ć*
AUX-1SG STEMII-INF

Modal meanings in Polish are expressed by full verbs. Sentences with modal verbs are embedded constructions rather than simple sentences with a complex predicate. Furthermore, there is a number of impersonal modals in subjectless constructions: *można* 'one:can', *wolno* 'one:is:allowed:to', *trzeba* 'it:is:necessary:to', etc. (Smoczynska 1985: 603-04, 08).

The acquisition of Polish has been studied extensively (Smoczynska 1985; Weist et al. 1999; Weist et al. 1997; Weist, Pawlak, & Carapella 2004; Weist et al. 1984). Smoczyńska's (1985) description is based on the longitudinal data of ten children and a few extra observations. She does not explicitly state the criteria of productivity that she has used. With respect to her data, she notes first of all that the acquisition order of forms differs for individual children. In general, however, the acquisition of inflection starts with the 2s imperative used in opposition to the 3s imperfective present. Then the infinitive emerges, after which the perfective future (formally identical to present imperfective) and the past tense appear, the latter mainly with perfective verb forms, but also with imperfective. Finally, the imperfective future (periphrastic construction) is acquired in which the future auxiliary is occasionally omitted. On average, children of 2;0 years old use all the available tense-aspect combinations. Around this age, children also make reference to hypothetical events, although they do not yet mark it linguistically. Marking of hypothetical statements—using the particle *by*—emerges in all children before age 3, although the frequency increases at least till age 5. Reference to counterfactual events appears later (Smoczynska 1985: 646-53).

In Polish child language, tense and aspect morphology emerge almost simultaneously and meaningfully according to Smoczyńska. She claims that tense morphology does not coincide with an aspectual distinction, like past for completedness and present for ongoingness. Past morphology would not mark resultant state since it may also refer to past activities and to moderately remote

past events. From the initial period of inflected verbs, the children use imperfective past forms to refer to an activity in the past, such as *leciał samolot* 'fly:IPFV:PAST plane' (= 'The plane was flying') (1;7), *pływała się* 'swim: IPFV:PAST' (1;8) and *jadłam* 'eat: IPFV:PAST' (1;11) (Smoczynska 1985: 647). Unfortunately, there is no information presented about the frequency or productivity of these forms or the contexts in which they are used.

As well as Smoczyńska, Weist and colleagues (1986: 364; 1984) argue that children in Polish distinguish between perfective and imperfective aspect, simultaneously with tense distinctions and that tense and aspect are marked independently. This claim is supposedly supported by the fact that children distinguish between perfective past and imperfective non-past forms: if children would only mark the distinction between completeness and non-completeness and ignore the tense marking on the verb, they could have used perfective non-past forms (perfective for marking completeness) in opposition to imperfective non-past forms (imperfective for marking non-completeness) in contexts where adults would also make a distinction between past and non-past. However, this scenario does not occur. Children are sensitive both to the aspectual and to the tense distinction in the verb forms.

In contrast to the claims of Smoczyńska and Weist et al., Stoll (2001: 124) claims that there is a strong relation between tense, aspect and situation type in Polish. She points out that the longitudinal data in Weist et al. (1984) reveals a correlation between tense and aspect. Telic verbs (achievements and accomplishments) are preferably used in the perfective aspect. Atelic verbs (states and activities) can only be imperfective: they are however preferably used in the present tense, rather than the past tense. Bloom & Harner (1989) made a similar point. They reanalyzed the data in Weist et al. (1984) and found that although Polish children may use past tense with imperfective state and activity verbs from the same age as perfective past, the latter were far more frequent.

In sum, according to Weist and Smoczyńska, Polish children acquire different combinations of tense and aspect remarkably early. Especially the use of imperfective past forms before the age of 2;0 is precocious compared to other languages. It seems as if children already master the difference between imperfective past and imperfective present, between perfective past and perfective future and between perfective and imperfective past. Only the contrast between perfective and imperfective future occurs somewhat later, but it is acquired around 2;0. Rejecting these claims, Stoll and Bloom & Harner query the productivity of the combinations: there is a strong correlation between on the one hand atelic verbs, imperfective aspect and present tense and on the other hand telic verbs, perfective aspect and past tense. My view on this matter will be discussed in 10.5.2.1.

Weist and colleagues (Weist et al. 1999; Weist et al. 1997; Weist et al. 2004; Weist et al. 1991) performed several experiments to investigate the acquisition of tense and aspect in Polish, compared to English and Finnish in order to find support for the developmental stage model of Weist, described in the introduction to Part III. Children between 2;6 and 5;6 or 6;6 are tested on conceptual and linguistic temporal tasks. The children in general appeared to understand linguistic distinctions between future/past reference and between perfective/imperfective aspect in the past between age 2;6-3;6. Children understood the distinctions between remote versus immediate past and future reference, between the concepts 'before' versus 'after', and between sequential versus simultaneous order of events (the difference between 'and then' versus 'when') much later, between 4;6-5;6.

The experiments furthermore contain elicited production tasks. They show that all children linguistically encode the distinction between past and future tense from 2;6. Polish and English children also encode the aspectual distinction between perfective/imperfective in the past from 2;6, but Finnish children do so only from 4;6. The delayed performance of the Finnish children is probably caused by the fact that Finnish has no primary aspect markers: the case distinction between partitive and accusative can be used to express imperfective/perfective aspect, but it is not its main function. Linguistic encoding of the ordering of two events (simultaneous versus sequential) develops around 4;6 in all languages.

A general result of the experiments is that the children's performance on the linguistic tasks is very sensitive to the experimental design. The different studies show that it is very difficult to set up crosslinguistic experiments that really test the same thing in each language: the frequency of use of language-specific categories is different across languages, just as their phonological saliency, structural complexity, reliability (one form covers one function), etcetera.[11]

Russian

Russian is an East Slavic language. The basic grammar of the Russian verb strongly resembles Polish (see above): there is an obligatory aspectual opposition between perfective and imperfective aspect and a three-way temporal distinction. The perfective verb form is in most cases derived by prefixation from the imperfective form. However, the opposite pattern also occurs: secondary imperfectives are derived from a perfective (prefixed) verb form by suffixation. Finally, there are suppletive aspectual pairs. Besides the aspectual distinction there is a temporal distinction between past, present and

[11] Weist et al. (2004) examine the influence of distributional properties of an expression on the acquisition patterns.

future, the present tense being restricted to imperfective verb forms. Verbs in the past tense are inflected for gender and number and verbs in the present and future tense are inflected for person and number. The (imperfective) present and perfective future have the same inflectional paradigm. The imperfective future is constructed with an auxiliary *byt* 'will' (Bar-Shalom 2002: 323-25).

The spontaneous use of aspect and tense morphemes was investigated by Bar-Shalom (2002) in four children between 1;6 and 2;11. She does not explain her criteria for considering forms productive. She claims that past tense forms immediately appear both with perfective and with imperfective forms and both with telic and atelic verbs. One of the children for example uses from 1;6 telic perfective past; *upa-l-a* fall.PFV-PAST-F.SG 'fell'; from 1;7 telic imperfective past *ubir-a-l-ø busi* take+away-IPFV-PAST-PL beads 'was putting away the beads' (specific set of beads); from 1;8 atelic perfective past *po-plava-l-i* PFV.swim-PAST-PL 'swam a while' (perfectives with *po-* mean 'V for a while') and atelic imperfective past *wote-l-a* want.IPFV-PAST-F.SG 'wanted'. (2002: 328-29). Three other children use first telic perfective past and atelic imperfective past and later telic imperfective and atelic perfective past. The future tense is first acquired for perfective verbs for all children, for example at 1;6 *naden-im* '(we) will put on'. The periphrastic future for imperfective aspect occurs later, for the first time around 2;0: *bud-u-spat* '(I) will sleep' (2002: 331-32). The use of aspectual forms is errorless: reference to present tense actions is correctly restricted to imperfective verb forms, whereas both aspects are used for past and future reference. The conclusion of Bar-Shalom is that Russian is different from non-Slavic languages, in that imperfective past forms are used from early ages.

Gagarina (2003) has examined the speech of three Russian children, L, V and R from onset of speech to 3;0 in on average 2;5 hours of speech per month. She arrives at different conclusions than Bar-Shalom. The children start using verbs between 1;7-2;1, both infinitives and inflected forms. Infinitives are used instead of inflected forms at least till 1;11-2;3 and during this period infinitives may denote situations in the past, present and future. They occur mainly in answer to adult's questions while they are more rare in self-initiated utterances. In all three children perfective and imperfective verb forms occur simultaneously: perfectives mainly have past tense inflection, whereas imperfectives have present tense inflection. From about 1;9-2;2 the past perfective and present imperfective come to be used more often, but inflectional rules are not yet mastered fully: 3s forms predominate, some forms only occur incidentally and there are still many rote-learnt forms. There are sporadic occurrences of perfective verbs with future tense and imperfective verbs with past tense inflections.

First contrastive uses of lemmas are mainly between infinitives or imperatives versus present or past tense forms. There are no aspectual contrasts

yet at least up to about 2;0-2;3. There are a few temporal contrasts for specific lemmas though: L uses at 1;9 the imperfective verbs *chistit'* 'clean' and *sobirat'* 'collect' in past and present tense, V uses at 2;3 the perfective verbs *upast'* 'fall down', *poexat'* 'start going by car', *pojti* 'start on going' and *prijti* 'come' in past and future tense and the imperfective verbs *bolet'* 'be ill' and *est'* 'eat' in past and present tense and R uses at 2;0 the perfective verbs *poexat'* 'start going by car' and at 2;1 *pojti* ' 'start going by foot' and *prijti* 'come' in the past and future (similar to V). According to Gagarina, however, these forms should not be considered as evidence that tense marking is acquired, as there is no active morphological productivity yet.

Gagarina thus shows that children in general start out with imperfective present and perfective past inflection. Gradually, perfective future and imperfective past forms come in. According to Gagarina (2003):

> mastering of aspect begins when the child starts to produce/use a) PERF and IPFV verbs in all (three) tenses, b) modifications of the basic meanings of PERF and IPFV aspect, c) counterparts of one lexeme, d) one and the same stem with different prefixes (diverse Aktionsarten) in various contexts with different partial meanings of PERF and IPFV aspect. It seems that, generally, as long as finite verb forms are rote-learnt, their development (and choice) would be determined much more by extralinguistic (and external situational) and contextual factors then when rule-based learning starts. (p.155)

Gagarina (p.144) also claims that as long as infinitives are used where inflected forms should be used, the child has probably not yet constructed a verb paradigm, but instead is 'only on the way to learning the appropriate morphological rules'. At that stage, children use one or more inflected forms in a set of familiar or repeated contexts while they use the infinitive in new, unfamiliar contexts.

Stoll (1998; 2001) set up experiments in order to test the children's comprehension and production of the perfective-imperfective distinction, the past-present distinction and contrasts in telic-atelic situation type. One hundred children were divided in age groups of 2, 3, 4, 5, and 6 year-olds. They watched videoclips in which two puppets each performed the same kind of action in a different way (2001: 128-30), for example the continuous reading of a book versus reading a book all the way through and closing it. The first action should be referred to in adult Russian by an imperfective verb form, whereas the second action could be described by a perfective verb form. One of the contrasts tested was between telic and atelic actions, as in the above example, but other contrasts made by perfective and imperfective forms were also tested. Perfective forms in Russian can express that an action lasted for a while (stand, sit for a while and stand again versus sitting continuously), that an action started (starting to cry versus crying), or that an action was done semelfactively, for

example, wave once with one hand (versus wave all the time). After the child had watched the videoclips with the two actions, both clips were shown again simultaneously on a split screen and stopped in a frozen frame. The experimenter asked the child which puppet did something, for example: Who read the book? The question was always asked in the perfective form, since the imperfective form in Russian is neutral and could refer to both scenes.

The first result is that the percentage of correct answers increases with age. Children between 2 (ca.55%) and 4 (ca. 30%) in a large number of cases chose the wrong scene or both scenes. They do not see a difference between the scenes or they do not relate the difference to the imperfective and perfective forms. The responses are however not completely random. There is no relation with the formal contrast of the perfective-imperfective pair (whether by prefixing, secondary imperfective, or suppletive pairs), but there is a relation between the situation type (telic, delimitative, ingressive, semelfactive) and the number of correct responses. Children of all ages performed best on the telic situation types with 95% correct in 6-year-olds but worst on ingressives ('start to'). Children of all ages even preferred the wrong scene for the ingressive meaning, i.e. the scene where the puppet performed the action for the whole time (Stoll 2001: 135-41).

The findings of Stoll are in stark contrast to the claim that children learning Slavic languages master aspect and tense from the start, as was made by Bar-Shalom (2002) for Russian and by Weist et al. (1984) for Polish. Their main argument is the absence of errors, but the contexts in which the aspectual forms occur have to be analyzed systematically. Early competence can only be supported:

> if one can give a clear distributional analysis of verb forms showing that the two different aspectual forms occur independently of the Aktionsart of the verb, independently of tense, and independently of any other semantic category. (Stoll 2001: 148)

In Gagarina (2004) the matter is further complicated by raising the question whether the perfective-imperfective distinction in Slavic languages should be considered a grammatical or a lexical process. She stresses that only verbs with potentially telic readings form proper aspectual perfective-imperfective pairs, as they mark the distinction between a completed event and an ongoing event. Imperfective verb forms may denote ongoingness but also habitual or generalised-factual events. The relation between prefixes (18 subtypes) for deriving a perfective from an imperfective and the resultant meaning is unpredictable: with one verb the prefix only marks perfectivity, whereas with another verbs it adds additional lexical meaning. It is also not predictable which prefix may combine with which lexeme. There is thus some ground for

considering the perfective and imperfective form of a lemma as two related, though different lemmas rather than as two inflectional forms of one lemma.

Gagarina (2004) studied the use of aspectual pairs in the same children as in Gagarina (2003), from the onset of verbs till five months later. She observed a close relation between the percentage of perfective and imperfective verbs in the input and in the children's speech. The absolute majority of perfective verbs denote resultative actions and combine with past tense inflection. The majority of imperfective verbs denote ongoing actions or processes, as well as intentions and combine with present tense inflection. Note that imperfective verbs mainly co-occur with (durative) telic verbs or verbs of motion. Gagarina (2004: 50) argues that the two types of verb forms 'do not really reflect tense, but indicate aspectual distinctions'. However, children do not 'mistakenly analyse tense morphology as grammatical aspect', but just represent the correlation between tense and aspect that is also typical for adult Russian.

From about the third month after verb onset the first imperfective past forms are produced to mark ongoingness or generalised-factual events and the first perfective future forms arise to mark near future: both combinations are very rare, and again, this is the case in the input as well (between 8 and 18% imperfective past and between 15 and 31% perfective future) (2004: 51). Within the five months, the number of contrastive aspectual pairs is not high: 10% in the children's speech and 19% in the input. Within these pairs, the perfective forms cluster with past tense and the imperfective forms with present tense so they are hardly used contrastively within one tense.

In sum, Bar-Shalom claims that Russian children acquire tense and aspect independently from the start. In contrast, Stoll and Gagarina claim that tense and aspect morphology arise around the same time, but are at first not or hardly ever used contrastively. They doubt if children master aspect and tense from the start as Russian children, like children in other languages, show a relation between tense-aspect and situation type. The exact meaning of early tense and aspect inflections, however, is not clarified in either of the studies. I will discuss my view on this matter in 10.5.2.1.

10.3.7 Japanese

There is debate in the literature whether Japanese is a separate language family, or whether it is related to Korean and / or to Altaic languages. Here, I treat it as a separate family. The most relevant TMA expressions of Japanese are presented in Table 10-9. The precise semantics of the different constructions are not always discussed very well in the literature. In those cases, more general labels of the TMA domain are applied in the FG classification.

Table 10-9. Relevant TMA expressions in Japanese (based on Clancy 1985 and P. Li & Shirai 2000:129-31)

Form	Author's definition or translation	FG classification
–ta	Perfect / perfective / past tense	Perfective (π1) + past (π2)
–te i-	Progressive /resultative	Progressive (π1) / resultative (π1)
–ru	Non-past tense (present states, habitual, future)	Non-past (π2)
–(chat)ta	Completed past	Completive (π1) + past (π2)
–nakatta	Negative past tense	Past (π2)
–nai	Negative non-past tense	Non-past (π2)
–tai	Desiderative, non-past tense	Volition (π1)
–chau	Completed non-past	Perfective (π1) + non-past (π2)
–oo	Intentive/cohortative	Modality (π1) / illocution (no TMA)?
–eru	Potential	Potentiality (π?)
kuru	'come to'	Aspect (π1)
oku	'put'	Aspect (π1)
–nakya	Obligation, 'must'	Obligation (π1)

In Japanese, there are several inflections on the verb for marking tense and aspect. The past tense marker *–ta* is in between a perfect or perfective aspect marker and a past tense marker. It is still used for referring to currently relevant states. There are hardly any restrictions in the combinations of the past tense marker with different verb types. The non-past marker *–ru* combines with stative verbs to refer to present states and with dynamic verbs to refer to habitual or future actions. The obligatory aspectual marker *–te i–* yields progressive meaning with activity and accomplishment verbs. Unlike English, the progressive marker does not refer to the pre-state when combined with a punctual situation (as in: *they are reaching the summit*) but to the post-state, as in *the ball has fallen* (and it is still there). In those cases it marks the duration of the resultant state and is analyzed as a resultative marker. It is in general not combinable with stative verbs, but it may mark temporariness, consider (29) (from Shirai 1998: 285):

(29) *Huzisan-ga* *mie-te i-ru*
Mount Fuji-NOM be:visible-ASP-NONPAST
'We can see Mount Fuji' (at this moment).

The progressive/resultative marker is combined with a past or non-past marker. The completed past *–chatta* adds the notion of completion or totality to past tense—'ate all up'—or the implication that the event was unfortunate—'got broken' (Clancy 1985: 425). In addition to inflectional marking, there are concatenated verb structures, that mark aspectual nuances: verbs like *kuru* 'come', *shimau* 'finish', *oku* 'put', *aru/iru* 'exist' occur after the non-final form of the main verb. Besides, there are sentence-final particles that express assertion, emphasis, questioning, call for confirmation and epistemic or evidential notions.

The acquisition of Japanese is described in Clancy (1985). This description is mainly based on extensive longitudinal data of one girl (1;0-6;0), on more limited longitudinal recordings for five children (1;6-3;6), and on diary studies on ten children. The acquisition of tense and aspect in particular is described in Shirai (1993; 1998) and Li & Shirai (2000). Finally, Matsui, Yamamoto, & McCagg (subm.) concentrate on the acquisition of epistemic and evidential expressions.

First, the general overview of Clancy (1985) will be presented. She does not explicitly use productivity criteria, but she presents examples of contrastive use. She claims that the first inflections are already productive before MLU 1.5: this is probably the result of the lack of a base form of Japanese verbs and the fact that the verb and its inflection are utterance final and therefore perceptually salient to the child. At first, lemmas occur in one form, but before the age of 2;0 children already contrast between imperative *–te* and past tense *–ta.*[12]

Around 2;0, there is an increase in verbal inflections: present progressive / resultative *–teru* (= *–te* + i*–ru*), non-past tense *–ru* and completed past *–chatta* are productive at this age. The non-past negative suffix *-nai* and desiderative *–tai* emerge and between 2;0 and 2;6, the completed non-past *–chau*, cohortative/intentive *–oo,* past progressive/resultative *–te–ta* and potentials in *–eru* come in. In the same period many concatenated verb structures are acquired, such as aspectual constructions with *kuru* 'come' and *oku* 'put'. Around 3;0, the child acquires the expression for obligation *–nakya* 'must'. The first verbs are restricted in their use: verbs occur with only one inflection, verbs with present tense morphology are referring to states, verbs with past tense morphology to change of states. Unfortunately, the use and semantics of the other inflections are not discussed (Clancy 1985: 381-87, 425-27).

[12] The three most common sentence final particles are also acquired before 2;0, *yo, ne* and *no*, but they do not belong to the TMA domain. Children use *yo* (assertive/emphatic) mainly in answers to questions; *ne* to express agreement with the addressee or to seek confirmation or approval from the addressee (similar to the use of a tag question in English) and *no*, which in adult Japanese indicates certainty about an inference, is by children used in questions (wh- and yes/no-), especially when speaker and addressee share a lot of information, and in answers.

Shirai (1993; 1998) investigated the acquisition of *–ta* (past), *–te i–* (progressive / resultative) and *–ru* (non-past) and the association of these three forms with situation type. He examined previous reports and longitudinal data from three children between 1;0 and 3;0. The onset of *–ta* is first, followed by *–ru* and then *–te i–* (after 2;0). However, productive use (more than five lemmas in one month) is almost at the same age for *–ta* and *–ru*, around 2;0, and a few months later for *–te i–*. The non-past form occurs from the start with different verb types: state, activity, accomplishment and achievement verbs, although the stative verbs for inanimate and animate existence, *aru* and *iru*, have high token frequency. Between 1;6 and 1;8, most past markers combine with telic verbs, either punctual or non-punctual. It is most strongly, but not entirely, associated with achievement verbs [+punctual, +telic] (between about 60% and 75%). The past marker is initially relatively frequently used with stative verbs, especially with *atta* and *ita*, verbs for inanimate and animate existence; these forms are probably the result of rote-learning as they are not used contrastively with the present forms. The past marker is often used to refer to situations that are currently relevant, i.e., as a perfect aspect marker, in particular in combination with stative verbs. For only one child, the use of *–ta* emerges during (and not before) the recorded data, and this child '(…) appeared to be using *–ta* in the beginning as a perfect marker, signifying current relevance (…) Only much later was he able to use it as a past tense marker (…).' (1998: 299). Finally, the progressive / resultative marker *–te i–* occurs with all but stative verb types. Some children acquire the progressive and resultative meaning simultaneously, whereas for other children one of the meanings arises earlier. Notice in this respect that many verbs in Japanese may be interpreted as either achievement (punctual entry into the activity) or as activity.

For one of the children the relation with the input was studied. It appears that in the different samples *–ta* is used mainly, but not exclusively, with achievement verbs (50%-71%), *–ru* is not restricted to any verb type, and *–te i–* is used primarily in its progressive meaning up to 1;8, and after that age more often in its resultative meaning. The distributional pattern of the three grammatical forms over situation types in the input is thus similar but less strong than the distribution in the child's speech.

Japanese children very early use grammatical expressions for reported speech, between 1;11-2;1. However, these expressions seem not to function as evidential markers of hearsay, but purely as markers of direct speech which do not belong to the domain of TMA. Examples are presented in Clancy (1985: 437), here in (30):

(30) *buun* *tte* *tob-u* *no.* (child at 1;11)
sound-of-flying QUOT fly-NONPAST EP.
'It flies (going) "buun".'

[And, when adult had failed to understand pronunciation of child:]
Uupapa *tte* *it-ten* *no.*
Supercar QUOT say-PRS.PROG EP.
'I'm saying, "supercar".'

Matsui et al. (subm.) performed an experiment to test the children's comprehension of epistemic and evidential expression in Japanese. They contrasted the use of the sentence ending particle (*da*)*yo* (speaker certainty or speaker knowledge) with *kana* (speaker uncertainty, epistemic) or with *tte* (hearsay, evidential) and the use of the verbs 'know' with 'think' (epistemic contrast) and 'see' with 'hear' (evidential contrast). Ninety-seven children participated in the study in age groups of on average 3;6, 4;6, 5;5 and 6;5. Four contrasting pairs of utterance types were generated, such as 'The apple is in the blue box *dayo/kana*' or 'I *know/think* the car is in the green box.' Children first watched a thief who surreptitiously hid objects in one of two containers. Then two animals told about the location of the objects, but they made conflicting statements. One used the most certain expression, the other the less certain. Afterwards, the child had to indicate the location of the hidden objects.

It appeared that in each age group children performed best on the *yo-kana* pair (epistemic particles) and worst on the 'see'-'hear' pair (evidential verbs). At 3;6, the children gave 75% correct answers for the epistemic particle pair, whereas the other pairs were at chance level or slightly above. At 4;6, the epistemic verbal pair is now also understood correctly (73% correct answers), whereas the remaining two pairs are only correctly answered in 62% or less. At 5;5, the children seem to have grasped the meaning of the evidential particle pair as well (70% correct) and finally, at 6;6, the children have more than 70% correct answers on the evidential verb pair. Children in all age groups performed significantly better on the particle pairs (*yo* versus *kana* and *yo* versus *tte*) than on the verb pairs ('know' versus 'think' and 'see' versus 'hear'). Performance increased over age, but the differences between age groups were larger for the verb pairs than for the particle pairs.

Both for the verb pairs and for the particle pairs, children performed better on the epistemic opposition in certainty (*yo-kana* and 'know'-'think') than on the opposition in evidentiality (*yo-tte* and 'see'-'hear'). This cannot be explained by frequency effects alone: in the input samples of one child, *yo* is most frequent (3955 tokens), then *tte* (1603) and then *kana* (970). The verbs are far

less frequent than the particles: 'see' is the most frequent one (410 tokens), followed by 'know' (70), then 'think' (51), then 'hear' (34).

The subjects were furthermore tested on a false-belief task: it appeared that there was no correlation between passing or failing the test and the performance on the particle pairs (78% of the children who failed the test were able to make correct choices based on the particles), but there was a correlation between the false-belief task and comprehension of the verb pairs. Children who failed the test performed significantly worse on the comprehension test than those who passed the test. The explicit knowledge about theory of mind needed for passing a false-belief task is apparently not required for understanding epistemic modality as expressed in the particles, which is based on implicit or unconscious understanding of another's mind. The results suggest that it is easier for children to grasp procedural information (implicit) about the speaker's mind as conveyed by the particles than to grasp conceptual (explicit) information as conveyed by the verbs. Furthermore, the concepts of certainty seem to be easier than those of evidentiality, performance on the former at least improving up to the age of four or five and the latter up to the age of six.

In sum, the first inflections acquired in Japanese, are tense and aspect markers. The past tense marker is acquired first. There is, however, evidence that the early past marker functions at first as a perfect aspect marker in the children's language. Shirai (1993; 1998) reports that the present tense ($\pi 2$) marker is acquired before the progressive /resultative ($\pi 1$), whereas Clancy (1985) reports that present tense ($\pi 2$), progressive/resultative ($\pi 1$) and completive past ($\pi 1 + \pi 2$) appear about simultaneously. This matter will be further discussed in 10.5.2.1. The performance in the comprehension tests suggests that epistemic distinctions expressed by sentence final particles are acquired later.

10.3.8 Kartvelian: Georgian

Georgian belongs to the Kartvelian or South Caucasian language family. Georgian has a complex, basically agglutinative, verb structure that is composed of several slots. The relevant slots are presented in (31):

(31) imperfective / perfective – Verb Root – durative / punctilliar - tense

Georgian verb roots can be divided into different conjugations. Verbs of the 1st and 2nd conjugation are telic, verbs of the 3rd and 4th conjugation are atelic (states and activities). Before the verb root, a directional prefix indicates the aspectual distinction between perfective and imperfective. The prefixes have to

be learned individually for separate verbs. After the verb root the distinction between durative and punctilliar aspect is indicated by the presence or absence, respectively, of a so called 'series marker'. The series marker is present in the future and present tense, the imperfective past (Imperfect), the conditional and conjunctive; the series marker is absent in the imperative, the optative and perfective past (Aorist). The present perfect is usually formed with the series marker and the pluperfect is formed without the series marker. After the series marker slot, tense is indicated: past perfective (Aorist), past imperfective (Imperfect), present or future tense (like in Polish, the present tense marker in combination with a perfective verb results in a future tense interpretation), present perfect and pluperfect. The present perfect and pluperfect are used as evidential markers beside their aspectual function (Imedadze & Tuite 1992: 40-49).

The acquisition of Georgian is described in Imedadze & Tuite (1992), mainly based on longitudinal data for two children and diary studies for several children. The first verb forms, from about 1;0, are telic verbs in the imperative and stative verbs in the present tense, such as *mina* 'I want' or *amna* 'I don't want'. Around 1;7, more verbs arise in the indicative: for a few months, stative verbs are always in the imperfective present and telic verbs in the perfective past. From 1;9 indicative verbs become more frequent; the future tense and optative emerge for expressing desire and intention. Although different verb forms are now used, there is still no opposition between punctilliar and durative aspect: telic verbs are always used in the (punctilliar) imperative, optative or perfective past and stative or activity verbs are always used in the (durative) present (p.57, 73). Fairly early Georgian children use the perfective and imperfective prefixes productively.[13] The difference in use between the two verb forms is, however, not explained, nor whether they associate with certain (lexical) aspect or tense forms. From what age children start using the imperfective past is also not explicitly discussed, but it seems to be acquired later than the other tenses (cf. p.70-71).

Between 2;0-2;6, an opposition arises between the punctilliar and durative aspect: first, telic verbs are used with both aspects (it is not indicated with what tense they occur). The form of the durative marker (series marker) is not predictable for a large number of verbs and children often overgeneralize the most productive and widespread durative marker, when a less common or unproductive form should be used. Beside the durative marker, the opposition between durative and punctilliar aspect is sometimes indicated by slightly or even completely different verb stems, for example *šl* for 'spread out'-durative,

[13] The Georgian-Russian bilingual child Dali produces innovative combinations from age 2;0 of Georgian prefixes and Russian verb roots (Imedadze & Tuite 1992: 68-69).

šal for 'spread out'-punctilliar; *šwreb* for 'do'-durative, *ḳen* for 'do'-punctilliar. Especially for telic verbs, children erroneously use the punctilliar stem for forming the durative construction. The opposite pattern occurs with verbs of the 4th conjugation (stative): stative verbs have unpredictably either the imperfective past or the perfective past to form the past tense. When the perfective past is used, children often apply it to the durative stem where they should use the punctilliar stem. The durative stems of stative verbs and the punctilliar stems of telic verbs are thus overgeneralized (Imedadze & Tuite 1992: 67-69).

The development of a distinction between durative and punctilliar co-occurs with another important development, the acquisition of case-marking. Georgian is a split-ergative language that applies a nominative case marking for verbs in a durative construction and ergative case marking for verbs in a punctilliar construction. From the moment that children apply the durative-punctilliar opposition for telic verbs, case markers begin to be used, and they are used correctly (p.57, 73).

The first perfect form to appear is the present perfect, which is primarily used for the expression of negated past actions, like 'I didn't break it'. Reports about initial use diverge from 2;3 till after 3;0. The present perfect in Georgian is used to express perfect aspect, but has an additional evidential sense of indirect experience: 'the speaker has inferred or been informed that an event has taken place, rather than having been a direct witness to it.' The perfective past (Aorist) is the neutral form and may, but need not, imply that the speaker witnessed the action or event. According to Imedadze & Tuite this evidential contrast emerges early in child Georgian. They illustrate it by an utterance at 2;3, in which the child would use the present perfect and the perfective past contrastively in evidential respect, consider (32) (p.67):

(32) *Š̌e=χed=e!* *melia-s* *da=ø=u=čer=i=a* *čiṭunia-ø*,
look:2SGS:3O:IMP fox-DAT catch:3O:3S:PFT bird-NOM

melia-m *mo=I=ṗar=a*
fox-ERG steal:3SGS:3O:PFT.PAST
'Look! The fox [apparently] has caught a bird; The fox ran off with it.'

Imedadze & Tuite consider this example as indicating an evidential distinction between the present perfect and the past perfective, in which the child 'is describing a picture in a book of a fox running off with a bird. The capture of the bird is not shown, but [the child] infers that it occurred.' However, when the child considers the perfect as the proper form for marking a resultant state,

whether witnessed or non-witnessed, he would have used the same form. Only if the child would use the perfective past and present perfect contrastively for describing witnessed and non-witnessed events with a resultant state, there is evidence that the child indeed grasps the evidential contrast. Like West Greenlandic (10.3.4), Georgian has an expression that functions both as a π1-operator (aspect) and as a π3-operator (evidentiality). Therefore, at a certain stage, children will use the expression in both these functions, without using it as a π2-operator. This goes against H7.

In sum, the details of Georgian language acquisition are not set. One of the earliest forms express volition (π1) 'want' and 'don't want'. The first inflected forms typically combine tense, grammatical aspect and situation type in the imperfective durative present for state and activity verbs and the perfective punctilliar past for telic verbs. The future and optative are acquired a bit later and express desires and intentions at first. Unfortunately, it is only marginally described how the distinctions in tense, perfective-imperfective, punctilliar-durative and telic-atelic may be combined in Georgian, what the resultant interpretations would be and how children find out about it. Moreover, there is no information on the contexts of use for these forms in child (or adult) Georgian, so it cannot be decided what children encode with these forms: aspect, tense or both. Between 2;0 and 2;6 the distinction arises between punctilliar and durative aspect, but again, the functions of this distinction are left unexplained. The final form acquired is the perfect, first the present perfect and later the pluperfect. Although it is claimed that one of the children indicates an evidential distinction by the perfect already at age 2;3, the example is not convincing and can be explained alternatively in terms of a purely aspectual distinction. To conclude, Georgian children make a major distinction between the telic-perfective-punctilliar-past (π1/π2), the atelic-imperfective-durative-present (π1/π2), and the future and optative used for desires and intentions (π1). They furthermore use expressions for volition (π1). Evidential uses of the perfect forms (π3) are acquired later. It seems as if children do not go through a stage in which there are π2-operators but no π1-operators, neither through a stage in which there are π3-operators but no π2-operators, but the data cannot count as hard evidence in support of the hypothesis due to the lack of information on the function of the forms in child Georgian.

10.3.9 Korean

Korean is classified as an isolate, although there is some suggestion of a possible relatedness to Altaic languages, Japanese or both. Korean has different expressions forms for indicating TMA: inflection, periphrastic complement structures, and obligatory sentence ending particles (SE's). Periphrastic

complement structures consist of a matrix verb that takes a verbal or clausal complement: these structures are used to express present and future tense, aspect and modality. Outside the periphrastic constructions, the matrix verbs function as single lexical verbs (Kim 1997: 403). SE's have very divergent functions: they are used to express modal notions, illocution, emphasis, evidentiality and politeness.

Korean has a three-way tense distinction between relative past, present and future tense in relative clauses. Inflection on the embedded predicate encodes that the time of the embedded clause was anterior, posterior or simultaneous to the time of the matrix predicate. Unfortunately, there are no data on the acquisition of these markers, except for the remark that children acquire relative clauses early, around age 2;0 (Kim 1997: 338, 46). In main clauses, past tense is encoded by inflection on the predicate *–ass/-ess*, whereas the non-past is in general left uncoded. However, present and future tense may be encoded by the periphrastic complement structure *kes* + *i-* (= complementizer + copula) that can take a clausal complement with relative tense inflection. The combination with a relative present marker on the verb, V-*nun kes-i-*, is used to describe ongoing events, such as 'The boat is passing by'; the combination with a relative future marker on the verb, V-*l kes-i-*, is used to describe future tense, such as in '(I) will play with daddy'. Furthermore, future time reference may be implied or expressed by the SE's for intention and volition, -*kkey* and *–llay*.

Aspectual distinctions (π1) are expressed by complement structures: progressive, egressive, resultative and perfective. Participant-oriented modality (π1) can be marked by several expressions: there are SE's for expressing intention and volition, -*kkey* and *–llay*, and several complement structures that express permission, volition, obligation, weak obligation, prohibition, and (in)ability.

Finally, there is a group of SE's, *–ta*, *–a/–e*, *–i*, and *–tay* of which the meaning is controversial. In Kim's analysis (1997) the first three markers express illocution and different degrees of politeness and do therefore not belong to the domain of TMA. The expression *–tay* is a reportative marker, an evidential notion (π3). In the analysis of Choi on the contrary (1991; 1995) all four expressions are claimed to express a notion of evidentiality or epistemic modality. This analysis will be discussed in detail later and also return in 10.5.3.1. A general overview of the relevant TMA expressions in Korean is presented in Table 10-10.

The acquisition of several forms is discussed in Kim (1997), and of modal complement structures and SE's in Choi (1991; 1995). The former study is based on the longitudinal data of five children between 1;7 and 3;5, with the focus on two children, and the latter on longitudinal data of three children

Table 10-10. Relevant TMA expressions in Korean (based on Kim 1997 and Choi 1991, 1995)

Form	Author's definition or translation	FG classification
-ass / -ess	Past tense	Past (π2)
-(u)n	Relative past in relative clause	Past (π2)
-nun	Relative present in relative clause	Present (π2)
-(u)l	Relative future in relative clause	Future (π2)
V-nun kes-i-	Present tense	Present (π2)
V-l kes-i-	Future tense	Future (π2)
V-ko iss-	Progressive	Progressive (π1)
V-a/e peli-	Egressive	Egressive (π1)
V-a/e iss-	Resultative	Resultative (π1)
V-a/e noh-	Perfective	Perfective (π1)
-kkey	Intention, future, prediction	Prospective (π1) / future (π2) / prediction (π3)
-llay	Volition, future	Volition (π1) / future (π2)
V-a/-e po-	Permission, 'shall I'/'may I'	Permission (π1)
V-to tway	Permission	Permission (π1)
V-ko siph-	Volition / desire	Volition (π1)
V-ya toy/hay/tway	Obligation, 'must',	Obligation (π1)
V-nun kes-i-	Weak obligation, 'should'	Weak obligation (π1)
V-ci mal-	Prohibition	No permission (π1)
V-su iss-	Ability	Ability (π1)
mos + V	Negation of ability	Inability (π1)
V-myen an tway	Negation of permission/obligation	No Permission (π1)
V-na pwa	Inference	Evidentiality (π3)
-ta	Declarative, informal / unassimilated information*	No TMA / proposition-oriented modality (π3)*
-a / -e	Declarative + Interrogative + Imperative, neutral/ assimilated information*	No TMA / Proposition-oriented modality (π3)*
-ci	Declarative + interrogative / shared certainty*	No TMA / proposition-oriented modality (π3)*
-tay	Reportative / indirect information	Evidentiality (π3)

Note. *Classification of these expressions differs in Kim (1997) and Choi (1991; 1995)

between 1;8 and 4;0. As a criterion for acquisition both authors required the form to be used with at least three different verbs, either within one month (Kim 1997) or within one session (Choi 1991, 1995). In spite of the slightly different criteria, the data will be treated here as comparable and the presented acquisition order and ages here are based on the average age of acquisition reported for the children in both studies (Kim 1997: Table 7, p.363, Table 8, p.406, Choi 1995: Table 2, p.179).

The first form to be acquired is the SE *–ta* at 1;9, either expressing declarative, informal (Kim) or epistemic modality (π3) (Choi). At 1;10 the SE *–a/-e* is acquired, either expressing informal, polite, declarative (Kim) or epistemic modality (Choi). At 1;10, also the past tense inflection and the modal marker for permission, V-*a/e po-* are acquired. Around 2;0, the complement structures for present, future and progressive are acquired as well as the SE *–ci*. Between 2;1 and 2;4 the aspectual expressions for resultative, egressive and perfective are acquired, as well as the SE for volition *–llay*. About a month later, at 2;5, the SE's for intention *–kkey* and for reported speech *–tay* are acquired. The children in Kim's study acquire several modal complement structures between 2;1 and 2;4, for volition (V-*ko siph-*), obligation (V-*ya toy-*), weak obligation (V-*nun kes-i-*), prohibition (V-*ci mal-*) and ability (V-*su iss-*). The children use one uncertainty marker *po* 'I guess' or *siph* 'I guess' productively at 2;7, whereas the children in Choi's study do not yet use it. Neither of Kim's subjects use the evidential construction *kes kath-* 'seem' productively at 2;8/3;3 (Kim 1997: 403-07).

The reports for the SE's are remarkably similar in both studies, but the reported age of acquisition for (participant-oriented) modal complement structures are divergent. Kim studied six modal constructions that are acquired between 1;10 and 2;4; Choi also studied six modal constructions, (three of which overlap with Kim's study), but these are acquired only between 2;6 and 3;0. The three modal constructions that overlap between both studies (ability, obligation and volition, V-*ko siph*) are acquired by Choi's subjects at least six months later than by Kim's subjects. It is unclear why there is such a big difference for these forms between both studies.

In the analysis of Kim, the data are more or less in accordance with the predicted order of acquisition: past tense (π2) and participant-oriented modality (permission, π1) are acquired simultaneously; progressive aspect (π1), present and future tense (π2) are acquired slightly later. Further expressions for aspect and participant-oriented modality are acquired later than tense, but there is thus no stage in which π2-operators are present but π1-operators are not. The first π3-operator (reportative, *–tay*) appears quite early compared to other languages, but later than π1- and π3-operators. Unfortunately, the initial contexts of use of the different tense forms are not discussed in the literature.

In the analysis of Choi, however, children in Korean start out with π3-operators, *–ta* and *–e*. Here, Choi's analysis of the SE's and the child data will be discussed in detail. According to Choi, in adult Korean *–ta* is used in declaratives when the speaker has just perceived something noteworthy in the present context. It expresses that the information is new to the speaker (S), that it is registered for the first time. The SE *–e*/*–a* is used in declaratives or interrogatives for information that is old to S, that is registered earlier and already assimilated in the knowledge system of S. The suffix *–e* is the most frequent in adult spontaneous conversations and can be considered the neutral suffix (Choi 1995: 173). The SE *–ci* expresses certainty of S to the truth of the proposition and denotes at the same time that the information is also known to the listener or can be readily inferred. It is for example used in questions, when agreement of the listener is expected, such as in 'Isn't Mary pretty-*ci*?' Finally, the suffix *–tay* expresses that the source of information is indirect, such as hearsay (Choi 1997: 105-06).

In language acquisition, *–ta* and *–e* are among the first forms to be acquired. Choi states that they are initially used to distinguish between declarative and imperative: *–ta* is used to describe events and situations in the here-and-now, whereas *–e* is restricted to requests or commands. Within one to six weeks, however, at the age of about 1;10-2;0, *–e* is also used in declaratives and *–e* and *–ta* are now used to differentiate between the status of the information. In 85% of the cases *–ta* is used in the following contexts:

(a) describing a scene in a picture as the child is looking at it,
(b) describing events/states that the child has just observed:
  (i) a perfective aspect which results in a particular state, e.g. *nemecy-ess-ta* 'fallen down'.
  (ii) an ongoing event/state, e.g., *can-ta* 'sleeping',
(c) commenting on the existence or non-existence of an event/object. (Choi 1995: 182; 1997: 111)

The suffix *–ta* is used for new/unassimilated information that the child experiences in the here-and-now, whereas the suffix *–e* is used to refer to information already assimilated in the child's knowledge system. In 64% of the cases it is used in the following contexts, although the distribution of *–e* over the various functions differs for individual children:

(d) to give information about a past event/state;
(e) to convince the listener of an event/state of affairs, or to talk about an event/state which was not occurring at the time of

(f) speech (e.g., negation, actions which the child was about to perform, make-believe events while playing with a doll or toy); and, in questions to verify the truth of a proposition. (Choi 1995: 184; 1997: 112)

The next SE's that Choi (1997: 115-17) discusses are *–ci* and *–tay*, that are acquired somewhat later, around 2;0 and 2;2, respectively. In adult Korean *–ci* expresses shared certainty of the truth of the proposition. The suffix *–tay* expresses indirect source of information, such as hearsay or a newspaper. The first occurrences of *–ci* in child language are in the context of (partial) repetition of an adult utterance with *–ci*, such as in (33) (1997: 115):

(33) ADL: *nemecy-ess-ci*? [when a pile of blocks fell]
'fall-PAST-SE' (= fell down?)
CHI: *nemecy-ess-ci*. [as a statement]

Note that this type of use is the one acquired around 2;0. Later in development, between 2;2 and 2;4, *–ci* is used spontaneously by the child in contexts where there is perceptual support for the proposition or where certainty about the proposition develops during ongoing discourse and the final statement receives *–ci* (almost like a conclusion). Finally, *–ci* comes to be used for expressing weak obligation for events that are normally done in a particular situation, together with the obligation connective *–ya*. Consider (34):

(34) Situation: Mother and child (2;3) have just finished washing the doll. Mother asks: 'Since the baby finished her bath, what should she do now?'
CHI: *os ipe-ya-ci*
clothes put.on-CONN-SE
'She must put clothes on.'

The modal SE *–tay*, for expressing hearsay ('it is said that' / 'I heard that') is acquired last, with first instances around 2;3, 2;4. It is used much less by the children than the other three SE's, but it is used consistently for '(i) telling the listener what the child believed a third party said or felt or (ii) reporting what a third party just said.' The children always seem to assume that the addressee does not know the information (Choi 1997: 117).

Finally, there is a special use of *–ta* with high pitch, that is used according to Choi (1995: 196) for marking that the information is new to the addressee (and

not to the speaker), such as when showing a new bracelet: 'I have a bracelet-*ta*!' This use of the particle is acquired last.

In Choi's analysis, Korean children linguistically mark an epistemic or evidential contrast (π3) around the age of 1;10-2;0 between information that is new and information that is old to the speaker. Children therefore go through a stage in which π3-operators are present, but π1- and π2-operators are not.

The final conclusions on Korean depends on the analysis of the function of the SE's *–ta*, *–e*/*–a*, *–ci* and *–tay* in child language. In the analysis of Choi (1991; 1995; 1997), the acquisition of Korean does not support H6. Korean children use evidential and epistemic SE's extremely early. This study is often quoted as evidence against the hypothesis that deontic modality (π1/ π2) is acquired before epistemic modality (π2 / π3). In the analysis of Kim, on the other hand, the acquisition of Korean is in accordance with H6. There is no stage in which the children have π2-operators, but no π1-operators, or π3-operators, but no π2-operators. The analysis of Korean SE's will be further discussed in 10.5.3.1.

10.3.10 Mayan: Quiché and Yucatan

There are two languages of the Mayan family in the corpus: Quiché or K'iche' Maya and Yucatan or Yucatec Maya. Mayan languages in general have very rich inflectional systems. The specific TMA expressions will be discussed separately for both languages.

Quiché / K'iche' Maya

Quiché or K'iche' Maya is spoken in the western highland region of Guatemala. It belongs to the Greater Quichean family of the Mayan languages. Quiché has a complex inflectional system: there is no grammatical tense marking, but there are five aspectual/modality categories; the incompletive, completive, potential/irrealis, volitive/imperative and perfect. They are marked by a prefix and a suffix from a 'termination' class, the form of which depends on the type of aspect, the verb type (root or derived transitive and intransitive), the distinction between clause medial and clause final position of the verb and the form of the verb root. Consider Table 10-11.

As an illustration, the forms for the termination class 'dependent', combining with volitive/imperative aspect, are as follows: for root transitive verbs the termination is *-o'* or *-o:* when the vowel in the verb root is /o/ and *-u'* or *-u:* when the vowel in the verb root is /u/; for derived transitive verbs the termination is *-j* and for intransitive verbs the termination is *-a*, or *-oq* when the verb is in clause final position. The Perfect termination that combines with perfect aspect is *-o:m* for root transitive verbs, *-m* for derived transitive verbs

Table 10-11. Relevant TMA expressions in Quiché (based on Pye 1992: 226-27; Pye 2001: 3)

Termination + prefix	Author's definition	FG classification
Plain		
k-	Incompletive, imperfective	Aspect (π1)
x-	Completive, perfective	Aspect (π1)
ch-	Potential / irrealis	Irrealis (π2)
Dependent		
ch-	Volitive / imperative	Imperative (illocution)
Perfect		
ø-	Perfect	Aspect (π1)

and *-inaq* for intransitive verbs. The first three TMA markers have the same terminations, but differ in their prefixes. The irrealis and imperative have the same prefix, but differ in their termination. There are two irregular volitive/imperative forms for the verbs *go* and *come*. Furthermore, Quiché has complement taking verbs for expressing progressive *tajin*, ability *kowin* and volition *a:j*. They combine with the incompletive aspect prefix (Pye 1992, 2001).

The acquisition of Quiché is described in Pye (1992; 2001), based on nine-months-recordings of three children, starting at 2;1, 2;9 and 3;1. Three other children were recorded for one month. The different terminations are already used productively in the earliest data (ca.2;0); the preverbal (T)MA-expressions however appear gradually. There is some individual variation, but in general the picture is similar. Pye (1992: 255) presents the order of acquisition, based on the 90% criterion of Brown (1973), discussed in 8.2.. Those morphemes that do not yet reach the 90% criterion are ordered according to the highest percentage of occurrence. The earliest forms to be acquired are the perfect, the progressive and the irregular volitive forms for the verbs 'go' and 'come'. The incompletive, completive and regular volitive do not reach the 90% criterion in the samples of the children. Only the oldest child uses the incompletive and completive prefix in more than 50% of the obligatory contexts at around 3;8. For all children, the incompletive and completive are more frequent than the regular volitive. The children apparently do not yet use the potential.

A remarkable fact is that the order of acquisition does not reflect the frequency in the input. In the input, the incompletive, completive, and regular volitive are much more frequent than the irregular volitive, the perfect, and the

progressive. It seems to be the case that perceptual saliency, a combination of syllabicity, stress and utterance position, has more influence than frequency.

Finally an important area in Quiché is cliticization: there are many particles expressed as clitics on the verb. Unfortunately, the available data on the acquisition of these particles is sparse. Pye (1992: 297) remarks that the particles that modify the verb phrase, *chi(k)*[14] 'again'/'already' and *k'u(t)* 'so, then' are most frequent and probably acquired before the particle *k'a* 'still'. The particles *a(h)* 'certainly, must', *ne(')* 'maybe, perhaps', *pu(ch)* 'perhaps' and *b'a:(')* 'indeed' are least frequent and acquired last.

In sum, the acquisition of Quiché supports the hypothesized order of acquisition. Perfect and progressive aspect are acquired first, followed by the perfective and imperfective. The potential/irrealis (π2) seems to be acquired later. The aspectual particles for 'already' and 'still' with narrow scope (π1) and the quantitative particle 'again' with narrow or medial scope (π1/π2) are all acquired before particles expressing epistemic modality, having wide scope (π3).

Yucatan / Yucatec Maya

Another Mayan language in which acquisition has been investigated is Yucatan or Yucatec Maya, spoken in Mexico/Belize. It belongs to the Yucatecan subbranch of Mayan languages. Yucatan has a set of 'status' suffixes, among which are the incompletive, completive, perfect, subjunctive, imperative and past participle. The form of these suffixes is, like the termination suffixes in Quiché, dependent on the verb type (intransitive, transitive etc.) and on TMA markers that occur preverbally. These TMA markers (a range of 15) are independent elements, mainly auxiliaries, with the exception of the perfective and imperfective prefixes. In adult Yucatan, status markers occur always with a preverbal TMA marker, except for the perfect and participle. The relevant expressions are presented in Table 10-12.

The contrastive use of inflection has been studied in one child (1;10-2;4) by Pfeiler (2003). The first verb forms at 1;9 and 1;10 are bare roots or verbs with the suffix *–eh* (subjunctive or imperative). For intransitive verbs, bare forms correspond to incompletive status, for transitive verbs, this corresponds to subjunctive or imperative status. Both forms are used as imperatives, and the bare roots are sometimes used as desiderative illocutions.

After 1;10 for transitive verbs, incompletive status is encoded, although without the obligatory preverbal marker, and also the perfect status suffix *–mah*

[14] The particles have a clause medial and clause final form, the latter indicated in between brackets.

Table 10-12. Relevant TMA expressions in Yucatan (based on Pfeiler 2003: 380-81)

Status + TMA	Author's definition or translation	FG classification
Incompletive		Imperfective (π1)
táan	Progressive	Progressive (π1)
k-	Incompletive/imperfective	Imperfective (π1)
ts'o'ok	Terminative 'conclude, result'	Aspect (π1)
yaan	Obligative, 'must, have to.'	Obligation (π1)
he'el…-e	Assurative future 'surely, indeed'	Tense (π2) + certainty (π3)
taak	Desiderative	Volition (π1)
Completive		Perfective (π1)
t-	Completive / perfective	Perfective (π1)
Subjunctive		
sáan	Recent past	Recent past (π2)
uuch	Remote past	Remote past (π2)
Perfect		
ø	Perfect	Perfect (π1)
Participle		
ø	Resultative	Resultative (π1)

and the past participle *a(h)-a'an* are used The incompletive is used for ongoing events, the perfect for events just ended and the participle for resultant states.[15] The first real contrastive uses of status markers is at 2;0: the contrast between a perfect *mach-mah* 'has grasped' and an incompletive *mach-ik* 'grasps' and the contrast between a completive *lúub-ih* 'fell' and the participle *lúub-a(h)-a'an* 'fallen'. Bare roots are still used, with imperative or desiderative meaning.

Around 2;1, inflection becomes more frequent. The verb 'fall' is now also used with incompletive (*-ul*) and subjunctive suffix (*-uk*). The completive status marker is used with the correct meaning, for events just ended, but without the obligatory prefix *t-*. The incompletive suffix begins to be used in combination with the obligatory prefix *k-*. The tense marker *sáan* for recent past appears with 'fall' and 'sleep' and the correct subjunctive status suffix is used for prohibition.

[15] Barbara Pfeiler, personal communication.

After 2;1 the proportion of bare verbs decreases: the participle and incompletive status are used with various lemmas and increasing frequency. At 2;2 there is a contrastive use of the completive and incompletive marker for 'threw' and 'throws'. The most frequent contrasts for transitive verbs are between the imperative, completive, participle and incompletive and for intransitive verbs between the completive and participle. For positional verbs, the incompletive and subjunctive forms are contrasted.

Contrastive use of suffixes occurs before contrastive use of the preverbal auxiliaries. Although some of the auxiliaries begin to be used rather early, they are very infrequent. The most frequent marker is the incompletive *k*-, with six tokens in the complete corpus. The first and third occurrence of the auxiliaries are presented in Table 10-13. The earliest auxiliaries are the recent past (π2), the completive (perfective, π1), incompletive (imperfective, π1) and the assurative future, which expresses future tense (π2) with a sense of certainty (π3). Note, however, that all preverbal auxiliaries are very scarcely used up to the age of 2;4.

In sum, the contrast between perfective, imperfective, perfect and resultative aspect (π1) is acquired first, although the incompletive and completive form lack the prefix for a while. The fine-grained aspectual and temporal (π2) distinctions that are expressed by prefixes are acquired later, with the recent past marker being the first tense form. The assurative future expresses a sense

Table 10-13. Use of TMA prefixes in one child (1;9-2;4) (based on Pfeiler 2003: 393-94)

First use	Third use	Author's definition	FG classification
1;10	-	Progressive	Progressive (π1)
1;11	2;3	Completive	Perfective (π1)
2;1	2;4	Incompletive	Imperfective (π1)
2;1	2;4	Assurative future	Future (π2) + certainty (π3)
2;1	-	Subjunctive	-
2;1	-	Desiderative	Volition (π1)
2;1	-	Terminative	Aspect (π1)
2;1	2;1	Recent past	Recent past (π2)
2;3	-	Obligative	Obligation (π1)
2;3	-	Remote past	Remote past (π2)

of certainty (π3). This supports the hypothesized order of acquisition. A remarkable fact of Yucatan is that the 'perfective/past' domain is divided in many phases, covered by the participle (resultative), completive (perfective), perfect (perfect), recent past and remote past, and probably also the terminative. Children do not seem to have any problems with this and start to use several forms within this domain from early on.

10.3.11 Semitic: Modern Hebrew

Modern Hebrew is a semitic language, spoken in Israel. It is a language that has no obligatory aspectual distinctions and modal marking is realized lexically. In this regard, it is not the best language for testing the hypothesis. However, it is interesting to examine the contexts of use of the first tense forms in Hebrew so that they can be compared to other languages. Hebrew has a three way distinction between past, present and future tense: the verb forms are constructed of a consonantal root with alternating vowels, pre- and suffixes to indicate the tenses, for example, different tenses of 'learn' are all build on the root 'l-m-d': present sg.masc. *lomed*; past 3sg. *lamad*; future 3sg. *yilmod,* infinitive *lilmod*. The present tense forms, inflected for person and gender, are similar to the participial forms, which in combination with the past tense copula denote past imperfective, past habitual (optional) or hypothetical. The future form denotes future tense and probability.

The acquisition of Hebrew is described in Berman (1985). The first verbal forms in Hebrew are imperatives, followed by infinitives. 'Well into the third and even fourth year, children "over-use" infinitives, as the most typical way of expressing requests, desires, and prohibitions' (p.268). Already in the one-word stage present and past forms of verbs are used, while the future tense emerges later, around 2;6. Initially, present tense forms are used only for activities ('cry', 'play') and states ('want', 'know') whereas past tense forms are used with telic (punctual) verbs ('fell', 'broke, got broken'). The first future tense forms encode immediate rather than remote future. The present tense is already used earlier together with *axshav* 'now' to encode the next immediate step in a series of activities. Tense operators in Hebrew are thus at first restricted to one aspectual type. By age 3;0 the same lemma is used with all three tenses: s*hote* 'is-drinking', *shata* 'drank, has-drunk' and *yishte* 'will-drink, is-going-to-drink' (p.269).

Besides tense inflections, Hebrew has different verb-patterns (binyanim) that encode properties of events, like transitiveness, causative, inchoative, iterative, etcetera, for example 'write' k-t-b, in the pa'al (neutral) is *katav* 'write', in the nif'al (passive) it is *ni-xtav* 'be written' and in the hitpael it is *hitkatev* 'correspond' (write + reciprocal). Although most notions covered by the verb-patterns do not belong to the domain of TMA, the acquisition pattern

resembles the development of tense and aspect in other languages. Between age 2;0 and 3;0 a given verb root is only used in one pattern. Between age 3-4 some variation of verb patterns occurs with certain frequent verbs. Children use the correct form in different contexts, but Berman argues that they do not yet have a clear perception of the systematic relation between verb patterns and semantics. Between the age of 4 and 5 children start to grasp this relation: numerous roots are used in different verb patterns in many different contexts and children make substitution errors and lexical innovations. Between age 5 and 6 children have full command of the system for most verbs, although they avoid certain verb patterns, mainly passives and inchoatives and use (wellformed) analytic periphrastic expressions instead (Berman 1985: 270-76). As well as in languages with aspect and tense marking, where specific lemmas at first occur with only one aspect or tense, in Hebrew specific lemmas at first occur only in one verb pattern.

In sum, Hebrew only has grammatical tense markers and a non-obligatory combined past imperfective/habitual or hypothetical. Only the tense markers occur in early child Hebrew, and they are used contrastively only from about 3;0. The acquisition of TMA in Hebrew is contrary to the prediction by H6 that children never go through a stage in which π2-operators are present, but π1-operators are not.

10.3.12 Sino-Tibetan: Mandarin and Cantonese

There are two languages in the corpus that belong to the Chinese subbranch of the Sino-Tibetan language family: Mandarin and Cantonese. Both languages are isolating with respect to their morphological structure.

Mandarin

Mandarin Chinese is spoken in the northeast region of China and is the main language, in that it has the largest number of speakers. It is also spoken in Taiwan. Mandarin is mainly an isolating language without tense marking, but with aspect particles and modal verbs. In the literature, there is no consensus on the exact functions of Mandarin aspect markers. Imperfective aspect can be encoded by *zai* or the suffix -*zhe*. The former is a progressive marker and confined to non-stative situation types. The latter marks that an event is enduring or continuing and naturally combines with states, in particular as background information. There is a third general imperfective marker –*ne* that generally co-occurs with *zai* or –*zhe* in sentence final position. The imperfective aspect markers are not obligatory: the English utterance 'I'm writing' can be translated to Mandarin without an aspectual marker. The progressive *zai*

highlights prominent actions, so the sentence in (35) can be uttered in for example the contexts i-iii (Erbaugh 1992: 389):

(35) 'I'm writing now,' implying, i) so don't bother me, ii) I'm not drawing, iii) tell the guests to wait.

Perfective aspect in Mandarin is marked by *–le*: use of this marker either implies the completion ([+telic]) or termination ([-telic]) of an event. In combination with a state, it marks the inception of this state. The marker *guo* indicates that an event has been experienced (once) at some indefinite time, usually in the past, but sometimes in the future. The resultant state does not obtain at speech time. If it does, then *–le* is used. In addition to aspect markers, Mandarin has expressions for participant-oriented modality (π1). Erbaugh mentions that there are grammatical devices for marking conditionality or hypothetical, but she does not present the forms used. The relevant expressions are presented in Table 10-14.

The acquisition of Mandarin is described in Erbaugh (1992); the acquisition of lexical and grammatical aspect in particular has been analyzed by Li & Shirai (2000). Note that there are mainly π1-operators in Mandarin, which makes it very likely that H6 is supported by the data on acquisition. Like Hebrew, however, the contexts of use of the different forms are interesting for the comparison across languages.

Erbaugh (1992) examined the longitudinal spontaneous speech of four children between the ages of 1;10 and 3;10. Before age 2;0, TMA expressions

Table 10-14. Relevant TMA expressions in Mandarin (based on Erbaugh 1992: 388-90; and P. Li & Shirai 2000: 92-96)

Form	Author's definition or translation	FG classification
-le	perfective	Perfective (π1)
zai	Progressive [+dynamic]	Progressive (π1)
guo	(experiential) perfect	Perfect (π1)
-zhe	durative	Aspect (π1)
-ne	Imperfective	Imperfective (π1)
yào	'want'	Volition (π1)
huì	'can/might'	Permission (π1)
néng	'can, able to'	Ability (π1)
?	Hypothetical	Hypothetical (π2)

are extremely rare. Between 1;8 and 2;5 the perfective marker *-le* appears. The most common modal at this age is *yào* 'want', which combines with a verb. Time marking (by adverbs) occurs very infrequently.

Between 2;3-3;2, children often use *huì* 'can/might' and *néng* 'can, able to'. The perfective marker *–le* is used commonly and correctly. It is used most often with reference to punctual events with a clear result that has current relevance (36), but even the youngest children use it also with activity verbs, such as 'roll', 'fly', 'talk', 'cry', 'draw' and 'play' (37). However, many of these activity verbs occur in resultative verb constructions, i.e., a serial verb construction with a resulting telic interpretation, such as *he-wan-le* 'drink-finish-PFV':

(36) *dǎ-pò-le*
hit-break-PFT
[I] have broken [it]'

(37) *kū-le*
cry-PFT
'[I]'ve cried.'

About 85% of the uses of *–le* in the corpus refers to immediate past. Children often use it to 'call attention to a noteworthy change of state, such as breaking a cup or finishing a block tower.' (Erbaugh 1992: 423). Children use *-le* productively, which is shown by the fact that they ungrammatically attach it to nouns with a resultative meaning, such as the following examples at 2;0: 'I've robot-ed' (I've become a robot); '[It's] house-ed', when a block tower is completed; '[it] has two-ed,' when lego-blocks are pulled apart (p.426-27).

After 2;6, the perfect aspect marker *guo* is used occasionally for past experience, for extended recurring activities and actions, rather than for unique experiences. Between 2;3 and 3;0 children infrequently but correctly use the progressive and imperfective markers. Remember that these markers are not obligatory in adult Mandarin, and only used when the speaker wants to emphasize the ongoingness of the event or mark it as background information. The progressive *zai* contrasts with the unmarked form for activity verbs and can be used to ward off requests, as in (38) (from Erbaugh 1992: 429):

(38) Situation: Pang (2;8) refuses her grandmother's requests to sing, claiming she is too busy slicing up clay.
Wǒ zài qiē nàge
I PROG slice that
'I'm slicing that up!'

The progressive is used contrastively to the perfective. This is shown by (39), which is uttered a moment later than (38), when Pang has finished:

(39) *qiē-hǎo-le*
slice-finish-PFT
'(I)'ve finished slicing'.

In contrast to the perfective marker, mainly used for self-reference, 50% of the progressive markers describes the action of someone other than the child.

Between 2;10 and 3;4 children begin coordinating events, by using the progressive or temporal adverbs. After 3;4 narratives emerge. The acquisition of aspectual expressions for distinguishing between foregrounded and backgrounded actions and states continues throughout late childhood.

After 3;2 modals are mostly used in correct contexts, although the main verb is still often omitted, which is ungrammatical in adult Mandarin. It seems as if the object marker *bǎ* is interpreted as a verb. Consider (40) (from Erbaugh 1992: 415):

(40) **bù* *yào* *bǎ* *wǒ* ø
not want OBJ-MARKER me ø
'don't ø me'.

Auxiliary verbs and modals frequently function as main verbs: 'I can ø this', 'I want (to) still ø' (= 'continue ø-ing').

Already from age 2;0 the Mandarin children refer to hypothetical or counterfactual situations, by juxtaposing two clauses. The correct, explicit grammatical devices for marking conditionality are, however, rare before 3;10.

Li & Shirai (2000) carried out several experiments to test the children's production and comprehension of the aspectual markers. Three age groups of 45 children of 4, 5 and 6 year old were shown two picture stories. The stories only contrasted in representing different parts of an event, such as 'the window is open' versus 'the window opens'. One of the stories could be described by a sentence with the imperfective marker *zai* or -*zhe*, the other with the perfective -*le*. The children had to chose the story that best fitted the description they heard.

Overall performance increased with age. At 4 years of age, the marker –*zhe* was already understood correctly in more than 80% of the cases and at 5 already with ca. 90%. The progressive marker *zai* is best understood with activity and semelfactive verbs and worst with telic verbs. For the former verb types, 4-year olds answer 70% correctly, for the latter verbs types only about 55%. At 6, 90% of the activity and semelfactive verb combinations is

understood correctly and about 70% of the combinations with telic verbs. The marker -*le* is understood best with telic verbs (about 70% correct at 4;0) and worst with activity (38%), stative (44%) and semelfactive (51%) verbs. There is progress up to age 6, when the combination with telic verbs is understood correctly in about 90% and the other combinations of lexical and grammatical aspect fluctuate between 50-70% correct responses. The test shows that children have clear preferences for certain combinations of aspect and situation type.

In a second test, children between 3 and 6 (25 per age-group) had to describe the actions of a puppet to an experimenter that was blindfolded. The general result is that –*ne* and *zai* are used mainly with activity and semelfactive verbs and –*le* predominantly with telic verbs. All age groups use –*ne* and –*le* also with stative verbs and there are overgeneralization errors of *zai* to stative verbs. The marker –*zhe* was hardly ever produced (apparently, the marker –*guo* was completely absent).

The third test consisted of an elicited imitation task, in which children had to imitate grammatical or ungrammatical combinations. The children were between 3 and 5, divided in three age groups of 25 children. The imperfective marker was combined with resultative verb constructions [+telic] and with stative verbs. It turned out that the children have the greatest difficulty with the combination *zai* + telic verb but do not have problems imitating *zai* with stative verbs. Older children are better than the younger at imitating both the grammatical as the ungrammatical combinations. These findings suggest that children (at least at age 3) are sensitive to a distinction between atelic and telic (process and result)[16] but not to a distinction between stative and dynamic (state and process).[17]

Li & Shirai (2000: 125) arrive at the conclusion that the patterns in child Mandarin are the result of the distribution in the input. The sensitivity to the process-result distinction is not absolute and becomes stronger with age, so that it cannot be explained by a prelinguistic or innate concept.

In sum, the data on Mandarin are in accordance with the hypothesis: aspect ($\pi 1$) is acquired first, then participant-oriented modality ($\pi 1$) and finally the expression of hypotheticality ($\pi 2$). There is at first a strong association between perfective aspect and telicity and between progressive aspect and atelicity.

Cantonese

Cantonese or Yue is another Chinese language, spoken in the southeastern parts of China, including Hongkong. Cantonese has mainly aspectual ($\pi 1$) and

[16] This is predicted by the Basic Child Grammar hypothesis of Slobin (1985).

[17] This is contrary to the prediction by the Language Bioprogram hypothesis of Bickerton (1984).

modal distinctions (π1, π2, π3), but also an expression for future tense (π2) and repetition (π2). Since Cantonese formed part of the GRAMCATS sample, the exact TMA expressions in adult Cantonese are presented in Appendix G.

In a longitudinal study on eight children (1;5-3;8) it appears that between 1;9 and 1;11 aspect markers, modal auxiliaries and sentence final particles are produced. First, aspectual markers are acquired: the perfective *zo2* is acquired before the durative *zyu6* and the progressive *gan2*. Around 2;0 modal auxiliaries are acquired: *dak1* (postverbal), *wui3* (preverbal) and *ho2ji3* (preverbal). (CANCORP).[18] *Dak1* is used to express ability and root-possibility, *wui3* to express ability and intentional future and *ho2ji3* to express root-possibility and permission.

According to Lee & Law (2001) Cantonese has at least 30 sentence final particles that cover notions of aspect, mood, modality, condition, temporal order, evidentiality, focus, etcetera. These markers are not obligatory in adult Cantonese. Note that this analysis of TMA expressions in Cantonese is not identical to the one in the reference grammar used for Chapter 7 (Kwok 1971). However, for now, these particles will be considered grammatical expressions and the information on their acquisition will be discussed here. In child Cantonese, final particles emerge as soon as two-word combinations appear. Lee & Law (2001) examined the acquisition of five evidential or epistemic modal particles, which, in adult Cantonese, express the degree of commitment of the speaker to the proposition or the relationship between information and knowledge status of speaker and hearer. The particles are presented in Table 10-15. In Functional Grammar all these markers are classified as having wide scope (π3), and according to H6 they should be late in the acquisition process.

Table 10-15. Sentence particles in Cantonese (based on Lee & Law 2001)

Form	Author's definition or translation
wo5	Quotative, reported speech
gwaa3	Uncertainty about truth of proposition
wo4	Unexpectedness/surprise about information
lo1	Obviousness of information, 'needless to say': it also expresses agreement with what the interlocutor said before
aa1maa3	Elaboration: proposition is a reason or justification for another event or situation preceding in (non)linguistic context. Often used in answers to wh-questions.

[18] See www.arts.cuhk.edu.hk/~cancorp/

Lee & Law investigated in spontaneous speech when the particles occur and in comprehension tests whether children understand the adult function. The spontaneous use of the particles is examined in longitudinal data of three children between 1;7 and 3;8. It turns out that the first particle, *wo5* for marking quotative, is only used by one of the children, three times after age 3;0. Two of these instances are even redundant in that they combine with a verb of communication. Although the children hardly ever use the quotative particle they seem to understand the concept of reported speech as they regularly use direct and indirect quotation from about 2;5, which they express with lexical verbs of communication: 'mam/dad/teacher *said* (that …)'.

The second particle, *gwaa3* for uncertainty, is not used at all in the samples. The eldest child does, however, understand some notion of uncertainty as she occasionally uses the adverb for 'probably'. The third particle, *wo4* for unexpectedness or surprise, occurs once in the data of the youngest child and occasionally and correctly in the samples of the two older children from age 2;5 onwards. An example is presented in (41) (ex. 33c in Lee & Law 2001):

(41) Situation: Child (2;9.28) plays with a Garfield toy and comments on another toy in comparison with the Garfield toy.
gam daai zek wo4
So big CL UNEXP
'(this is) so big [surprise]'

The particle is often combined with expressions that indicate that the situation described is extraordinary, such as adverbs of degree like 'so'.

The fourth particle, *lo1* for obviousness, is actively used by all children. It is rare before 2;0 but becomes quite frequent between 2;0 and 2;11. It occurs first when talking about characteristic properties of people or things, visible facts (to child and adult) or ego-related facts (name, intended actions/desires). An example is presented in (42) (ex.34a in Lee & Law 2001), in which SFP stands for sentence final particle:

(42) Situation: talking about a washing machine

ADL:	*sai*	*matje*	*aa3*?	
	wash	what	SFP	
CHI:	*sai*	*saam*	*lo1*.	(Child at 2;5)
	wash	clothes	OBV	

'(it) washes clothes (obviously).'

Although the particle is used in contexts that may seem appropriate, it is:

> unclear whether the child assumed what was conveyed should have been evident to the hearer. It is possible that the child used the particle to mark information that was salient or readily available in his/her own knowledge or apparent from the environment without taking into account the state of the hearer's knowledge. (Lee & Law 2001: 28)[19]

A later use of *lo1* is in inferential contexts of cause or effect. This use emerges around 2;3, and becomes frequent after 2;6. After 3;0 it occurs productively in conditional contexts: 'if … then …-obviously.' Although Lee & Law (2001) consider this as marking cause or effect, the examples could still be interpreted as marking obviousness (of the cause or effect), consider (43) (ex. 34d in 2001):

(43)	ADL:	*gam dimgaai*	*wui han*	*aa3*?	
		so why	will itchy	SFP	
		'why do you feel itchy?'			
	ADL:	*jau*	*me*	*ngaau*	*nei* *aa3*?
		have	what	bite	you SFP
		'what bit you?'			
	CHI:	*man*	*ngaau*	*lo1*	(Child at 2;11)
		mosquito	bite	OBV	
		'mosquitos.'			

In my view, the use of the marker in contexts of cause and effect is the result of the development of these linguistic contexts rather than a semantic change of the particle.

The final particle, the elaboration marker *aa1maa3,* does not occur in the data of the youngest child, it occurs only twice in the data of the middle child (only one appropriately), but it occurs 114 times in the data of the oldest child. She mainly uses it in answer to 'why'-questions (52 times) or other wh-questions (24 times). It is also quite often used inappropriately (35 times) in that it marks new information without a preceding context that is elaborated (when the child initiates a new topic that is only slightly or not at all related to the preceding context) or it does not provide information ('I know because I know - elaboration', LLY at 3;3.15, ex. 37b in Lee & Law).

In an experimental study Lee & Law further investigated the comprehension of the more frequent markers *wo4* (surprise/unexpectedness) and *aa1maa3* (elaboration). Thirteen six-year-olds had to make use of the information

[19] In this latter use, it resembles the use of the adverb *natuurlijk* 'of course' in Dutch, which children use quite often in answer to adult's questions if they convey information that is obvious from their own point of view. This adverb is probably used at a later age than the Cantonese particle.

conveyed by the particles. In the comprehension test of *wo4*, the children were told a story with pictorial support, in which two puppets had a box and a magician changed the contents of one of the boxes, without the puppets knowing of which box. The puppets looked into their boxes to the contents and the first puppet says: 'My box has a X'. The second puppet (or vice versa) says: 'My box has a X-*wo4*.' The child had to guess the contents of which box were changed, which is possible if the particle *wo4* is comprehended as indicating surprise (about the change of the contents). However, the percentage correct guesses ranged from 0-75% in the children and only 3 of the 13 children showed consistent comprehension. This test reveals that, although children of 2 and 3 use *wo4,* they probably do not yet understand its adult meaning.

A comparable, though more abstract story was set up for testing the comprehension of *aa1maa3,* but here the results were even worse. None of the children reliably understood the role of the particle, although the authors recognize that the test could have been too complicated.

Finally, the input of the respective particles to the three children is investigated. The quotative and uncertainty particle are extremely infrequent in the input (3-7 tokens and 1-2 tokens in the recordings) and when they are used, they are mainly directed to an adult addressee, not to the child. A possible explanation for the infrequent use is that in child directed speech these particles are not necessary. The quotative and uncertainty markers are used to weaken assertion, commitment, and responsibility for the truth of the proposition, but in child directed speech 'no social penalty will ensue if adults overcommit themselves to a statement.' (Lee & Law 2001). The other three particles are more frequent: 37-79 tokens for the unexpectedness particle, 243-692 tokens for the obviousness particle and 28-70 tokens for the elaboration particle: there is thus a clear similarity between the distribution of the particles in the input and in child language. The general conclusion of these studies is that both the understanding and the production of epistemic and evidential particles develop late. Although some of the particles occur before 3;0, they do not yet have complete adultlike semantics.

In sum, Cantonese children acquire operators with narrow scope (aspect and participant-oriented modality) before operators with wide scope (quotative, uncertainty, obviousness, surprise, elaboration). The acquisition of TMA in Cantonese therefore supports the hypothesis. Cantonese does have TMA expressions with medial scope (see Appendix G, GRAMCATS sample), such as modal markers that express event-oriented meanings. Unfortunately, there is no information available on the acquisition of these expressions.

10.3.13 Trans-New Guinea: Kaluli

Kaluli is spoken in Papua New Guinea. It is a Bosavi language, belonging to the Central and South New Guinea stock of the Trans-New Guinea languages. The relevant categories of aspect and tense are presented in Table 10-16. Verb stems in Kaluli vary drastically, depending on tense. In general there is one stem form used for the future imperative, negative imperative, present and recent past and one for the present imperative, future declarative, purposive and intentive 1 and 2. However, this distinction does not hold for all verbs and for many verbs the stem form is completely unpredictable. The stem for the past tense is completely irregular in any case.

The acquisition of Kaluli is described in Schieffelin (1985), based on diary notes, longitudinal data of three children (ca.2;0 - ca.2;8) and a few recordings of a fourth child. No explicit criteria for acquisition were used. Between 1;8 and 2;0 only the imperative and the non-past form are used. Between 2;0 and 2;6, children use different inflected verb forms and they do not use bare stems. When the children talk about a third person, they mainly use present and recent past forms for describing ongoing and completed actions, respectively. There is very limited use of Intentive 2 or future, which may be due to sociolinguistic factors: for Kaluli people it is culturally not allowed to speak of other's intentions as the *communis opinio* is that one cannot know what someone else thinks or feels.

When children talk about themselves, most utterances are initially in the present tense and describe their own actions. From 2;3, children also use other tenses: reference to already initiated and future actions predominates; 10-15% of all utterances refers to past events; 5-12% to intended actions (Intentive 1).

Table 10-16. Relevant TMA expressions in Kaluli (based on Schieffelin 1985: 572)

Form (1p)	Author's definition or translation	FG classification
-ɔl	Present	Present (π2)
Irregilar stem change	Past	Past (π2)
-abe	Recent past	Past (π2)
-an	Habitual	Habitual (π2)
-mɛnɔ/-iɛnɔ/-ɛnɔ	Future	Future (π2)
-ɛni	Intentive 1: 'about to' (only 1p)	Immediate prospective (π1)
-gɔl	Intentive 2: 'starting to'	Ingressive (π1)

Note. 1p = first person

Up to 2;6, children have gaps in the verb paradigms: they do not use all possible verb combinations and certain inflections are restricted to specific lemmas. In general, children talk about what is observable and knowable (Schieffelin 1985: 573-74).

Aspect in Kaluli is expressed through prefixes, infixes and lexical items. It is optionally expressed, contrary to tense inflection, and 'may be used when the speaker wishes to highlight some feature of the situation' (p.581). Around 2;6, the aspectual prefix -ɔ becomes productive, marking 'still, in the process of'. Aspectual notions expressed through infixing appear only after 2;6, and before 2;9 children use infixing infrequently and often incorrectly. Children mark duration through repetition of the verb, whereas adults only use this device in narratives.

Besides the simple verbs, there is a serial verb construction that marks past consecutive action. The suffix –ɛsɛgɛ is applied to the verb stem, see (44) (from Schieffelin 1985:585):

(44) *diɛsɛgɛ* *miɛnɔ*
take:PAST:CONSEC come:1:FUT
'having taken, I will come.'

This construction arises between 2;1 and 2;3 and is at first mainly used with the verbs *dima* 'take' in combination with the final verbs *mena* 'come' and *hamana* 'go'. Other serial verb constructions with an auxiliary verb *dowab* 'do' in third person express notions of participant-oriented modality ('want to', 'able to'). They are used correctly at 2;6, but probably not yet fully productively.

Between 2;2 and 2;6, the evidential particle *-lɔb* for marking visual evidence becomes productive. However, children tend to use it as a general emphatic marker, for example when they found something, 'without the correct pragmatic force' (p.542). Around 2;8 the evidential markers for expressing 'having heard' and 'inferred from evidence' are used and 'children began to use these more specifically for their evidential features, not as generalized emphatics' (p.543). The quotative verb 'say:3' is frequently used from age 2;2, to mark reported speech. Like the evidential particles it is at first often used emphatically, but also correctly in contexts of direct speech (p.542, 87-88).

In sum, the development of TMA markers in Kaluli is not in accordance with the predicted order by the Scope Hierarchy: the obligatory tense markers appear first. Non-obligatory aspectual distinctions are acquired after tense, the first particle around 2;6. What supports H6 is that evidential markers are first used for emphasis and only later, around 2;8 in the proper adult function of evidentiality.

10.4 INTERMEDIATE CONCLUSION

Before the results with respect to H6 will be discussed, H7 will be discussed briefly. H7 predicts that there will be no stage in child language in which a polysemous expression is used in the function of a π1-operator and a π3-operator, but not as a π2-operator. There was hardly any information in the studies with respect to this hypothesis. The data on the acquisition of the different functions of *–mIʃ* in Turkish supported the hypothesis. However, West Greenlandic and Georgian both have an expression that can function as an operator of perfect aspect and as an operator of evidentiality (π3). In these languages, children will thus reach a stage in which they use a polysemous expression with non-adjacent scopes. In Chapter 7 on adult languages, the co-occurrence of perfect aspect and evidentiality also appeared to go against H3b on polysemous expressions in adult languages (7.5.2.1). Here, West Greenlandic (Inuit) was also the exception to the rule. Furthermore, in 7.2.3, it appeared that diachronically, evidentiality may develop directly from perfect aspect (7.2.3), skipping a scopal layer. The assumption that underlies H3b and H7, i.e., that semantically related meanings have adjacent or similar scopes, is clearly too absolute. In order to test H7 thoroughly, detailed research is needed on the acquisition of polysemous modal expressions that can be used will all types of scope.

With respect to H6, the data on the acquisition of TMA show a large variety in the acquisition order of TMA expressions across languages. A summary of the crosslinguistic data is presented in Table 10-17. The categories presented in the table reflect the interpretation of the children's forms as described in the literature. In some research, adult tense forms are analyzed as expressing something else than tense in child language. Only if the researcher has explicitly stated that tense forms in child speech are used with an alternative function, is this indicated in the table by 'tense used as'.

The languages in the table are presented in the same order as they have been discussed, under their language families which are ordered alphabetically. In the rightmost column a plus or minus indicates whether the acquisition order is in accordance with the Scope Hierarchy. If π1- and π2-operators are acquired simultaneously or if π2- and π3-operators are acquired simultaneously, this is indicated by a '±'. For some languages, the acquisition order of different sets of morphemes is clear, whereas the overall acquisition order of all morphemes is not. In those cases, the different acquisition orders are separately presented, for example, the acquisition order of different modal expressions in Italian is presented separately from the acquisition order of tense and aspect as the mutual acquisition order is not known. For French, Polish and Russian, the analysis of different researchers leads to different conclusions: these

Table 10-17. Overview of acquisition orders of TMA in the languages of the sample

Language	Acquisition order	Predicted
Turkish	(Tense used as) aspect (π1) < (tense used as) tense (π2) < habitual (π2) < evidentiality (π3)	+
Warlpiri	(Tense used as) aspect (π1) < (tense used as) tense (π2) < evidentiality (π3)	+
Sesotho	Aspect (π1) / tense (π2)	±
West Greenlandic	Aspect (π1), participant-oriented modality (π1) < habitual (π2) < tense (π2) < evidentiality (π3) < iterative (π1)	+
Finnish	Tense (π2) < aspect (π1) < participant-oriented modality (π1) < irrealis (π2)	-
Lithuanian	Participant-oriented modality (π1 or lexical?) / tense (π2)	± or - ?
Greek	Aspect (π1) / participant-oriented modality (π1) < tense (π2) < event-oriented (π2) / proposition-oriented modality (π3)	+
Dutch	Aspect (π1) / participant-oriented modality (π1) < irrealis (π2) < tense (π2) < future / prediction (π2/π3)	+
German	Participant-oriented modality (π1) / aspect (π1) / tense (π2)	±
Swedish	1. Aspect (π1) / tense (π2) 2. Participant-oriented modality (π1) < event-oriented modality (π2) 3. Prospective ("intentional future") (π1) < future (π2)	± + +
French	1. According to Bronckart & Sinclair and Clark: aspect (π1) < tense (π1) 2. According to Kilani-Schoch: aspect (π1) / tense (π2) 3. Participant- or event-oriented modality (π1/π2) < event- or proposition-oriented modality (π2/π3)	+ ± +
Italian	1. Aspect (π1) / tense (π2) 2. Participant-oriented modality (π1) < event-oriented modality (π2) / proposition-oriented modality (π3)	± +
Spanish	Aspect (π1) / tense (π2) / participant-oriented modality (π1)	±
Polish	1. According to Weist et al. and Smoczyńska: aspect (π1) / tense (π2) 2. According to Stoll and Bloom & Harner: aspect (π1) / tense (π2) ?	± ?

Language	Acquisition order	Predicted
Russian	1. According to Bar-Shalom: aspect (π1) / tense (π2) 2. According to Stoll and Gagarina: aspect (π1) / tense (π2) ?	± ?
Japanese	(Tense used as) aspect (π1) < aspect (π1) / tense (π2) < proposition-oriented modality (π3)	+
Georgian	Aspect (π1) / participant-oriented modality (π1) / tense (π2) < evidentiality (π3)	±
Korean	1. According to Choi: evidentiality / proposition-oriented modality (π3) < participant-oriented modality (π1) / tense (π2) < aspect (π1) 2. According to Kim: participant-oriented modality (π1) / tense (π2) < aspect (π1) < evidentiality / proposition-oriented modality (π3)	- ±
Quiché	1. Aspect (π1) < irrealis (π2) 2. Aspect (π1) < quantification (π1/π2) < proposition-oriented modality (π3)	+ +
Yucatan	Aspect (π1) < tense (π2) < proposition-oriented modality (π3)	+
Hebrew	Tense (π2)	-
Mandarin	Aspect (π1) < participant-oriented modality (π1) < hypothetical (π2)	+
Cantonese	Aspect (π1) < participant-oriented modality (π1) < evidentiality / proposition-oriented modality (π3)	+
Kaluli	Tense (π2) < aspect (π1) < evidentiality (π3)	-

conclusions are all presented in the table. Finally, for Lithuanian, it is unknown to me whether the first TMA expressions in child Lithuanian should be considered lexical or grammatical, so that it is also unknown whether π1- and π2-operators appear simultaneously, or π2-operators appear as the first operators.

The different studies on the acquisition of TMA show a heterogeneous picture. There is no clear universal pattern, although tense and aspect forms always occur early and evidentiality (π3) always occurs late. Furthermore, for a few languages, tense forms are claimed to function as aspect markers, whereas the reverse claim is never made.

On the basis of this first analysis, the languages that confirm the predicted order are Turkish, Warlpiri, West Greenlandic, Greek, Dutch, Japanese,

Quiché, Yucatan, Mandarin and Cantonese.[20] French might also belong to this group, according to the analysis in Clark (1985) and in Bronckart & Sinclair (1973). For several languages, π1-operators do not appear before π2-operators, but simultaneously with them. In most cases this concerns aspect and tense expressions: this holds for Sesotho, German, Swedish, Italian, Spanish, for French in the analysis of Kilani-Schoch (2003), Polish and Russian, depending on the analysis of the early forms, Georgian and Korean in the analysis of Kim (1997). Lithuanian might also belong to this group, although it is not clear whether the early modal forms are lexical or grammatical and it is also unknown whether Lithuanian has aspectual forms. All these languages support the hypothesis in that there is no stage in which π2-operators are present, but π1-operators are not. However, they do not show a clear distinction between π1- and π2-operators, whereas it was expected that π1-operators are easier to acquire because they are communicatively more relevant and conceptually more concrete. Languages that present real counterexamples to the hypothesis are Finnish, Korean in the analysis of Choi (1991; 1995; 1997), Hebrew and Kaluli. In these languages, children go through a stage in which there are π2-operators but no π1-operators or in which there are π3-operators but no π1- and π2-operators. How the results should be interpreted will be discussed extensively in the next section.

10.5 DISCUSSION

10.5.1 Introduction

There is a substantial number of languages that show an unexpected acquisition order of operators. As argued in 8.1 π1-operators should be acquired before π2-operators, and π2- before π3-operators (H6), but in many languages, π1- and π2-operators appear at the same time. In some languages π2-operators appear before π1-operators. These early π2-operators are always tense expressions. In one language, Korean, π3-operators appear before π1- and π2-operators according to the analysis of one researcher.

However, as argued in 10.1, the semantic function of the TMA forms in child language is crucial to testing H6, whereas the acquisition orders presented in Table 10-17 are based on studies that partly did and partly did not focus on the functions of child TMA forms. Although the data on TMA **forms** suggest that the patterns of acquisition are purely language-specific phenomena, I expect to find universal developments when the acquisition orders are

[20] English also belongs to this group. Cf. Chapter 8.

compared at the level of semantic **functions** of these forms. In this section, the data will therefore be re-examined, in order to assess whether there are universal patterns in the acquisition of functions of TMA expressions. The data across languages are, therefore, compared within specific semantic domains. First, the functions of aspect and tense expressions in child language will be investigated for each language in 10.5.2. Secondly, the crosslinguistic data on the acquisition of modality are discussed again in 10.5.3, in order to examine functional similarities between languages. The data in Korean will be subject to a reanalysis. The discussion will lead to a revised overview of acquisition orders in Table 10-18 in 10.6. There, the overview of the acquisition orders in the different languages will be based on the functions that children actually mark by their early TMA forms.

10.5.2 Acquisition of tense and aspect

In testing the order of acquisition of the markers at different levels, the meanings of the forms in the early stages of language acquisition are particularly important. In general, the early **forms** that children use are tense and/or aspect and for most languages, the prediction (H6, see 10.1) boils down to the question: is aspect ($\pi 1$) acquired before tense ($\pi 2$)? This question cannot be answered solely on the basis of the forms that children use, but the **functions** of these forms in child language also have to be taken into consideration. The question is whether there are universals in the contexts of use and in the meanings of the early TA forms. In Chapter 9 the hypothesis that early tense and aspect forms are used to encode event type was already rejected. However, there may be other universal uses and the co-occurrence of event types and TA forms may provide important information to establish the functions and contexts of use of TA expressions. If it turns out that there are universal uses of early TA forms, then the next question is how these early uses should be classified semantically. This will be the topic of 10.5.2.2.

10.5.2.1 Functions of early TA forms

In this section, the functions of the early tense and aspect forms are discussed for each language, in the same order as in 10.3. The discussion is based on the relevant passages in 10.3.

Turkish: In Turkish, the first TMA contrast that is linguistically encoded is between the past marker *-dI* and the present progressive marker *–Iyor*. The past marker refers to completed events or observable end states that hold at the time of speech. It is mostly used in combination with change of state verbs. The progressive marker is used to refer to ongoing states and events in the here-and-now, predominantly in combination with activity verbs and to a lesser

extent with stative verbs. A further contrast arises with the optative marker *-yA* that is used to indicate intention and plan immediate activity. Aksu-Koç (1988: 74) explicitly claims that the early tense/aspect forms are used to indicate aspect and not tense.

Warlpiri: The main contrast that is encoded in early child Warlpiri until about age 3;0 is the following: the past inflection marks the endpoint of an immediately completed event and is mainly used in combination with telic verbs; the non-past inflection is used to mark ongoing activity in the immediate context, mainly in combination with atelic verbs. Around 2;11 an additional distinction is made within the non-past inflection between present imperfective and immediate future, to mark intentional events.

Sesotho: Both aspect and tense markers are used from the start, but the functions of these forms are unknown.

West Greenlandic: Children under 2;6 mainly talk about the here-and-now. They describe actions taking place at speech time, by using zero-forms, the prospective (pre-states) and perfect (post-state). At 3;0, children have still difficulty describing past events. At this age, *ssa* is used to express intention of first person.

Finnish: In Finnish, the contrast between past and present tense forms seems acquired remarkably early, around 1;6, 1;7, as the child uses the forms contrastively. The function of the past tense markers however is usually to refer to immediate past events and to past events still continuing at the present. Only a few children occasionally use the past form to refer to more remote past events. Nearly all examples of past tense forms in Toivanen and Laalo are with telic (and often punctual) verbs, except for 'was', 'slept' and 'remembered'. The non-past tense is used to refer to the present or immediate future events in the child's surroundings or to the child itself.

What is more, in Finnish there are no simple aspectual inflections on the verb. The different viewpoints that the perfective-imperfective opposition in many languages represent may, however, in Finnish be established by the use of the partitive-case, an object marker which expresses non-entirety, either of the object or of the process in which the object is involved. This case marker is productively and very frequently used around 1;11, at the same age as the past tense marker and in about one quarter of the cases it denotes an incomplete action, such as an ongoing or a temporary process (Toivainen 1980: 128-29; 1997: 160). In (45) the child (1;11) is not looking at part of 'it', but the process of looking is described as partial. In (46), an example at 2;4, it is not the case that part of the guitar is given to Matti, but the giving is partially, it is only lending (Toivainen 1997: 160-61):

(45) *Si-tä* *Marko katso-o*
It-PARTIT Marko look-3SG
'I am looking at that.'

(46) *Anto-i* *isä* *si-tä* *Mati-le*
Give-PAST father it-PARTIT Mati-DATIVE
'Daddy lent it (his guitar) to Mati.'

Unlike the partitive, the accusative case is used to refer to 'an object or things as a whole entity and to the completion of the process depicted' (Toivainen 1980: 135). It appears a few months later than the partitive, around 2;2.

Lithuanian: For Lithuanian, there is no information available on the contexts of use of the tense forms.

Dutch: In Dutch, at first the past participle (perfect) is used in contrast to root infinitives and the present tense to indicate the distinction between completed and non-completed events. The present tense is used to refer to ongoing events, whereas modal constructions and periphrastic future are used to express possible or necessary events. Blom (2003) refers to this opposition as realis-irrealis, but the term irrealis is used quite differently from the current study. The terms 'possible' and 'necessary events' refer to participant-oriented functions of ability, permission and intention. Only after 2;9, the formal opposition of tense forms seems to express a semantic opposition between past and present tense.

German: Before the age of 2;2, in German there is contrastive use of past participles, present tense and modal verbs. According to Bittner (2003), past participles occur in contexts related to perfectivity and the examples she presents (between 1;9 and 2;1) all seem to refer to a resultant state or immediate past. Behrens' data (1993: 173-175) support the view that the past participle is very often used to refer to an immediate past event or to a post-state that is relevant at the moment of speaking. Behrens also found that past participles are predominantly combined with telic events and that there is often a proximal and causal relation between the past event and the present moment. These findings suggest that the early past participles in child German have a very restricted use and the question is whether their meaning is adultlike.

Behrens (1993) explicitly claims that the past participles (Perfekt) in German child language indicate past tense, like in adult German. She defends this position with several arguments that will be critically reviewed here. First, she looks at the use of copulas. Behrens (p.177) states that the use of copulas is the most clear indicator that tense marking is acquired, since the sole function of copulas is to encode deictic tense. Since in German past copulas and past

participles/Perfekt[21] emerge simultaneously the past participles mark past tense immediately, like the past copulas. Behrens would indeed have a point (ignoring the fact that early past copulas are probably acquired by rote-learning and do not necessarily function to carry tense marking) if the past copulas were used productively and in contrast to the present copulas at the same time as past participles are used productively. However, her own data point to a different development of the two forms. In her discussion of longitudinal data, she shows that the past copula is in general acquired at least one or two months later than the past participle (e.g. p.79, 87, 103), and that it is used very infrequently (p.104) or not yet productively (p.94). Mills (1985) claims that the past copula is acquired later than the past participle and Bittner (2003) shows that the past copula is not used productively before 2;2, whereas the past participle is already productive at that age.

A further argument put forward by Behrens (1993) is that, if early past participles were used to indicate telicity (as claimed by the Aspect Before Tense hypothesis) whereas the auxiliary brought in the tense component, then a change in reference would be expected as soon as the past participles are used in combination with the auxiliary. This does, however, not occur in the data: the bare past participles and the complete Perfekt construction including the auxiliary are used with equal frequency in the same contexts, referring to immediate past results, as well as to remote or nonfactual results and to activities. Behrens concludes that from the beginning, the use of past participles is semantically target-like and therefore, it must reflect temporal (and aspectual) notions. However, target-like contexts of use cannot be considered independent evidence for target-like meanings.

Behrens finally argues that the forms in child language have adultlike tense semantics is that the co-occurrence of past participles and situation type does not clearly change in development. This would indicate that children in general have a preference for talking about resultative events, and that there is no change in the semantics of the past participle, from meaning 'resultant state' or 'telicitiy' to 'past tense'. With respect to this last argument, it may be true for Behrens' data on German that there is no substantial change in the relation between tense markers and situation type. However, for many other languages, such as shown for English in Chapter 9, the correlation in adult language between resultant states and past tense is less strong than in child language and I doubt whether this would not also be the case in German. The data used in Behrens' study probably stop at a too early age to see the change.

[21] The construction past participle + auxiliary is the default past tense marking in German, but in combination with telic situation type, it may indicate perfect or resultative aspect.

To conclude, Behrens' arguments that early past participle forms in child German have adultlike tense semantics are not convincing. The crosslinguistic data show that the use of past participles in contrast to present tense forms in child German is very similar to the use of early TA forms in other languages. Past participles are at first only used to refer to resultant states or to immediate past events and present tense forms are used to refer to ongoing events or states. The semantic interpretation of this use will be discussed in 10.5.2.2.

Swedish: In Swedish, past participles (the Supine and the Perfect) contrast with present tense, like in the other Germanic languages and refer to stable and obvious outcomes of events that are relevant at the moment of speech. They typically combine with telic verbs. The present tense is used to refer to ongoing activities or current states. When the simple past comes in, it is used to refer to post-states and sometimes to remote past, but then, there is a clear trigger in the present context. A further contrast that comes in are modal verbs and intentional future to refer to intentional events or immediate future events.

Greek: In early child Greek, imperfective present forms mark ongoing events and states and perfective past forms are predominantly used for marking resultant states or immediate past reference. Somewhat later participant-oriented modality and the subjunctive/future particle begin to be used to indicate intentional events.

French: In French, past participles (of the *passé composé*, the perfect construction) are used to mark results or end states, and are mainly restricted to telic lemmas. The present tense form is used to refer to durative actions. The periphrastic future comes in a little later and is used to indicate intentional events. In the view of Kilani-Schoch (2003) the acquisition of aspect can only follow the mastery of different past tense forms, as these forms also mark aspectual meanings. However, in this statement, she ignores the fact that the aspectual senses of different tense forms also contrast with each other within the here-and-now. There is evidence that the first 'tense' forms in French, the past participle, the present tense and the periphrastic future, mainly contrast in their aspectual senses, rather than in their temporal senses. The first use of the past participle is to mark perfect aspect (end-states that hold in the here-and-now) and is in opposition to the present tense marker. The second contrast is also made within the here-and-now, between the present tense and the periphrastic future that refers to intended, immediate future events.

Italian: In Italian, past participles are mainly used with telic events to refer to clear results. They encode end states that are relevant in the here-and-now. In contrast, present tense forms are used for describing objects and events in the here-and-now.

Spanish: In Spanish, the first contrast is, like in the other Romance languages, between present tense, past participle and periphrastic future.

However, there is no clear information on the use of the forms in child language.

Polish: For Polish Weist et al. (1984) and Smoczyńska (1985) claim that aspect and tense are acquired simultaneously and immediately used independently: This claim is supposedly supported by the fact that children contrast perfective past and imperfective non-past forms: Weist (1986:364) states that if the imperfective form encodes non-completeness and the perfective form completeness, and children do not analyze the tense morphemes, then they would use the perfective non-past form for marking completeness (which in adult Polish marks future tense), and they do not. However, it is not necessarily the case that the perfective and imperfective form contrast at first in child Polish. An alternative analysis is possible, i.e., that the combined forms, imperfective present and perfective past, distinguish between endedness and ongoingness. This view is supported by the fact that the perfective and imperfective verb forms are scarcely used contrastively or not at all and seem to remain unanalyzed for a long time.[22]

Although it may be the case that in Polish imperfective past forms occur early, this does not necessarily indicate that children use tense and aspect independently. First of all, the imperfective in Polish does not mark imperfective aspect, but rather neutral aspect. Imperfective verbs may be complete or non-complete events. Furthermore, Stoll (2001) and Bloom & Harner (1989) found that Polish children predominantly use perfective past forms, in combination with telic events, and imperfective present forms, in combination with atelic events. The imperfective past rarely occurs. A possible re-analysis is that children mainly contrast perfective past forms with imperfective present forms, for marking the distinction between events that are ended and ongoing events. These forms contrast later with the perfective present forms (adult future tense) for marking immediate future or intentions.

Russian: As well as for Polish, it is claimed for Russian that children use tense and aspect independently. Bar-Shalom (2002) claims that children in Russian use both perfective and imperfective pasts. However, the perfective past forms outnumber the imperfective past forms by far. One of the children only uses three imperfective past forms between 1;7 and 2;4 (between 4 and 8% of all past verbs) whereas another child uses a few more imperfective forms: 1 at 1;7 (6% of all past forms), 9 between 1;8 and 1;9 (14% of all past forms) and 16 at 2;0 (27% of all past forms). The input distribution at 1;6 and 2;4 to this latter child has also been studied : at 1;6, 16% of the past forms are imperfectives and at 2;4, 24%. Bar-Shalom (2002: 334) considers this 8%

[22] Cf. Gagarina's analysis (2004) of perfective and imperfective verb forms as separate lexical forms, instead of derived forms of one rote.

difference normal variation, but without further study the conclusion is not justified that this difference does not reflect an increase in imperfective past forms in the input. Furthermore, although both aspects are used in different tenses before 2;0, contrastive aspectual uses for single lemmas occur only after 2;0. The earliest example found is at 2;2, *zakrasila* vs. *krasila* 'painted'. Other verbs used contrastively in aspect are 'draw', 'fall', 'cook', 'wash', 'buy', 'sleep', 'catch', 'give'. The use of imperfective past is thus sporadic in early stages, and past tense is mainly restricted to perfective forms, which is a similar pattern to other languages.

On the basis of the data of Stoll (2001) and Gagarina (2003, 2004) there is evidence that the combination of past and perfective is mainly used for marking completed, telic events, whereas the combination of imperfective and present is mainly used for marking ongoing events. When the combination of perfective with future comes in, it refers to immediate future or intentions.

Japanese: Japanese children first use the polysemous marker *–ta* (perfective aspect ($\pi 1$)/past tense ($\pi 2$)) mainly in combination with telic, punctual verbs to mark perfect aspect, signifying current relevance. It is used contrastively with non-past tense and progressive aspect, but there is no information on the use of these markers.

Georgian: In Georgian, children first contrast the perfective punctilliar past for telic events and the imperfective durative present for states and activities. Later, they acquire the future and optative for expressing intentions and desires.

Korean: The first contrast between TMA forms in Korean is between past tense, present tense, future and progressive. There is, however, no information on the children's use of these forms.

Quiché: In Quiché, there is no tense marking, only aspect marking. Children first start with broad aspectual distinctions, expressed by the suffixes. Finer aspectual distinctions by prefixes are made later on. The first distinction is between perfect aspect (post-states) and progressive aspect (ongoing events). There is no specific information on the use of the forms by the children.

Yucatan: In Yucatan, there are many aspectual distinctions. At first, children only make a broad contrast by suffixes between incompletive aspect on the one hand, to refer to ongoing events, and on the other hand the perfect and completive for events just ended and the resultative for resultant states.

Hebrew: Hebrew formed a counterexample to the hypothesis (H6) because there are only tense operators in children's speech. This is in fact not unexpected considering the TMA system in Hebrew. This system is very limited and the only $\pi 1$-operator is a periphrastic portmanteau expression for imperfective past, a function in general acquired after 'simple' tense markers. However, there is evidence that early tense markers are not yet used to mark tense. Berman states that the past tense is at first only used with telic situation

types, present tense with atelic situation types and future tense for marking immediate future. Only at 3;0, tense forms are used contrastively to mark deictic tense.

Mandarin: In child Mandarin there is a strong association between perfective aspect *–le* and telicity, and children mainly use this form to refer to punctual events with a clear result that has current relevance. It is used sometimes with activities, but then often in the so-called resultative verb constructions. It is used predominantly to refer to immediate past events, in order to call attention to a noteworthy change of state. The perfective contrasts with progressive aspect, that associates with atelic verbs and is used to indicate present ongoingness or involvement in an activity.

Cantonese: Unfortunately, there is no information available on the contexts of use of the early aspectual forms in Cantonese.

Kaluli: Schieffelin (1985) indicates that Kaluli children predominantly talk about what is observable (the here-and-now). They use the present tense to refer to ongoing events, the past tense to refer to completed events and the intention or ingressive ($\pi 1$) marker to talk about their own intentions.

To conclude, for seven languages of the 24 languages there was not enough information available on the contexts of use of early tense and aspect forms to be able to compare them to other languages. These languages (Sesotho, Lithuanian, Spanish, Georgian, Korean, Quiché, Cantonese) are therefore excluded from further analysis. The remaining 17 languages showed large similarities in the functions of the early tense and aspect forms. Children distinguish at first between, on the one hand, ongoing events and, on the other hand, events just ended or resultant states relevant to the present. This analysis is very similar to the one in Slobin (1985). A little later, they make an additional contrast to encode intentions or immediate future. It depends on their mother tongue which forms children use to encode these functions. The following patterns are attested. In languages that have a perfect construction ('have' + past participle) that is used frequently in the input, children make at first a contrast between the past participle and the present tense (German, Dutch, Swedish, French, Italian[23]) for the distinction between events just ended or resultative states and ongoing events. A little later children acquire a periphrastic future form or modal auxiliaries to indicate intention. Secondly, in languages that obligatorily mark both tense and aspect (Polish, Russian, Greek), children make a contrast first between perfective past forms to refer to events just ended or resultant states and imperfective present forms to refer to ongoing events and states. Later, the perfective future tense is used to refer to

[23] Spanish shows a similar formal contrast in the early stages of language acquisition, but there is not enough information available on the functions of these forms.

intentional actions. Thirdly, in languages that have basically aspectual distinctions (Yucatan, Mandarin) children first acquire a broad distinction between a form that marks ongoing events (zero form in Mandarin) versus one or more forms that mark events just ended. More fine-grained distinctions, including reference to intentional events, are in general acquired later.[24] Fourth, in languages that have a basic tense distinction only (Finnish, Warlpiri, Hebrew), non-past or present tense forms are used in contrast to past forms to refer, on the one hand, to ongoing events and, on the other hand, to events just ended or resultant states relevant to the present. Later, children acquire the forms to encode intentional acts. Finally, in my sample, there are languages that have independent morphemes for encoding tense and aspect. In these languages, children first acquire the past tense, perfective or perfect form to encode events just ended in contrast to other events (Turkish, West Greenlandic, Japanese). The encoding of reference to ongoing events and intentions is acquired somewhat later. The data on English, in Chapter 8, are in accordance with this picture. Here, the progressive and present tense are used to refer to ongoing events or states, whereas the past tense is used to refer to events just ended and resultant states relevant at present. The prospective, future and modal auxiliaries, mainly in combination with first person, are used to refer to intentions.

In sum, depending on the language, the forms used for encoding ongoing events are present tense, progressive, imperfective or present imperfective, hereafter referred to as "imperfective" forms. Events just ended or resultant states are encoded by past, perfect, perfective or past perfective, hereafter referred to as "perfective" forms. In early acquisition, only one of the functions may be linguistically encoded, whereas the other function is left unmarked. A later contrast acquired is the encoding of intentional events by modal verbs, (immediate) future or prospective, hereafter referred to as "prospective" forms.

10.5.2.2 Universal acquisition order of tense and aspect functions

In the introduction to Part III the different semantic interpretations posed forward for early tense and aspect morphemes were briefly discussed. The two main approaches are that early tense and aspect morphemes encode situation type or that early tense and aspect morphemes are used with adultlike semantics from the start. Are the data in accordance with these interpretations?

The first approach, formulated in the Aspect Before Tense Hypothesis and the Prototype Account, claims that children's tense/aspect forms express

[24] Child Quiché also shows a broad formal aspectual contrast at first and more fine-grained distinctions later, but there is not enough information on the functions of these forms in child language.

situation type or that their semantic representations are restricted to a specific situation type. It was already shown in Chapter 9 that this approach cannot be maintained for English. The crosslinguistic data in this chapter strongly support this conclusion with respect to all languages. Although certain combinations of tense-aspect-situation type are in fact more "natural" or less marked universally, the correlation between situation type and tense/aspect markers is not absolute in child language, in no stage, in none of the reported languages. Although at first the majority of verbs encoded for past tense are telic and punctual, children never exclusively combine past morphology with telic situations and not every past tense marker can be interpreted as referring to a visible result. There is clear evidence that children before 2;0 more spontaneously and more frequently refer to immediate past events (Toivainen 1980; Weist et al. 1984), but they do sometimes refer to (moderately) remote past events. On the other hand, not all present tense, imperfective or progressive markers are combined with states or activities. The fact that tense/aspect morphemes do occur with other than the prototypical situation type is evidence against the view that children encode situation type: why would children use linguistic forms so inconsistently, sometimes to encode telicity or stativity, but sometimes not? If in the child's grammar a progressive or imperfective encodes the features [-telic, +dynamic] then how could it co-occur, though less often, with the opposite situation type [+telic]? Are the semantic representations sometimes "on" and sometimes "off"? A further problem not accounted for in all "situation-type"-approaches is the fact that children at a certain stage will have to reanalyze the tense/aspect forms and either change the semantics to the adult target, or, in the prototype approach, relax the semantic restrictions. Why, when, and based on what evidence would the child come to a reanalysis? For English, the Discourse Topic Hypothesis appeared to be a better explanation for the skewed distribution of event types over tense/aspect forms and this hypothesis presumably may also account for the distribution in other languages.

The second approach discussed in the introduction is that early tense morphology is used to encode tense from the start. The discussion on German and Polish in 10.5.2, however, has shown that this interpretation is also problematic. The major argument in favor of this approach is that early tense forms combine with different situation types: therefore, tense morphology should be used independently and encodes deictic tense. However, tense morphology is in all languages closely related to situation type or grammatical aspect and the markers do not seem to function very independently at all in the child's system. Although the proponents of this approach are correct in that the rare uses in child language also have to be accounted for, they are probably too much ignoring the fact that children have a predominant use of the forms. This predominant use is productive in child language far before the other use and it

is central in the communication. It is claimed that the forms are used in an adultlike way, but the adult distribution is not discussed and there are no clear definitions of what is considered tense or aspect. Furthermore, this approach fails to explain why children, if they have mastered the adult semantics of tense forms, use it so rarely in an adultlike way.

So far it remains unsolved what the early oppositions encode. In order to answer this question, criteria are needed to decide which uses may be considered aspect and which uses tense. Most studies, however, lack a clear definition of tense and aspect. In this thesis (3.6), an adultlike use of aspect and tense was defined as follows: **aspect** operators select the part of the temporal structure of a property or relation—including the pre- or post-state, that is relevant to topic time. It is only this selected part of the temporal structure that is the predicated property or relation of the argument(s); **tense** operators locate the part of the event that is relevant to the discourse on the time axis in relation to a reference time interval, in general the speech time interval. The question is thus whether children primarily select parts of events that hold at topic time or whether they primarily encode the relation between the temporal location of the event and speech time.

On the basis of the crosslinguistic data on the acquisition of tense and aspect morphemes and the detailed study of English in Chapter 9, I will present an alternative model on the semantic development of tense/aspect morphology in child language that will address the question what children exactly encode. It adapts the ideas of the models of Christensen (2003) and Weist (1986), discussed in the introduction to Part III. It is formulated in terms of the definitions of tense and aspect in this thesis in order to be able to evaluate whether the uses in child language can in fact be considered marking either tense or aspect.

The theoretical approach to tense and aspect in this thesis will be repeated here in short (see Chapter 3 for the complete discussion). An important aspect in this approach is the notion of topic time (TT) from Klein, i.e. 'the time span to which the speaker's claim on this occasion is confined' (1994: 4). Contrary to Klein's view, I assume that the TT interval is not systematically encoded linguistically. Interlocutors mutually understand what is the TT by means of pragmatic and contextual clues, world knowledge about (the sequence and duration of) events, and possibly by linguistic information, such as adverbials, temporal clauses, and tense marking. This idea closely resembles that of Christensen (2003), who states that the temporal information conveyed in the grammatical tense system is vague and incomplete and that the speaker supplies additional temporal information, either by deictic (context, shared knowledge), anaphoric (subordinate clauses) or explicit (adverbial) specification. Her notion of deictic specification is in practice similar to mutual understanding by the

interlocutors. In contrast to Christensen's approach, I assume that the additional temporal information does not serve to specify event time, but to specify TT.

The TT interval is the determining factor in deciding what part of an event structure is relevant to communication. Aspectual operators are used to explicitly select the part of an event structure that is predicated of the arguments, relevant to TT; for example, the progressive selects the middle part of the event, as this is the part that holds at TT, not its initial and terminal boundaries. The perfect selects the post-state of an event and a perfective selects the entire event structure. It is only the selected part of the event that holds at TT and that is assigned to the arguments.

The definition for tense presented in this thesis is that tense locates the event in time with respect to the speech time interval (and not the TT, as Klein proposes), but only the part that is relevant to TT. Whenever the present tense is used, the relevant part of the event overlaps the speech time interval (ST). Whenever the past tense is used, the relevant part of the event is anterior to ST. Whenever the future tense is used the relevant part of the event is posterior to ST. The perfect and prospective in this approach indicate that the post-state or the pre-state of the event are located in time with respect to speech time.

What is it, then, that children need to learn? They need to learn:

- that parts of event structures need to be selected for building up an adequate description of the property or relation ascribed to the arguments;
- that there are different event structures;
- that TT may shift;
- that event time needs to be encoded; and
- that TT sometimes needs to be specified linguistically.

How do children enter their way into this system? The first clues that children have are real world events, linguistic forms in the input and their co-occurrence. Imagine the world from the child's perspective. A prototypical moment in his or her world may look like Figure 10-3. In this figure, at five o'clock, which is the present, the blocks have just fallen down, the child is intending to play with lego soon, and in the background the child's parents are talking and drinking coffee. Earlier the same afternoon, at two o'clock, the child played on the slide. The lines below the picture represent the relations between the time intervals of the different events, speech time (ST) and topic time (TT).

The TT interval is overlapping speech time; it is in the present. As discussed in Chapter 9, children at first predominantly talk about the here-and-now, that is, the TT is nearly always located in the present. The temporal location of TT is very trivial to children: it is by default in the present. As children under 2;0

hardly ever spontaneously refer to other times than the here-and-now, I assume that they are hardly or not at all capable of distinguishing between different TT intervals. They are egocentric and cannot yet think of other worlds than those they observe themselves to talk about; these observations mainly concern the

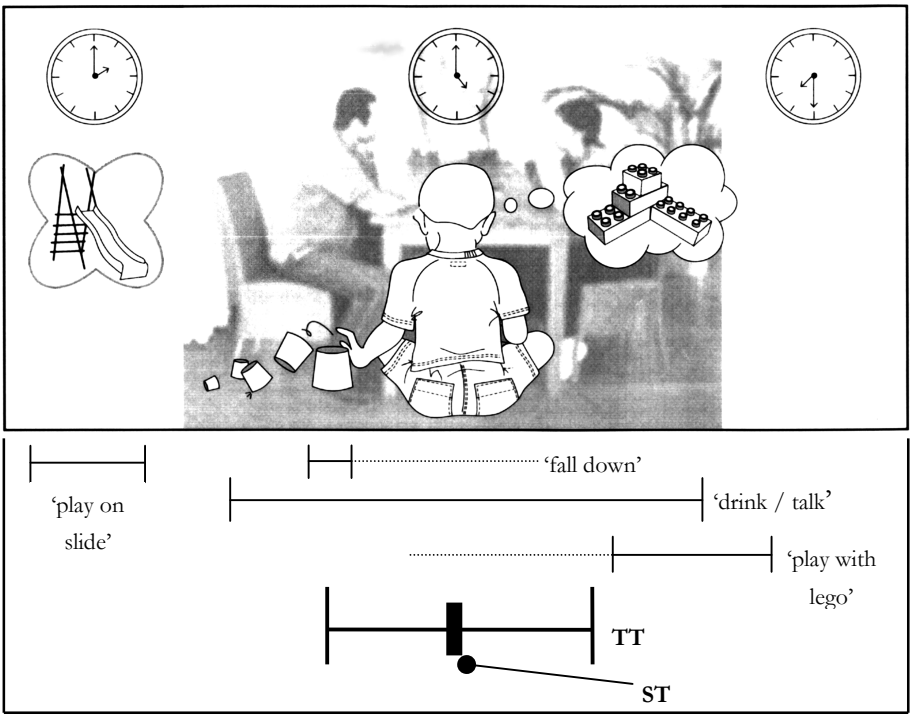

Figure 10-3. Typical relations between event time, speech time and topic time in the child's world

physical world, or their own intentions or needs. Now and then, memories about a past event are triggered. As TT is not indicated in any way by the child in this stage, the interlocutor has to interpret what time interval the child is talking about on the basis of shared knowledge or experience.

Within the TT interval of the here-and-now, children experience differences between events and the way they are described. Some events are ongoing at the moment one wants to talk about it ('daddy and mommy drinking and talking'), other events are just ended at the moment one wants to talk about it ('blocks falling down'), and still other events are about to happen at the moment one wants to talk about it ('playing with Lego'). The child has to choose linguistic elements for referring to them. In the first stage, before about 1;9, children use

verbs as names for events. Although they use different verb forms, and although early inflected verb forms are in general appropriately used, they are unanalyzed and the different forms do not correspond yet to any systematic semantic distinction.

In the next stage, because the child is constantly confronted with a co-occurrence of linguistic forms and different event types, a relation between form and function will emerge. The crosslinguistic data clearly indicate that, between about 1;9 and 2;0, children across languages distinguish with their early linguistic forms between on the one hand events that have just ended or resultant states, and on the other hand events that are ongoing. They systematically use an "imperfective" form (present, imperfective, present imperfective or progressive) for states or activities that they perceive right now (*father drinking*, *mother talking*), a "perfective" form (past, perfective, past perfective, perfect or resultative) for events that have just ended or that caused a present result (*blocks fell / fallen*). Dependent on the language, children start to use the "perfective" form in opposition to a non-finite form, the "imperfective" form in opposition to a non-finite form, or both the "perfective" and the "imperfective" form in opposition to each other. Slightly later, between about 2;0 and 2;6, children also start encoding intended events. They use modal, prospective or future forms for this purpose (*wanna/gonna play with lego*).

It is in this stage, in which conversation is predominantly restricted to talking about the here-and-now, that there is the strongest association between situation type and tense and aspect markers and there is not yet much contrastive use. Often the same lemmas are used with a single TMA expression. This is not the result of a semantic representation restricted to certain situation types, but a natural interaction of real world events in the here-and-now and the linguistic forms used to refer to these events. Real world events that have some extension in time, such as drinking, talking, sitting, overlap the here-and-now and the most common ways to describe them are by activities, states or nonpunctual telic events and the appropriate linguistic forms for referring to them are, depending on the language, a present, progressive or imperfective form. Real world events that happen in a moment, such as something falling, are already ended once one may comment on it. The most common way to describe them is by telic situation types and the appropriate linguistic forms for referring to them are, depending on the language, a past, perfective or perfect form. Events that are conceived of as establishing a certain change in the world or that have a salient result as their endpoint (telic situation types) are probably interesting topics for the child to talk about, hence the strong correlation between "perfective" forms and telic situation types. Finally, intentional events

may be of all types and there is no strong correlation between grammatical form and situation type.

In early child language, TT is thus by default located in the present, overlapping speech time and the majority of the events referred to is by default located in this here-and-now topic time. There are, however, distinctions between the events that take place at topic time, the here-and-now: there are events that have just ended or that are resultant states of previous events, there are events that are ongoing and there are events that are about to occur. In other words, different phases of events hold in the here-and-now: the post-state, the intermediate interval or the pre-state (see 3.3.2). In this interpretation, early TA forms are thus used to encode **aspectual** distinctions.

Although children's TT is by default located in the now, occasionally, children are confronted with TT in the past or in the future: triggers in the context make the children remember some moderately remote past event, or, quite often, their parents initiate this topic. In Figure 10-3, a parent might ask: *What did you do this afternoon?* This helps the child (referred to as scaffolding) in talking about the past event of playing on the slide. The child may respond to the question with for example *play(ed) with Anna / slide / hurt my foot* or other descriptions. Now, the conversation is oriented towards the past, the parent has located TT at a time interval in the past. It is also possible that TT is located at a (moderately remote) future time interval, but these instances are even more rare. Only when TT is in the past or in the future, and deliberately, instead of by default, located in the present, then the function of deictic tense may develop. When TT is in the non-present, it has to be indicated that the part of the event relevant to the TT interval, is located prior to or after speech time. In most situations of early child conversations, however, TT is in the here-and-now and the temporal location of the relevant part of the event is also by default in the here-and-now. There is no explicit marking of temporal location, since there are no contrasts that need to be marked. Deictic tense semantics can be ascribed to children's tense forms only when children use it to prevent ambiguities about the temporal location of an event: this happens only when children actively differentiate in the location of TT. As long as children do not distinguish between TTs productively, or, in other words, if they do not regularly initiate conversations about past events or future events, it is meaningless to contribute tense semantics to the children's forms, as they do not yet function that way.

As the data show, children's spontaneous conversations are predominantly about the here-and-now; they use tense/aspect expressions to encode events just ended / resultant states and intentions to immediate future more consistently and much more frequently than to encode (fairly) remote past or future events. The predominant function of early grammatical tense/aspect

markers is thus an aspectual function. They encode what part of the event structure holds at (the default) TT, which is the here-and-now. Children's first use of TA morphemes is to make a distinction between a "perfective" and "imperfective" selection of the event structure and the next distinction is a "prospective" selection. The functions are in between quotation marks, as I do not want to claim that the markers function exactly the same as a perfective, imperfective or prospective marker within a specific adult system. For example, the "perfective" form in child language may select the complete event structure or the post-state, whereas in adult languages this job may be divided between two or three different forms (for example, a perfective past and a perfect or resultative expression). The form that is most frequently used in the input, is probably the one that children acquire first. Children crosslinguistically thus start with the linguistic encoding of a distinction between "perfective", "imperfective" and "prospective" aspect, using different language-specific forms. Early grammatical tense/aspect markers predominantly encode which part of the event structure holds at the default TT, which is the here-and-now. The productive encoding of these aspectual contrasts is acquired much earlier, around 2;0, than the productive encoding of temporal contrasts, around 2;6.

The aspectual distinctions are at first only made consistently and frequently for the TT interval in the here-and-now and not yet for other TTs. Note that the first stage resembles Weist's (1986) event-time system, although the interpretation is quite different: in his analysis, children mark that event time (ET) is before, after or simultaneous to ST, whereas reference time (RT) is simultaneous to ST. In my approach to tense and aspect, I state that in the early stages TT overlaps ST, and that the early distinctions mark the different phases that hold at TT, and not yet the relation between ET and ST. In the very same stage in which aspectual functions of tense/aspect forms are acquired for present TT, lies the origin of the development of tense semantics.

Tense forms will develop tense semantics in use because of two developmental trends. First, the child has already learnt through experience that an observable resultant state is originates in a preceding event. The preceding event is often but not necessarily brief in time, and in a sense, a tense/aspect marker used in the description of this event is ambiguous in whether it refers to the post-state, to the preceding event or to both. What are the implicatures of the grammatical form and what are the conventionalized parts of the semantics? Languages differ in whether they apply separate forms for past tense, perfective and perfect aspect and children find out about the exact mapping of their forms in contexts where the time gap between the event, the resultant state and the here-and-now becomes larger or where there is no clear resultant state. On the other hand, children are stimulated to talk about real past events, either by scaffolding by their parents or by their own vivid

memories. As there is no or only a weak connection between these remote past events and the here-and-now, focus is completely drawn to a TT interval in the past. The occasional occurrence of TTs in the past and of growing time gaps between event, result and here-and-now, helps the child infer where the boundaries are of the use of a morphological form in his own language.

A similar story holds true for the early marking of events about to occur. It gradually develops into distinct marking of prospective aspect and participant-oriented modality on the one hand and future tense marking on the other hand. This development is closely related to the capacity of the child to plan ahead and to think of the future. A first step is the marking of own intentions in the immediate future. When the time gap between intention and actual event becomes larger and children are confronted more often with reference to real future events, they find out that there are distinct forms for prospective aspect and future tense or that a particular form is also apt for reference to more remote events.[25]

Early tense morphemes in child language thus function as grammatical aspect markers. In my view, they need not be **reanalyzed** entirely in a later stage: at first, tense morphemes (or tense-aspect combinations, such as the perfective past in Slavic languages and Greek) express only part of their potential semantics. They do not yet have the complete target-like function, but only the part of the semantics or possible implications of the adult meanings of the form that are most relevant to the communication of a child. The form can naturally come to include other functions as these other functions may already be implied by the earlier semantics. The child has to learn that the form expresses additional senses, closely related to the senses already acquired by the child, or that the combinations of the form with different event-types determine which implications exactly hold. The most drastic reanalysis a child may need to make is that the meaning with which the morpheme was used is only a (dominant) implicature of the target meaning and not the meaning itself. Extension or specification of meaning arises when children's conversation topics begin to vary more often and more actively. This gives them the opportunity to add uses and semantic specifications on the basis of pragmatic inferences.

After the early stage (up to about age 2;6) in which children have acquired aspectual marking for the here-and-now and deictic tense has begun to develop, children become more flexible and proficient in changing TT. At first, they do not need to vary it very often. Their attention and memory span is in general

[25] Note that I do not claim that the child restricts future forms at first to immediate future events because of his semantic representation, but simply because more remote future events are not yet part of his conversation topics and are probably not conceptually established. The semantics of the form at any moment cover the remotest future notion that the child has.

restricted to situations in the here-and-now. External cues can trigger past memories, but they are scarce. More and more, children remember past events and they come to find past events interesting conversation topics. Now, TT is no longer only simultaneous to the present and present tense forms are now used to encode that the relevant parts of the events are overlapping ST. Among the first combinations of tense and aspect that are used productively are present progressives, present perfects and present prospectives (between about 2;3-2;6).

Children steadily become more proficient in thinking and talking about events outside the here-and-now and their conceptualization of events becomes more structured and complex. This raises the need to mark different phases within a displaced TT, in other words, they start indicating which phases hold at TTs dissociated from the here-and-now, that is, they start to combine tense and aspect in the past, by using past imperfective forms. These combinations emerge between about 2;9 and 3;3.

Children now thoroughly develop the ability to help their interlocutors to establish TT. Between 2;6 and 3;0, they start presenting cues for the addressee, such as time adverbials (explicit specification) or temporal clauses (anaphoric specification), although they do not always use them correctly or unambiguously (cf. Christensen 2003, 10.3.6.2). First adverbials seem to concern aspectual distinctions but later on, time distinctions are also encoded.[26] The emergence of explicit specification of time strongly indicates that children have understood the need to mark the concept of time linguistically. Further conversation topics that arise between 2;6 and 3;0 are 'hypothetical situations' and 'general comments on the world'. The TT is an extended time interval that overlaps the present.

Children advance in manipulating combinations of aspect, tense and situation types in order to create a linguistic representation of the world in the way they want it. The last developmental steps in the field of tense and aspect, that only arise after 4;0, is the acquisition of the combinations of post-states and pre-states, located in the past or in the future (similar to Weist's free reference time system), such as *will be/was going to*, *had/will have –ed*, and the introduction of a second deictic centre at TT: the future in the past.

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[26] This is supported by reports on the acquisition of adverbs, for example in Warlpiri (Bavin 1992: 361), children use *jalangu* 'now' and *nyurru* 'complete, ready' first, around 3;8, then *ngaka* 'soon'. The form *nyurru-wiyi* for 'in the distant past' emerges later, and first refers to immediate past before it comes to refer to distant past (around 6;0). This pattern strongly resembles the development of temporal adverbs in Polish (Weist & Buczowski 1987) where first the adverbs 'already', 'now' and 'soon' are used, then immediate past or future adverbs like 'yesterday', 'today' and 'tomorrow' and finally adverbs with remote time reference. In Swedish (Christensen 2003: 58) the pattern is similar: children start out with 'now', 'soon', 'later' and 'again'. After that they start using 'yesterday', but in a sense of general past reference, not specifically to refer to the day before this day.

The development proposed here resembles the stage model of Weist, but has a principally different approach to aspect and tense. Behrens (1993: 186-7) rightly argues that Weist's stage model is unsatisfactory in that it assumes that linguistic encoding is a good indicator of conceptual development, since her data show that there is a considerable time gap between the first reference to non-here-and-now and linguistic encoding of these notions. What I have tried to describe are principally the stages of the acquisition of the **linguistic** system, how children learn what needs to be encoded linguistically, rather than reflecting the stages of cognitive development. I assume that there is a time gap between the development of concepts and the recognition and consistent application of linguistic encoding of those concepts. I agree with Behrens that there is no new temporal concept when children start using tense morphemes to express time: however, I do think that children acquire a new linguistic insight, namely that they have to encode tense. In Behrens' own words, children show an 'increase in grammaticality' during development. They do not acquire the concept of time around age 2;6, but they do acquire the capacity to linguistically encode tense around 2;6, on the basis of form-function correspondences in the input.

10.5.2.3 Conclusion

After re-analyzing the early tense and aspect morphemes according to function, there appear to be striking similarities across languages. It appeared that across languages, children make a distinction between a "perfective" form and an "imperfective" form to distinguish between events just ended or resultant states and events that are ongoing in the here-and-now. A further contrast arises when children start using a "prospective" form for referring to intended events. The exact forms that are used for these functions are dependent on the language they are acquiring. In this analysis, tense and aspect forms in early child language are predominantly and productively used to encode aspectual contrasts ($\pi 1$). With respect to H6, this means that children first use $\pi 1$-operators with scope over the predicate, and only later $\pi 2$-operators with scope over the predication. These findings support H6. In contrast to a formal comparison of early TMA expressions across languages, the functional comparison has shown that there are universals in the development of tense and aspect systems. This was already hypothesized by Slobin (1985). The interpretation of the forms put forward in this section will lead to a revised overview of the acquisition order of TMA expressions in 10.6.

10.5.3 Acquisition of modality

The reanalysis of the use of tense and aspect morphemes has shown that there are remarkable crosslinguistic similarities in the acquisition of tense and aspect if the functions and use of the forms are compared and not the language-specific forms. The universal acquisition order appeared to support H6. In this section, a closer look at the acquisition of modality and related senses of future tense (π2), irrealis (π2) and evidentiality (π3) is presented, in order to find out whether there are also general trends in this domain. H6 predicts that modal expressions with narrow scope (participant-oriented modality, π1) are acquired before operators with medial scope (event-oriented modality, π2) and these are in turn acquired before operators with wide scope (proposition-oriented modality, π3). This order is in accordance with the claims in the literature (see introduction to Part III) that deontic modality is acquired before epistemic modality. First, in 10.5.3.1, the acquisition of Korean will be discussed and the early forms will be reanalyzed. In 10.5.3.2 an overview will be presented of the acquisition of modal meanings in each language in order to see whether there are universals. Finally, in 10.5.3.3, the explanations for the acquisition order proposed by Stephany (1986) and Papafragou (1998; 2000) will be evaluated (see the introduction to Part III).

10.5.3.1 Reanalysis of Korean

Before the overview will be presented, Korean will be re-examined first. For Korean, there was an unexpected acquisition order in the acquisition of TMA morphemes (10.3.9) according to Choi's analysis (1991). In her view, children use epistemic modality (proposition-oriented, π3) from a very early age, expressed by sentence ending particles (SE's). However, I have some objections to Choi's analysis. Firstly, her definitions of the SE's involved are not uncontroversial (cf. Martin 1992) and do not convincingly cover the children's uses, and secondly, she has applied the labels 'evidentiality' or 'epistemic modality' too easily in her definitions.[27] Her data and analysis will be discussed now in detail.

Firstly, Choi claims that *–ta* is used to refer to information new to the child, unassimilated in his knowledge system and that *–e* is used to refer to information already assimilated in the child's knowledge system. However, the example that Choi provides to illustrate the function of *–e* is not very convincing, consider (47) (ex.15, 1995: 184):

[27] Choi compares her semantic classification of the SE's to the analysis of DeLancey (1986) for Tibetan. He indicates however that the respective morphemes do not indicate a true evidential contrast, as they do not differentiate in degrees of certainty of knowledge.

(47) Situation: TJ (2;2) is in the middle of a book, but doesn't want to read anymore. TJ closes the book.
eps-e
Not-exist-SE
'no more'

Choi claims that the information expressed in (47) is old to the child as 'the information that the child conveys has been established in her mind before actually saying it' (1995: 185), but what is the evidence for this? A major problem with this analysis, especially for the use of *–e*, is that it is inconsistent. It is unclear why there would be a relation between Choi's definitions and the contexts of use of the two forms: *–ta* would be used mainly for describing a scene in a picture as the child is looking at it, for events or states that the child has just observed and for commenting on the existence of an event/object; *–e* would be used to give information about a past event/state, to convince the addressee of an event or to talk about intended, negated or make-believe events and in questions to verify the truth of the proposition (see 10.3.9). For example, Choi suggests that a question for verification relates to already available knowledge and reference to a scene in a picture to non-available knowledge, but she does not motivate why this would be the case. Moreover, the contexts of use of the two forms are partly overlapping: in 5% of the cases, *–ta* is used in contexts that are claimed to be related to assimilated knowledge and in 36% of the cases *–e* is used in contexts that are claimed to be related to non-assimilated knowledge. There is thus no clear opposition in meaning.

Secondly, according to Choi, the functions of *–ta* and *–e* are evidential, and mark the status of the information as unknown or known to the speaker. However, evidentiality and epistemic modality have to do with expressing the source of the information or the commitment of the speaker to the truth of the proposition in order to indicate the reliability of the proposition or the responsibility of the speaker for the truth. Both *–ta* and *–e* in Choi's approach do not express any of these functions. Choi (1995: 169) also notes that these SE's are interrelated with discourse-pragmatics and in my view this function is much more important in the children's uses. The suffix *–ta* may simply function as an emphatic marker[28] whereas *–e* is the neutral utterance ending. Two alternative analyses have as much explanatory power as Choi's own analysis. First *–ta* could be used for ongoing states and events, whereas *–e* is used for non-ongoing states and events. Second, the suffixes could be related to the

[28] This analysis would be in accordance with Kim's analysis (1997) who claims that *–ta* is mainly used with the existential verbs for 'exist' and 'not.exist' and that its use is closely related to a certain degree of exclamation. *Ah, yeppu-ta* 'oh be.pretty.DECL' (=Oh, (it is) pretty (!)).

notions of topicality and focality: Choi states that *–ta* is mainly (83%) used when new topics are introduced during interaction, non-contingent to previous discourse, whereas *–e* functions in discourse (61%) to contribute more information on the current topic (1997: 109-13). To resume, there is not enough justification that the children's uses of *–ta* and *–e* express (non-)integrated knowledge. Furthermore, if *–ta* and *–e* do express (non-)integrated knowledge, then it is still not an evidential or epistemic notion, in the sense that the source of knowledge is expressed in order to provide the reliability status of the proposition.

The third SE that Choi discusses, *–ci*, is said to express shared certainty of the truth of the proposition. However, the use of this certainty marker is quite different from markers such as English *must*. With *–ci* the evidence is available to both speaker and hearer and the marking of certainty is not important to the addressee as a factor of how reliable the information is. As children use it commonly in yes/no questions or as answers to questions, it seems to function for them as a tag-question or answer, seeking or providing confirmation.

Choi claims for the fourth SE *–tay*, that it expresses hearsay (it is said that / I heard that), an evidential category. It should be used for '(i) telling the listener what the child believed a third party said or felt or (ii) reporting what a third party just said'. The children always seem to assume that the addressee does not know the information (Choi 1997: 117). Papafragou (1998: 385) considers the occurrence of *–tay* as a genuine change in quality because it marks the beginnings of a representational conception of the mind, since it attributes thoughts, utterances and emotional states to others. I would agree with Papafragou if *–tay* was really used as a marker of hearsay. However, the children (as in adult Korean (Martin 1992: 801)) do not use it as a hearsay marker, but as a reported speech marker (x said that), which is quite a different and in a sense, less sophisticated use. Describing that a third party said something or quoting speech of someone else (= indirect/reported speech, quotative), is different from marking the source of information as *hearsay* for the sake of reliability, the source of information (evidential). Children use it simply to describe the real world or imaginary event that x said/says that… and describe this event by using *–tay*. This use is not different from other languages, where intonation or verbs of saying may be used for this purpose. For many languages it has been reported that direct and indirect speech markers occur early, and*–tay* has this function in Korean child language, see (48):

(48) Situation: TJ (2;4) looking at a picture of Ernie jumping.
pal ayaya ha-n-tay.
Foot awawa do-PRS-SE
'He says his feet are hurt.'

The only correct interpretation is that Ernie says that his feet are hurt, and not that one says that Ernie's feet hurt, which would be the gloss for the hearsay interpretation. The different uses of *–tay* should therefore be taken into consideration. The data suggest that children only use it in the reportative function, and not in the evidential hearsay function.

Finally, the use of *–ta* with high pitch (type 2) was used later according to Choi (1995: 196) to mark that the information is new **to the addressee**, such as, when showing a new bracelet: 'I have a bracelet-ta!'. However, an alternative, less complex analysis is equally well possible, in that the child uses *–ta* as an emphasis marker,[29] as was already suggested for the early uses of *–ta*, without high pitch, i.e., where it is used in contexts of showing something exciting or interesting to the addressee. This information is indeed unknown to the addressee, but that is to be expected when the child wants to make impression with a new object or some other news. Choi may have noticed correctly that the form occurs in contexts of new information, but the question is whether it in fact marks this information status.

Choi indicates that the acquisition of SE's is not so different from other languages. In the first stage *–ta* is used only for referring to the here-and-now. After that, *–e* and *–ci* are acquired for describing past events. The fact that SE's occur early is probably the result of perceptual saliency, since SE's occur at the end of the sentence and since they are obligatory and therefore frequent in the input to children. Furthermore, SE's have a relatively high degree of semantic transparency in that agent-oriented and epistemic meanings are distinguished morphologically, the former mainly expressed in complement structures, the latter mainly by SE's (Choi 1997: 118). The relative early emergence of the epistemic or evidential markers compared to other languages is also caused by the fact that epistemic meanings mostly investigated for other languages 'relate to the status of knowledge that results from reasoning by the child which is relatively independent of a particular discourse-interactional context.' The function of Korean SE's is quite different in this respect, since discourse-interactional factors are important, the primary function of SE's being 'to exchange information and construct shared knowledge among conversation participants' (Choi 1997: 119).

A problem with Choi's analysis of the children's speech is that she considers the contexts of use similar as to what is linguistically encoded. She therefore

[29] Cf. Papafragou (1998: 385-86): 'What the utterances with *–ta* share is that they describe things a child might consider new, important or, in general, emotionally exciting, things which she wishes to 'brag about'. (…) it by no means implies that the child is in a position to detect partial knowledge in the hearer.'

concludes that the children acquire 'epistemic meanings related to different degrees of assimilation of knowledge in their minds, different sources of information, and the knowledge status of the listener' (1995: 199). However, an alternative analysis seems possible, that is equally well compatible with the contexts of use that Choi describes. In my view, a Korean child first distinguishes between an emphatic and a neutral sentence ending particle, *–ta* vs. *–e*, instead of marking new versus old knowledge. The use of *–ci* may be used to mark a conclusion or request for confirmation, often in questions and in answers to questions, and not to mark certainty of shared knowledge.[30] The marker, *–tay* is mainly used as an indirect speech marker and not to mark hearsay, and finally *–ta* (type 2) is still used as an emphasis marker and not as marking new information to the listener. The contexts of these uses are compatible with the functions in adult language, i.e. the contexts of use are similar and the children's functions can be incorporated easily in the adult uses. Choi (1995) herself acknowledges that:

> the perceptual contexts provided an important basis for the children's acquisition of epistemic meaning of SE suffixes. (…) *–ta* was used with situations that the child experienced at the time of speech, and *–ci* was often used when the evidence was clearly present in the extralinguistic context. Also, *-tay* was used to relay information about a referent that was present in the immediate context. Such an evidential component which is related to the here-and-now probably influenced the early acquisition of these forms. (p.199)

She also notes that *–ci* was rarely used by the children in the function of marking certainty based on inference and the indirect speech function of *–tay* 'was not fully developed in the children's speech' (p.199).

In conclusion, there are alternative explanations possible of the early SE's in child Korean. In this reanalysis, the SE's are used to express emphasis, neutral SE, conclusion or request for confirmation, or direct speech marker. In these reanalyzes, the markers do not express evidentiality (π3) or proposition-oriented meanings (π3), but rather serve interpersonal functions, that are in FG located at the Interpersonal Level (see 2.2). This means that they fall outside the category of TMA operators like in the analysis of Kim (1997). In conclusion, the acquisition order of forms in Korean is in accordance with H6: past tense (π2) and volition (participant-oriented modality, π1) are acquired first, followed by progressive aspect (π1), present (π2) and future tense (π2).

[30] This use is comparable to the interjection *hè*? in Dutch or *you know* in English.

10.5.3.2 Universals in the acquisition of modality

Now that Korean is semantically reanalyzed, an overview can be presented of the information on the acquisition of TMA in each language. The languages are discussed in the same order as in 10.3.

Turkish: In Turkish, the optative marker *–yA* is acquired before age 2;0 for expressing desire and intention (participant-oriented modality, π1 or prospective aspect, π1). Evidential functions (π3) of *-mIş* are acquired much later, indirect evidence around 4;0 and hearsay after 4;6.

Warlpiri: Children in Warlpiri first acquire the expression for immediate future/prospective/intention, around 2;11. A little later, at 3;0, future tense begins to be used. One of the evidential modality markers appears early (2;8), but does not yet express evidentiality.

Sesotho: Children at 2;1 use expressions for intention and/or future tense. At 2;5, the potential marker *ka* is used for expressing ability.

West Greenlandic: The modal expressions used by children in West Greenlandic are obligation (π1) at 2;2, disposition (π1) at 3;1, volition (π1), ability (π1) and future (π2) at 3;4 and at 4;7, volition (π1) and evidentiality (π3).

Finnish: At 1;8, children use the non-past occasionally to refer to immediate future tense and the simple obligation marker to express obligation (π1). At 2;7, the complex periphrastic construction for obligation is acquired. The irrealis (π2) is encoded from 2;10.

Lithuanian: Already before 2;0, children use 'can', 'want', and occasionally the form for future tense. The function of the future tense forms in child language is unfortunately not discussed in the literature.

Dutch: At circa 2;0, children use their first modal verbs for participant-oriented modality (π1): *wil* 'want', *kan/kan niet* 'can/can't' (ability, root-possibility), *moet* 'have to', *mag* 'may' (permission). Prospective/intentional future (π1/π2) appears between 2;0-2;6. The past tense is used for pretend play at first. Predictive future tense (π2/π3) is acquired after 4;0.

German: Around 2;0, the first modal verbs appear to express participant-oriented modality (π1): *muss* 'have to', *soll* 'shall', *darf* 'allowed to', *kann* 'can', *mag/möchte* 'like/would like', *will* 'want'. The future tense (π2) is acquired around 3;0.

Swedish: Between 2;0-2;3, children acquire the modal verbs *kan* (*inte*) 'can(not)' and *vill* (*inte*) '(don't) want' for ability (π1) and volition (π1), respectively, and somewhat later *ska* + infinitive for prospective/intentional future (π1/π2). Probably around the same time event-oriented modality (π2) is used by the children: root-possibility, permission and obligation, in combination with *man* 'one'. The predictional future (π2) comes in much later, around 3;0. It is used frequently only around 4;8.

Greek: Before 2;0, there is participant-oriented modality (π1) expressed by the auxiliary *boró* 'can, may' and by a precursor of the subjunctive and future particle. This particle is mainly used to express the child's intentions, the obligations of the addressee or to ask permission (π1). Around 2;4, the modal auxiliary *prépi* is used to express obligation. After 2;10, future tense (π2) is clearly distinguished from modality. Only after 3;6 the auxiliary *boró* is used to express epistemic possibility (π2).

French: There is only scarce information on the acquisition of modality in French. The verb *vouloir* 'want' is one of the most frequent verbs between 2 and 4 years old and experiments have shown that the comprehension of deontic modality (π1/π2) develops before the comprehension of epistemic modality (π2/π3).

Italian: An experiment on the comprehension of deontic and epistemic modality in Italian shows that children understand deontic modality (π1) before epistemic modality (π3).

Spanish: In Spanish, children acquire the modal auxiliaries *poder* 'can' and *querer* 'want' for participant-oriented modality (π1) before age 2;0. The periphrastic future is at first used to express intention (prospective, π1). Only later, it becomes a real future tense marker (π2).

Polish: Modal meanings in Polish are expressed by lexical verbs and by a few impersonal constructions (event-oriented). There is no information on the acquisition of these forms. The inflectional perfective future is acquired before age 2;0, whereas the periphrastic imperfective future is acquired around 2;0. Already from 2;0, children make reference to hypothetical events. However, linguistic encoding of hypothetical (π2) emerges around 3;0 and is only frequent around 5;0. Counterfactual reference (π2) emerges later than hypothetical.

Russian: Russian children, like Polish children, acquire the perfective future before 2;0 and the imperfective future around age 2;0. There is no further information available on the acquisition of modality and related senses in Russian.

Japanese: Around 2;0, the desiderative *–tai* emerges (volition, π1), between 2;0 and 2;6 the intentive *–oo* (prospective, π1?) and around 3;0 the expression for obligation *–nakya* (π1). From experiments on the comprehension of epistemic (π3) and evidential (π3) particles it appeared that children around 3;6 understand the epistemic particles, whereas the evidential particles are only understood around 5;6.

Georgian: The first modal expressions in child Georgian are the forms for 'want' and 'don't want' (volition, π1). The optative and future are acquired before 2;0 and express at first desire and intention (π1). Evidentiality (π3) is acquired later, but the exact age is not mentioned in the literature.

Korean: In Korean the first modal expression is acquired at 1;10, for expressing permission (π1). Around 2;0, the future tense emerges. Between 2;1 and 2;5 several modal expressions are acquired, for volition, obligation, weak obligation, prohibition, ability and intention. Children use an uncertainty marker productively at 2;7 and they do not yet use evidential constructions productively around 3;0. The early sentence ending particles, analyzed by Choi as epistemic and evidential modal markers, have been reanalyzed as expressing interpersonal functions and fall outside the scope of this thesis.

Quiché: There is hardly any information available on the acquisition of modal expressions in Quiché, except that particles for expressing epistemic modality (π3) are acquired later than most other TMA expressions.

Yucatan: Around 2;1, the subjunctive suffix is used for prohibition (π1). The assurative future, expressing future tense (π2) and certainty (π3), is acquired around 2;4 and the desiderative (volition, π1) and obligative (obligation, π1) come in later. The exact use of the assurative future by the children is not investigated in detail.

Hebrew: The future tense in Hebrew arises around 2;6 and encodes immediate rather than remote future. There is no information on the acquisition of modal expressions in Hebrew.

Mandarin: Between 1;8 and 2;5, children acquire the expression for volition (π1). Between 2;3 and 3;2 the expressions for 'can, might' and 'can, able to' are acquired (π1). From age 2;0 Mandarin children make reference to hypothetical events (π2), but this is linguistically encoded only after 3;10.

Cantonese: Around 2;0, children use participant-oriented modal auxiliaries (π1) for ability/ root-possibility, ability / intentional future and root-possibility / permission.

Kaluli: Before 2;6, children have started using different forms to express their own intended actions (π1). Evidential particles are already used before 2;6, but at first as markers of emphasis. From 2;8 children start using the forms to express evidential meanings (π3).

A general conclusion that follows from this overview is that the acquisition of modality is at present still a rather unexplored area. For most languages, there are no reports on the acquisition of modal expressions. However, the scarce data do bring to light some general trends. First, for all languages that we have data on, children use participant-oriented modality markers before 2;6, especially to express volition and ability, and to a lesser extent, obligation and permission. Second, for several languages it is reported that children use modal expressions or a future tense form to express their own intentions before these forms start to be used for future time reference. The reverse development is never reported. In some languages, children use evidential or epistemic markers before 2;6, but then, they seem to express emphasis, rather than the target

meaning. The only language for which this may not be the case is the assurative future in Yucatan that supposedly expresses a sense of certainty (π3). In a few languages it is reported that the children use an indirect or direct speech marker before 3;0, or a particle to ask for confirmation. These meanings do not belong to the Representational Level, but rather to the Interpersonal Level in FG. I assume that children in most languages will have means to express these functions, although it depends on the specific language whether they are expressed by a particle, an intonation pattern, an interjection, an adverb, a tag question, etcetera. For a few languages reference to hypothetical events is reported to occur from 2;0 already. However, the appropriate linguistic encoding only emerges after 3;0. Encoding of counterfactual events occurs later than of hypothetical events in all the languages in the sample.

The data on English in Chapter 8 correspond to this general picture. English children start out with participant-oriented modality before age 2;6. The prospective and the future tense for marking intention occur from about 2;6. The future time reference of a future marker emerges much later, from about 4;6. Event-oriented and proposition-oriented modality is used from about 3;6, but infrequently. Hypothetical marking also occurs from about 3;6 or 4;0, whereas counterfactual expressions are used later, from about 5;0.

10.5.3.3 Explanations of acquisition order

Comparable to the prediction of the Scope Hierarchy (H6), it is claimed in the literature that deontic modality (π1/π2) is acquired before epistemic modality (π2/π3). In the introduction to Part III two explanations have been discussed that account for this acquisition order. Stephany (1986: 393) claims that the acquisition order is a logical consequence of Piagetian cognitive development. She predicts that between the age of 2 and 3 years children may start referring to potential future events. Only around age 7 or 8 will children begin to understand epistemic modality and not before 11 or 12 will they develop the capacity of hypothetical reasoning. Papafragou (1998; 2000) seeks the explanation for a later development of epistemic modality in the development of a theory of mind. She claims that in order to understand epistemic or evidential modal markers, a child needs a theory of mind. Only after 3;0, the theory of mind is developed to such an extent that children will be capable of using subjective epistemic expressions.

The claims that follow from both accounts are rather different, especially with respect to the age at which epistemic and evidential expressions may be expected to emerge. To what extent are the explanations in accordance with the data in 10.5.3.2? Both Stephany and Papafragou are right in that deontic modality is acquired before epistemic modality. However, the ages at which epistemic modality is predicted to emerge are not corroborated by the data.

Stephany (1986) predicts that the earliest epistemic expressions involve future potentiality, between 2 and 3. If she understands the encoding of intentional events by 'future potentiality', then her prediction is perfectly correct. If she means real future tense reference by this term, then the ages are set too early for many languages. The other predictions of Stephany are clearly not supported by the data. Stephany's prediction is that epistemic modality (undecidability) does not occur before 7 or 8, whereas for the languages that we know of, epistemic modality comes in around 4;0 already and in some languages even earlier. The prediction that hypothetical reasoning only occurs from age 11 is quite wrong. In Finnish the irrealis is linguistically encoded from age 2;10, in Polish from 3;0, in Mandarin from 3;10, and in English from between 3;6 to 4;0.

Papafragou's claim (1998; 2000) that epistemic modality only occurs after 3;0 is in general supported, but there are two exceptions: In Yucatan, the assurative future which encodes certainty is used before 2;6 and in Kaluli, evidential expressions are used from 2;8. A further argument against Papafragou's account is that the experiment of Matsui et al. (subm.) on Japanese showed that there was no correlation between comprehension of epistemic and evidential particles and performance on a theory of mind test (10.3.7). They concluded that the explicit knowledge about theory of mind that is necessary to pass a false-belief task is not required for understanding epistemic modality as expressed in the particles, which is based on implicit or unconscious understanding of someone else's mind. This is supported by the fact that Matsui et al. did find a correlation between the development of an explicit theory of mind and the understanding of epistemic and evidential **lexical verbs**, in contrast to **particles**. Although Papafragou's theory sounds plausible, the data do not straightforwardly support her claim. It is possible that there are correlations between theory of mind and epistemic expressions at a more refined level of analysis. Both the use of modal forms and the component parts of a theory of mind need to be investigated in more detail in order to support this view.

10.6 CONCLUSION

The discussion of the functions of TMA forms in the children's speech (10.5.2.1) leads to a revision of Table 10-17. Table 10-18 presents the acquisition orders of TMA in the different languages, based on the functions that the forms fulfil. For a few languages, there was not enough information available on the functions of the earliest TMA forms. This concerns Sesotho,

Table 10-18. Revised overview of acquisition orders of TMA in the languages of the sample

Languages	Acquisition order	Predicted
Turkish	(Tense used as) aspect (π1) < (tense used as) tense (π2) < habitual (π2) < evidentiality (π3)	+
Warlpiri	(Tense used as) aspect (π1) < (tense used as) tense (π2) < evidentiality (π3)	+
Sesotho*	Aspect (π1) / tense (π2)	±
West Greenlandic	Aspect (π1), participant-oriented modality (π1) < habitual (π2) < tense (π2) < evidentiality (π3) < iterative (π1)	+
Finnish	(Tense used as) aspect (π1) < (tense used as) tense (π2) / aspect (π1) < participant-oriented modality (π1) < irrealis (π2)	+
Lithuanian*	Participant-oriented modality (π1 or lexical?) / tense (π2)	± or – ?
Greek	(Aspect/tense used as) aspect (π1) / participant-oriented modality (π1) < tense (π2) < event-oriented (π2) / proposition-oriented modality (π3)	+
Dutch	Aspect (π1) < participant-oriented modality (π1) and (tense used as) aspect < (tense used as) tense (π2)	+
German	Participant-oriented modality (π1) / (tense used as) aspect (π1) < (tense used as) tense (π2)	+
Swedish	1. (Tense used as) aspect (π1) < (tense used as) tense (π2) 2. Participant-oriented modality (π1) < event-oriented modality (π2) 3. Prospective ("intentional future") (π1) < future (π2)	+
French	1. (Tense used as) aspect (π1) < (tense used as) tense (π2) 2. Participant- or event-oriented modality (π1/π2) < event- or proposition-oriented modality π2/(π3)	+
Italian	1. (Tense used as) aspect (π1) < (tense used as) tense (π2) 2. Participant-oriented modality (π1) < event-oriented modality (π2) / proposition-oriented modality (π3)	+
Spanish*	Aspect (π1) / tense (π2) / participant-oriented modality (π1)	±
Polish	(Aspect + tense used as) aspect (π1) < tense (π2)	+
Russian	(Aspect + tense used as) aspect (π1) < tense (π2)	+
Japanese	(Tense used as) aspect (π1) < aspect (π1)/ tense (π2) < proposition-oriented modality (π3)	+

Languages	Acquisition order	Predicted
Georgian*	Aspect (π1) / participant-oriented modality (π1) / tense (π2) < evidentiality (π3)	±
Korean*	Participant-oriented modality (π1) / tense (π2) < aspect (π1)	**±**
Quiché*	1. Aspect (π1) < irrealis (π2) 2. Aspect (π1) < quantification (π1/π2) < proposition-oriented modality (π3)	+
Yucatan	Aspect (π1) < tense (π2) < proposition-oriented modality (π3)	+
Hebrew	(Tense used as) aspect (π1) < (tense used as) tense (π2)	**+**
Mandarin	Aspect (π1) < participant-oriented modality (π1) < hypothetical (π2)	+
Cantonese*	Aspect (π1) < participant-oriented modality (π1) < evidentiality (π3) / proposition-oriented modality (π3)	+
Kaluli	1. (Tense used as) aspect (π1) < (tense used as) tense (π2) 2. Aspect (π1) < evidentiality (π3)	**+**

Note. *For these languages, there is not enough information available on the function of early tense and aspect expressions.

Lithuanian, Spanish, Georgian, Korean, Quiché and Cantonese. These languages are marked by an asterisk. Outcomes that differ from Table 10-17 are presented in bold in the rightmost column.

It appears that when H6 is tested on the semantic functions of forms, there are no real counterexamples to the hypothesis. Children start out with π1-operators or with forms that function as such. In five languages, Sesotho, Lithuanian, Spanish, Georgian and Korean, children acquire tense forms at the same time as aspect or participant-oriented modality forms, but for these languages there was not enough information available about the semantic function of the TMA forms in early child speech. In several languages children go through a stage in which they use tense forms predominantly and productively only with the function of aspect operators (π1). The arguments for this interpretation were presented in detail in 10.5.2.2. Only in a later stage the tense forms are used with tense semantics. For two of these languages, however, Hebrew and Kaluli, it may still be the case that children go through a stage in which they use π2-operators, but no π1-operators, namely, as soon as they start using the tense forms with tense semantics. In Hebrew, as there are hardly any π1-operators, the children might then have a TMA system that only contains tense operators (π2). For Kaluli, there is not enough information to determine whether children start using the tense forms for tense semantics

before, after or simultaneously to the acquisition of aspect forms for encoding aspect. Further research on both languages is needed in order to establish the exact order of acquisition.

The analyses of the longitudinal production data in this chapter have shown that although the specific TMA forms to be acquired vary from language to language, there are remarkable similarities where it concerns the functions of these forms. In many languages the first verbal distinctions concern illocution: children use different forms to mark imperatives and non-imperatives. The non-imperatives are declaratives and interrogatives. Children do not always use the correct adult forms to encode the different illocutions, but they do show a systematic relation between form and function. For some languages it is reported that there are neutral or all-purpose forms such as bare stems or root infinitives, but in languages that do not have a substantial amount of bare forms in the input, children use only (unanalyzed) inflected forms right away.

In the non-imperative forms, children across languages start differentiating before the age of 2;0 between, on the one hand, events that have just happened or resultant states of earlier events and, on the other hand, states and events that hold at the moment of speech. I have argued that children's productive use of tense/aspect morphology at this stage encodes the phase of an event that holds at TT, that is, grammatical aspect. Children use different grammatical forms for encoding this distinction, depending on the language they learn, but the variation is not arbitrary. Events that have just happened and resultant states are described by perfect, resultative, perfective or (recent) past tense morphology; events that are ongoing are described by progressive, imperfective or present tense morphology. The "perfective" forms (past participle, past tense or perfective) co-occur often, but not only, with (punctual) telic events with a clear result such as 'fall' and 'break'. The "imperfective" forms co-occur in general with states, activities (including semelfactives) and durative telic events. If in the input a present tense or imperfective form is mainly used for stative situations whereas a progressive form combines with dynamic situations, then children equally make this distinction and they rarely make errors. Although the correlation between tense/aspect and event type is strong, it is not absolute and it cannot be maintained that children's early inflections would grammatically encode situation type. Although aspectual distinctions are encoded consistently before temporal distinctions, the more sophisticated uses of aspect, for example perfect aspect in combination with past and future tense, develop until after 4;0.

Further notions that are encoded early in many languages are the modal notions of inability ('can't') and volition ('wanna'). They are mainly used for self-reference.

A third aspectual contrast that seems to appear early in all languages, between about 2;0 and 2;6, is reference to events that are about to occur. These events are in general intentions of the child. Expressions used for this function are prospectives, (immediate) future markers, mainly with first person subjects, or modal markers for volition, intention or obligation. No correlation is found for intentional events and situation type.

Although the early "perfective" forms are predominantly and productively used to refer to observable events in the here-and-now, "perfective" forms are not restricted to referring to events in the immediate past or to events with a clear result. Children from about age 2;0 use them incidentally to refer to more remote past events. Most frequently, the topic is initiated by their parents and/or there is a concrete observable trigger in the present nonlinguistic context that reminds the child of the earlier event. From about 2;6, children's spontaneous references to past events increase. For several languages it is noted that early past forms refer to events in fantasy or play or occur in stories.

From the start, there is no one-to-one relation between form and function. Different forms may be used for one reference type. In languages that have bare stems or infinitives, these forms co-exist for a long time (up to about 3;0) with verbs that are encoded for TMA and they are used to refer to different types of events. Children do not change the uses of their early forms but rather, they increasingly use the appropriate, adultlike forms.

Between 2;6 and 3;0, tense is encoded more and more consistently. Children more frequently and spontaneously refer to remote past events and they present clues for their addressees that indicate the temporal location of TT. Furthermore, children acquire a second or third form to differentiate functionally between different "perfective" senses such as past tense and perfective, perfect, or resultative aspect. Children that acquire languages with a remoteness distinction for past tense, now also use the remote past tense marker. The frequency of imperfective or progressive past markers increases and in periphrastic aspectual constructions the auxiliary is realized much more often. Modal auxiliaries are in general combined with infinitives.

Reference to generic and habitual states also emerges in this period. Present tense forms with a habitual interpretation are used for this goal. Reference to past habitual events by past habitual or imperfective past forms in general occurs later. Linguistic encoding of future time reference and of reference to hypothetical or non-actual events seems to develop after 3;0. Pluperfects are acquired very late in all languages, in general after 3;6. Evidential or epistemic forms are sometimes reported to emerge between 2;6 and 3;0 but then, their semantics do not yet seem to be adultlike, but rather to express emphasis. Targetlike use of evidential and epistemic distinctions seems to occur after 3;6 or later, although not much information is available about these forms.

The experimental results are less uniform, even within one language. In general basic tense (past, present, future) and aspect distinctions (perfective, imperfective) seem to be understood around 2;6-3;6, but are not errorless. The youngest children in the experiments are, however, around 2;6, so that the earliest stages of the acquisition of TMA fall outside the scope of the studies. Comprehension of aspect is unfortunately only examined for aspectual distinctions in past tense forms. More complex distinctions such as perfect and pluperfect seem to be acquired later, after 4;0, but the exact age of acquisition is dependent on the language. Reference to remote past or future events is understood later than reference to immediate past and future events.

Comprehension of deontic modal markers seems to be established before epistemic modal markers and tests on the comprehension of evidential and epistemic modal markers in general revealed poor comprehension, even after 4;0. Why there is such a big time gap between the comprehension in the experiments and the productive use in spontaneous data is unclear.

In general, H6 is confirmed and satisfactorily accounts for the acquisition pattern of TMA functions: in the early stage of verbal use, before 2;0, children encode aspectual (π1) phases in the here-and-now and use markers of participant-oriented modality (π1) to indicate volition and ability. In the next stage, children learn to distinguish between different TTs, their conversation is about different time intervals. They now start to encode temporal reference (π2). The origins of tense marking are already before 2;6, but only after 2;6, children more spontaneously and frequently refer to non-present TTs: now tense morphemes become meaningful in an adultlike way and tense is encoded consistently. Between about 2;6 and 3;0, children begin to learn to converse about the world as it is. They make generic and habitual statements, for example by the use of present tense forms or event-oriented deontic modality (π2). From about 3;0 they begin to use expressions of irrealis (π2) and event-oriented epistemic modality (π2) for referring to non-actual events. They also start using past habitual (π2) for referring to past events. Finally, there is some evidence that children after 3;6 or 4;0 learn to indicate the reliability of their statements and the responsibility they take for what they say, by using evidentials (π3) and proposition-oriented modality (π3).

Part IV **Conclusions**

Chapter 11

Conclusions and Implications

11.1 INTRODUCTION

In this thesis I have investigated the question whether the limits on variation in adult languages of the world are identical to the limits on variation in stages of first language acquisition. The studies of typological variation and language acquisition are in general separate disciplines in linguistics. However, as discussed in Chapter 1, there are probably important relations between the two fields. Acquisitional processes could be constraining factors on the possible variation in adult language systems. The field of typology might thus benefit from insights from psycholinguistics. On the other hand, the study on typology might provide helpful insights to psycholinguistics. Linguistic universals presumably also hold for stages of language acquisition. Phenomena in child language should, therefore, not be studied in isolation, but be compared to adult systems and to the systems in the input to children.

Powerful tools to describe linguistic variation in the discipline of typological variation are implicational hierarchies or markedness scales. These hierarchies define the possible configurations and occurrence of linguistic properties, the diachronic development, and relations to morphosyntax. One of the main issues in this thesis was whether implicational hierarchies also have predictive power with respect to first language acquisition. On the basis of an implicational hierarchy, the possible variation in grammatical TMA systems in adult languages and in stages of child language were studied in order to determine whether the limits on variation are identical. In 11.2 the main findings of this thesis are summarized. In 11.3 the implications for future research will be discussed.

11.2 SUMMARY AND CONCLUSIONS

Part I of this thesis dealt with theoretical issues of TMA. In Chapter 2 the approach to TMA in the theory of FG was explicated. In FG grammatical TMA expressions are described as operators that modify a semantic unit. The part that they modify, that they have in their scope, may be the predicate, the

predication or the proposition. The communicative functions of operators correlates with their scope. π1-Operators, having scope over the predicate, modify the property or relation designated by the predicate. They help to build up a proper description of the event. π2-Operators, having scope over the predication, modify the event designated by the predication. They situate the entire event in time or actuality, or indicate the frequency of occurrence; they specify the link to the real of imaginary world. π3-Operators, having scope over the proposition, evaluate the propositional content. They express the speaker's attitude or commitment with respect to the propositional content designated by the proposition. There are hierarchical relations between the operators: π1-operators fall within the scope of π2-operators and π2-operators fall within the scope of π3-operators. Each operator with wider scope modifies a semantic unit that is more complex and that denotes a more abstract entity: it is therefore cognitively more complex. Furthermore, the function of each operator with narrower scope seems to be communicatively more relevant or basic: the modifications of each operator with narrower scope are less predictable or inferable from context. This leads to the positioning of operators on a markedness scale, the Scope Hierarchy: π1-operators ⊂ π2-operators ⊂ π3-operators, in which '⊂' stands for 'is less marked than'. The general hypothesis that has been tested in this thesis is that the Scope Hierarchy is reflected in both adult and child languages.

In Chapters 3 and 4, the crosslinguistically most common TMA categories are semantically defined and classified according to their scope. In Chapter 3 the domains of aspect, tense and quantification were considered. A crucial distinction between the domains of aspect and tense turned out to be their scope. Aspect selects part of the temporal structure of the property or relation, and only this part is ascribed to the argument(s). Aspect expressions, therefore, have scope over the predicate only and function as π1-operators. Tense locates the relevant part of the event in time with respect to a referential point. Tense expressions have scope over the complete predication and function as π2-operators. With respect to quantification, a distinction was made between expressions of property quantification (π1) that indicate the frequency or intensity of the property or relation designated by the predicate and expressions of event quantification (π2) that quantify the entire event.

In Chapter 4 the domain of modality and related areas were discussed. Modality was classified on the basis of the three parameters sense, scope, and source. It was shown that these parameters could account for the fine distinctions within the domain of modality. For this thesis, the parameter of scope was most important: modal expressions can have narrow scope, medial scope or wide scope, referred to as participant-oriented modality (π1), event-oriented modality (π2), and proposition-oriented modality (π3), respectively.

The domains of irrealis and evidentiality were also discussed: irrealis expressions function as π2-operators and evidential expressions as π3-operators.

In Chapter 5 the general hypothesis that the Scope Hierarchy is linguistically reflected in adult and child language was split up in specific hypotheses with respect to diachrony, frequency, synchronic configurations, expression form, expression order and acquisition order of TMA expressions. Grammaticalization processes were considered an important factor in formulating the expected limits on variation in adult TMA systems. Since the general direction of grammaticalization is towards generality, abstractness and interpersonal meaning and since operators with wider scope have more general, abstract and interpersonal meanings than operators with narrower scope, it was hypothesized in 5.4.1 that the diachronic development of linguistic elements will show an increase in scope (H1). With respect to the frequency of operators, two factors were considered of importance (see 5.4.2). Firstly, it was assumed that operators with narrower scope are communicatively more motivated than operators with wider scope. They should, therefore, be more frequent, across and within languages and classes of narrower scope operators should be larger than classes of wider scope operators. Secondly, diachronic competition leads to the disappearance of operators further down the grammaticalization path (having wider scope, see H1). This also led to the expectation that the frequency of operators should decrease if scope increases: this should hold for the token frequency within a language, the number of operators in a specific class, and the crosslinguistic incidence of different operators (H2a-c). In 5.4.3, it was hypothesized that the Scope Hierarchy is reflected in the possible synchronic configurations of operators. The presence of less marked operators in a language is expected to be implied by the presence of more marked operators. This means that there are only four possible TMA systems; languages without operators, languages with only π1-operators, languages with π1- and π2-operators and languages with π1-, π2- and π3-operators (H3a). It was also predicted that polysemous expressions and portmanteau expressions could only have multiple semantic functions that are related conceptually and that have the same or adjacent scope (H3b). As for the expression form of operators, scope was expected to correlate with the degree of formal grammaticalization. Operators with wider scope should have a higher degree of formal grammaticalization than operators with narrower scope (H4, 5.4.4). Finally, the expression order of operators was expected to iconically reflect the hierarchical relations between operators: operators with narrower scope should be expressed closer to the predicate than operators with wider scope (H5, 5.4.5).

As the general assumption in this thesis was that the limits on variation in linguistic systems do not only hold for adult languages, but also for each stage of first language acquisition, it was expected that the Scope Hierarchy also describes the acquisition order of operators (5.4.6). Only if children acquire the operators in the order of the Scope Hierarchy, from least (π1) to most (π3) marked operators (H6), then their TMA systems are at each stage in accordance with the possible synchronic configurations (cf. H3a). This acquisition order was also independently motivated: if the assumptions are correct that children acquire concrete functions before abstract functions, less complex functions before more complex functions and communicatively more relevant functions before communicatively less relevant functions, then this also leads to the prediction that children first begin to use π1-operators, then π2-operators and finally π3-operators. Finally, it was hypothesized that polysemous items in child language, like in adult language, can only have meanings with similar or adjacent scope (H7, cf. H3b).

The hypotheses were first tested in grammatical TMA systems in adult languages (Part II). Chapter 6 concentrated on TMA expressions in one specific language, English. First, the TMA system of English was described in detail, based on corpus research. On the basis of this inventory H1 to H5 were tested. It appeared that the Scope Hierarchy makes correct predictions for the diachronic development of grammatical TMA expressions in English (H1), the synchronic configuration (H3a), the polysemous expressions (H3b), and the expression order (H5). The token frequency of π2-operators in adult conversations (H2a), however, appeared to be much higher than of π1-operators, whereas the opposite was expected. The high frequency of π2-operators appeared to be caused by the extremely large proportion of tense expressions (π2), resulting from the obligatory encoding of tense in English. When only non-obligatory expressions were compared, within the domain of modality, the token-frequency of π1-operators appeared to be higher than of π2-operators and the token-frequency of π3-operators was lowest, which is in accordance with H2a. These facts led to the conclusion that scope in fact influences the token-frequency of TMA expressions, but that obligatoriness of expression more strongly determines token-frequency. Finally, the expression form of operators (H4) appeared to be related to scope only indirectly: scope correlates to a certain extent with age of expressions and age correlates strongly with the degree of formal grammaticalization.

In Chapter 7 adult TMA systems were examined from a crosslinguistic perspective. H1 was tested in the literature: the universal semantic paths strongly supported the expectation that grammatical TMA expressions show an increase in scope in diachronic development. No counterexamples were attested. H2 to H5 were tested in a sample of 76 languages (the GRAMCATS

sample, Appendix A). The Scope Hierarchy appeared to make correct predictions for the frequency of operators (H2b-2c) in that π3-operators are far less frequent crosslinguistically than π1- and π2-operators and the size of the class of π3-operators is smaller than of π1- and π2-operators. However, the crosslinguistic frequency of π1- and π2-operators is about equal, as well as the size of these operator classes, whereas it was expected that π1-operators would be more frequent than π2-operators. These results suggest that π1- and π2-operators do not differ greatly in their cognitive complexity and/or their communicative relevance. The next hypotheses, H3a and H3b, were strongly supported by the languages in the sample. All languages showed one of the predicted configurations of operators. Furthermore, the different functions of polysemous expressions and portmanteau expressions had similar or adjacent scope for the vast majority (H3b). The only exception was an expression that could encode perfect aspect (π1) and evidentiality (π3). With respect to the expression form of operators (H4), the Scope Hierarchy seemed to be irrelevant. There was no clear relation between the degree of formal grammaticalization and scope, which confirmed the findings on English in Chapter 6. Rather, there appeared to be relations between semantic function, formal grammaticalization and morphological type of language. Finally, scope seemed to play a role in the expression order of operators (H5), in that there were many languages in which operators with narrower scope are expressed closer to the predicate than operators with wider scope. However, iconicity cannot by itself account for the syntactic phenomena.

In Part III the focus was on first language acquisition. Chapter 8 dealt with the acquisition of grammatical TMA expressions in English. The longitudinal spontaneous speech of eight children was examined with regard to the spontaneous production of TMA expressions. Using precise productivity criteria—relative frequency of operators compared to the adult stage and the input, variation in use, and contrastive use—the acquisition order was established. Although there were large distinctions in speed of acquisition, the qualitative development was very similar in all children. Most children appeared to start with π1-operators, but one child began with π1- and π2-operators simultaneously. This child seemed to have a holistic learning style. All children showed a higher rate of acquisition of different π1-operators, compared to other operators. π3-Operators were clearly acquired last. H6 was thus supported by the data. H7 could only be tested for one child: his data supported the hypothesis.

In Chapter 9 the question was examined with what meanings children use their TMA expressions in English. The hypothesis was tested that children's early tense and aspect expressions encode situation type, such as claimed by the Aspect Before Tense Hypothesis and the Prototype Account. The study

focused on inflectional tense and aspect expressions (Progressive, Simple present and Simple past) and their co-occurrence with situation types (states, activities, telic events). The distributions of possible combinations were compared to the distribution in the input and in the adult stage of English. It appeared that children do not show a stronger correlation between Progressive and activities than adults, but that they do show a stronger correlation between Simple present and states and between Simple past and telic situations. The correlation is, however, never absolute, so that there is no reason to assume that children use their tense and aspect forms to encode situation type. An alternative hypothesis was formulated: the Discourse Topic Hypothesis. There are strong relations between the use of certain forms and the general discourse topic. It appeared that the differences in distribution could be accounted for by the predominance of the discourse topic of the here-and-now in child language compared to adult and input language.

Finally, Chapter 10 examined the acquisition of TMA from a crosslinguistic perspective. For 24 languages from 13 language families reports have been found in the literature on the acquisition of TMA. Although the acquisition order of language specific categories was different across languages, a comparison of the use of these categories revealed remarkable crosslinguistic similarities. Children speaking very different languages appeared to start with linguistically encoding a distinction between events that have just ended and events that are ongoing, followed a bit later by the contrast with events that are about to happen (intentional events). These distinctions were interpreted as aspectual distinctions, rather than temporal distinctions: in the children's utterances, the topic time, the interval to which the speaker's claim is confined, is predominantly in the here-and-now. Children seem to encode which phase of an event is relevant at topic time. It was argued that encoding of tense occurs only when topic time is variable: however, in the early stages, it are the parents and not the children who initiate conversations in which the topic time is outside the here-and-now. Children thus encode aspectual distinctions productively and spontaneously before they encode temporal distinctions. The forms that are used to encode these distinctions are dependent on the language. The events just ended are encoded by a "perfective" form: (immediate) past tense, perfective, perfect or resultative forms. The ongoing events are encoded by an "imperfective" form: present tense, imperfective or progressive. Finally, the events about to happen are encoded by an "intentive" form: prospective, (immediate) future, or participant-oriented modality. This development supported the hypothesis that children start out with $\pi 1$-operators, under the condition that TMA expressions are analyzed according to the function they fulfil in the child's system. Children start out with linguistically encoding aspectual distinctions ($\pi 1$) and participant-oriented modality ($\pi 1$). Later, they

acquire the encoding of tense (π2). After about 3;0, other π2-operators are acquired: event-oriented modality, event quantification and irrealis. The last categories to be acquired, after about 3;6 or 4;0, are proposition-oriented modality and evidentiality (π3).

Overall, the approach taken to TMA appeared to be fruitful. The analysis of the utterance in different layers is related to cognitive complexity and to communicative relevance. As a result, operators can be positioned on a markedness scale, the Scope Hierarchy. This scale appeared to account for various linguistic phenomena in adult and in child language. Although scope could not explain expression form, it could partly account for frequency and expression order and the Scope Hierarchy made correct predictions on diachronic development, synchronic configurations and acquisition order. It appeared that there are probably no languages and no stages in child language that have a configuration of operators different from the predicted configurations. A general conclusion is thus that the limits on variation in adult languages and in stages of first language acquisition are in fact identical within the domain of TMA.

11.3 IMPLICATIONS FOR FUTURE RESEARCH

This research led to some important findings that have implications for future research. Firstly, the model of FG provided a rather abstract level of analysis of TMA expressions, with respect to their scope. Scope unites TMA categories that are in other studies considered unrelated, such as event-oriented modality and tense which both function as π2-operators or participant-oriented modality and aspect that both function as π1-operators. This approach revealed tendencies that could have been missed if the analysis had taken place at the level of specific semantic functions. The FG approach also has implications for the definition of different TMA domains. On the basis of scope a distinction should be made between property and event quantification and between different types of modality: participant-oriented modality, event-oriented modality and proposition-oriented modality. These distinctions should be recognized in further research.

Notwithstanding the success of the FG approach, the analysis at the level of scope also appeared to oversimplify matters at some points: with respect to the diachronic development of specific elements and the acquisition of operators, finer semantic distinctions appeared to be necessary to describe the precise developmental steps. Furthermore, certain semantic functions appeared to be overrepresented within a class of operators, such as tense within the class of π2-operators. As a consequence, these functions disproportionally determine the characteristics of the specific operator class. In future research on TMA, the

parameter of scope should therefore be included as one of the possible variables but the analysis should also take place at the more detailed level of specific TMA categories.

Second, this thesis provided some proposals for the definition and classification of different TMA domains. I adapted the definition of tense, using the notion of topic time of Klein (1994). However, contrary to Klein, I assume that topic time is not systematically located in time by tense expressions but inferred by pragmatic knowledge. Tense expressions, then, indicate the temporal location of the event with respect to a temporal reference point, in general, the moment of speaking. Furthermore, I attempted to describe the complex domain of modality. I showed that at least the three parameters sense, source and scope are needed to account for subcategories within the domain. This approach led to a preliminary sketch of a conceptual space for modality, reflecting the relations between different meanings. Further investigation is needed to find out whether this conceptual space can account for crosslinguistic variation.

Third, this thesis revealed new insights in possible variation in TMA systems. It appeared that all adult languages have grammatical TMA expressions; in child language, the first encodings of TMA arise very early (around 2;0) and most Creole languages also seem to have at least some grammatical TMA marking. Apparently, grammatical TMA expressions are very widespread crosslinguistically. Why TMA is such an important domain to be expressed grammatically in language is an important question for further research. Further, the possible configurations of TMA expressions within a language appeared to be limited: languages and stages of first language acquisition only have TMA expressions with wider scope if they also have TMA expressions with narrower scope. In this thesis it was assumed that cognitive complexity and communicative relevance account for the fact that operators with narrower scope outnumber operators with wider scope. This relation between operator types and specific TMA categories on the one hand and communicative relevance and cognitive complexity on the other hand should, however, be examined in more detail. If possible, neurolinguistic evidence should be found for the assumed relation between scope and cognitive complexity. The communicative relevance of different operators also needs to be elaborated further and might be linked to discourse topics.

Fourth, there appeared to be a relation between morphological type of language, expression forms, and TMA categories that are present in a language. This seems to be an important area for further investigation. If the presence of certain categories is strongly dependent on language type, this would have important consequences for the understanding of grammaticalization processes and the general typology of languages. It might become possible to predict

what meanings are most probable to grammaticalize within a specific language. It would also imply that languages cannot only be distinguished on the basis of their formal characteristics, but also on the basis of semantic characteristics. Which semantic functions are prominent? A proposal in this direction has been presented in Bhat (1999).

Fifth, because of the broad range of data that are taken into account in this thesis it was possible to establish universal relations between different TMA categories. Developmental steps in diachrony and language acquisition and functions of polysemous items show again and again that the following relations are very strong crosslinguistically:

i) resultative, perfect, perfective and (recent) past tense;
ii) progressive, imperfective, and present tense, and continuative. These categories are also related to iterative, habitual and frequentative;
iii) participant-oriented modality, prospective, intention, immediate future and future;
iv) irrealis, future and epistemic modality;
v) participant-oriented modality, event-oriented modality, proposition-oriented modality.

Language users create new meanings by pragmatic inference: the possible implicatures of certain meanings seem to be universal. The explanation for the relatedness of meanings must lie in universal conceptual relatedness. Scope is an important parameter in understanding pragmatic implicatures of specific semantic functions and in understanding ambiguous and polysemous interpretations of one form. The implicatures of a linguistic construction often concern wider scope interpretations. Metaphorical extension can be understood as interpreting the basic sense of an expression as applying to a larger part of the utterance.

Although there are similar developments in diachrony and in language acquisition, this should not be explained by a general principle that ontogeny repeats phylogeny. The correspondence arises because minds make similar inferences about semantics: relations between meanings are universal. Similar inferences can occur in diachrony and in language acquisition, because similar human beings deal with language. However, the underlying process is not identical. In historical development, grammaticalization in general starts with lexical items that become more general in meaning and are used more frequently. This is a process that runs over generations and across individuals: it is a change in the conventionalized meaning of a linguistic item within a group that correlates with an increase in scope.

For children, operators that have narrow scope are apparently easier to grasp, as they are more frequent in the input and probably more related to the discourse topic of the here-and-now. Therefore items that can be interpreted with different scopes will in general, but not necessarily, be acquired first in their most narrow scope interpretation. This is simply the meaning children are most familiar with. When in the input these items get used with wider scope interpretations, children will find out what is the implicature and what is the basic meaning. It looks as if history repeats itself, but the underlying developmental process is very different. This is evident, for example, from the fact that children do not necessarily start with the most narrow scope function of polysemous items. If the function with wider scope is more frequent in the input, this is the first function that is acquired. This is, for example, the case in English, where future *will* ($\pi 2$) is much more frequent in the input than volition *will* ($\pi 1$), and, accordingly, children acquire the future (or rather, the intention function) first, and only later the volition function, whereas the diachronic development was from volition to future. A further difference between the diachronic development and language acquisition may lie in the role of the conceptual maps of adults and children. When adult language users start interpreting linguistic elements with different meanings than their original meanings, this is the consequence of their conceptual map that makes inferences probable. However, when children start using linguistic elements with more general functions, it is unknown whether children can do so because they already have conceptual maps that help to make similar inferences as adults do or whether the input helps children to build up the relations between concepts. This question recently received special attention in Bowerman and Levinson (2001b).

Sixth, there are several implications of this study with respect to the study of first language acquisition. First of all, in Chapters 8 and 9, it was demonstrated that it is important to compare phenomena in stages of child language to the adult stage in order to establish what is specific for child language. Too often, claims are made about child language phenomena without explicitly investigating adult language use. This might lead to erroneous conclusions about developmental steps in language acquisition.

The research on the influence of discourse topics on the use of linguistic forms indicated that there are differences at least in the communicative needs of children and adults. This is an area that also needs further examination. What exactly are possible discourse topics in the stages of first language acquisition up to the adult stage of language? What linguistic forms are needed to talk about certain topics? And what is the distribution of the different forms for different discourse topics?

Furthermore, this thesis has shown that it is very important in the search for universals in language acquisition not only to compare the acquisition of **language-specific categories**, but also to examine the **function** these categories fulfil in the child's system. At this more abstract level of analysis there might be crosslinguistic similarities. Such an approach can only be successful if reports on language acquisition include the contexts of use: what does the child use these forms for? Unfortunately, detailed information on the use of specific categories is often missing.

Finally, this thesis supports the view that implicational hierarchies in fact describe possible languages for adult and for child language within the domain of TMA. Whether this conclusion may be generalized to other domains should be further investigated. Numerous implicational hierarchies have been established on the basis of research on typological variation that could be tested in child language, for example, the universals mentioned in Chapter 1 of this thesis. This might lead to new insights on constraining principles on child language: not every language system is a possible system for a child, because of general cognitive capacities and communicative needs that hold for all language users. If there appear to be consistent relations between typological variation and language acquisition in different linguistic domains it should also be examined whether the similarities in adult and child languages can be explained by the same underlying factors: are the cognitive and communicative factors responsible for limits on variation similar in children and in adults? Or are there specific processes that play a role in acquisition and that account for typological variation?

In order to understand what language is, why certain properties are frequent within and across languages and stages of language and others are rare, research should focus more on language users. The links should be examined between universal conceptual structures, communicative needs in different stages of language, learning mechanisms and specific linguistic properties.

Abbreviations

ø	zero morpheme
1	first person
2	second person
3	third person
ABL	ablative
ABS	absolutive
ADL	adult
AG	agentive
ASP	aspect
AUGM	augmentative
AUX	auxiliary
B	Biber et al. (1999)
C	Coates (1983)
C	consonant
CHILDES	Child Language Data Exchange System
CHI	Child
CIF	contrary information flow
CL	classifier
COMPL	completive
CONN	connector
CONSEC	consecutive
CONT	continuous
CWO	Collins' Wordbanks Online English Corpus
DAT	dative
DECL	declarative
DEF	definite
DIREXP	direct experience
e	event
EP	extended predicate
ERG	ergative
F	feminine
FAT	father
FG	Functional Grammar
FIN	finite
FUT	future tense
GEN	genitive
IMP	imperative
INF	infinitive
IPFV	imperfective
ITR	iterative
LOC	locative
REL	relative element
M	masculine
MOD	modal
MOT	mother
N	neuter
NEC	necessity
NCL	noun class
NOM	nominative
NONPAST	non-past tense
OBJ	object
OBV	obvious
OPT	optative
P	Palmer (1990)
p	proposition
PART	participle
PARTIT	partitive
PASS	passive
PAST	past tense
PFV	perfective
PFT	perfect
PL	plural
P / N	person/number inflection
POTN	potentiality
PPTC	past participle
Pred	predicate
PREP	preposition
PROG	progressive
PRON	pronoun
PrPTC	present participle
PRS	present tense

PTL	particle
QUOT	quotative
REDUP	reduplication
RT	reference time
S	speaker
SBCSAE	Santa Barbara Corpus of Spoken American English
SE	sentence ending particle
SFP	sentence final particle
SG	singular
ST	speech time
SUBJ	subject
SUP	supine
TMA	tense, modality, aspect
TT	topic time
UNC	uncertainty
UNEXP	unexpected
V	verb
V	vowel
x	argument

Appendices

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Appendix A The GRAMCATS sample (adult languages)

Family*	Language	Number
Isolates	Inuit	1
	Basque	2
Afroasiatic		
Chadic		
East Chadic	Margi	3
West Chadic	Kanakuru	4
Other Afroasiatic	Awngi (Agau) [Cushitic]	5
	Tuareg [Berber]	6
	Tigre [Semitic]	8
Macro-Algonquian	Cheyenne	9
Andean-Equatorial		
Equatorial		
Arawakan	Island Carib	10
Tupi	Cocama	11
Other Equatorial	Chacobo	12
Other Andean-Equatorial	Jivaro [Jivaroan]	13
	Tucano [Tucanoan]	14
Australian		
Pama-Nyugan		
Southwest P-N	Gugada	15
Pama-Maric P-N	Gugu-Yalanji	16
Other P-N	Alyawarra	17
Other Australian	Maung [Iwaidjan]	18
	Worora [Wororan]	19
	Alawa [Maran]	20

Family*	Language	Number
Austroasiatic		
Mon-Khmer		
Katuic		
Bahnaric	Koho	22
Other M-K	Palaung	23
Other Austroasiatic		
Austronesian		
Oceanic		
Eastern-Oceanic	Tahitian [Polynesian]	25
Papua Austronesian	Motu	26
NW New Hebrides	Atchin	27
NW & Central Solomons	Halia	28
Admirality-Western		
Bismarck Archipelago	Tanga	30
New Caledonia		
NE New Guinea	Nakanai	32
Other Oceanic	Trukese	33
Malayo-Polynesian	Pangasinan [Hesperonesian]	34
	Rukai [Formosan AN]	35
S Halmahera-W New Guinea	Buli	37
Aztec-Tanoan	Tohono O' odham	38
Caucasian	Abkhaz	39
Macro-Chibchan		
Chibchan	Guaymi	40
Other M. Chibchan	Guaymi	40
Dravidian	Kui	42
Ge-Pano-Carib	Abipon [Macro-Panoan]	43
Hokan	Karok	46
Indo-European		
Italian	Latin	47

Family*	Language	Number
Indo-Iranian	Maithili (Bihari) [Indic]	48
	Baluchi [Iranian]	49
Other Indo-European	Modern Greek [Hellenic]	50
	Danish [Germanic]	51
Indo-Pacific (Trans New Guinea)		
Central New Guinea	Yagaria [E NG Highlands]	52
	Ono [Huon-Finisterre]	56
SE New Guinea		
North New Guinea	Nimboran [North Papuan]	58
	Yessan-Mayo [Sepik]	60
Northeastern New Guinea	Bongu [Northeastern New Guinea]	59
Western New Guinea		
Central + South NG		
Other Indo-Pacific	Baining [New Britain]	63
Khoisan	!Kung	67
Na-Dene	Slave	68
Niger-Kordofanian		
Kordofanian	Krongo	69
Niger Congo		
Adama-Eastern		
West Atlantic	Temne	71
Benue-Congo	Mwera	72
Gur	Tem	73
Kwa	Engenni	74
Mande	Mano	75
Nilo-Saharian		
Chari-Nile	Bari [Eastern Sudanic]	76
	Ngambay [Central Sudanic]	77
Other Nilo-Saharian	Kanuri	78

Family*	Language	Number
Oto-Manguean	Palantla-Chinantec	79
Penutian		
Mayan	Tojolabal	80
Other Penutian	Zuni [Penutian isolate]	81
	Maidu [Maidu]	82
Salish	Shuswap	83
Sino-Tibetan		
Kam-Tai	Lao (Laotian)	84
Tibeto-Burman	Chepang [Gyarung-Mishmi]	85
	Meitei [isolate] (instead of Haka [Naga-Kuki-Chin])	95
	Lahu [Burmese-Lolo]	87
	Nung [Bodo-Naga-Kachin]	88
Other Sino-Tibetan	Cantonese	89
Macro-Siouan	Dakota	90
Ural-Altaic		
Uralic	Votyak-Udmurt	91
Altaic		
Turkic	Uighur	92
Other Altaic	Buriat	93
Creoles	Tok Pisin	94

Note. *The genetic classification is adopted from Bybee et al. (1994: 311-15), which is based on Voegelin & Voegelin (1978).

Appendix B CHILDES files used for each child sample of 750 utterances

Sample	Files	Age
Eve 1;6	1	1;6
Eve 1;9	6-7	1;9
Eve 2;0	13	2;0
Eve 2;3	19-20	2;3
Peter 1;9	1	1;9.8
Peter 2;0	6	2;0.10
Peter 2;3	10	2;3.3
Peter 2;6	15	2;6.16
Peter 3;0	20	3;1.20
Nina 2;0	7	2;0.24
Nina 2;3	17-18	2;3.14-2;3.18
Nina 2;6	30-31	2;5.27-2;5.28
Nina 3;0	42-43	3;0.3-3;0.10
Naomi 1;6	2-3	1;6.16-1;7.6
Naomi 1;9	6-12	1;9.7-1;10.11
Naomi 2;0	35-37	2;0.2-2;0.5
Naomi 2;3	51-58	2;2.25-2;4.5
Naomi 2;6	61-66	2;5.3-2;6.5
Naomi 3;0	73, 75-76, 78-80	2;11.8, 2;11.11-12, 2;11.17-24
Naomi 3;6	86, 88-89	3;5.3, 3;5.6-3;5.7
Naomi 4;6	91-92	4;7.28-4;7.29

Sample	Files	Age
Adam 2;3	1	2;3.4
Adam 2;6	7	2;6.3
Adam 2;9	13	2;9.4
Adam 3;0	20	3;0.11
Adam 3;6	32-33	3;5.29-3;6.9
Adam 4;0	42	4;0.14
Adam 4;6	49	4;6.24
Sarah 2;3	1-4	2;3.5-2;3.22
Sarah 2;6	16-18	2;6.4-2;6.20
Sarah 2;9	28-30	2;9.6-2;9.20
Sarah 3;0	40-42	3;0.18-3;0.27
Sarah 3;3	51-53	3;3.7-3;3.13
Sarah 3;6	64-66	3;6.6-3;6.23
Sarah 3;9	76-79	3;9.3-3;9.26
Sarah 4;0	87-89	4;0.5-4;0.28
Sarah 4;6	112-114	4;6.5-4;6.17
Sarah 5;0	134-137	5;0.2-5;0.25

Sample	Files	Age
Abe 2;6	011-19	2;5.29-2;7.0
Abe 3;0	60-66	2;11.30-3;1.5
Abe 3;6	106-112	3;6.3-3;6.22
Abe 4;0	152-158	3;11.25-4;1.5
Abe 4;6	180-188	4;5.28-4;7.5
Abe 5;0	204-210	4;10.29-5;0.11

Sample	Files	Age
Ross 2;6	20-22	2;6.18-2;8.0
Ross 3;0	32-33	3;0.1-3;0.28
Ross 3;6	41-42	3;6.1-3;6.25
Ross 4;0	46-47	3;11-4;0
Ross 4;6	51-53	4;5.8-4;7.6
Ross 5;6	60-63	5;5.12-5;7.16
Ross 6;0	69-71	5;11.?-6;2.26
Ross 6;6	76-77	6;5.30-6;6.8
Ross 7;6	91-92	7;6.9-7;7.11

Appendix C Absolute frequency of TMA expressions per domain in each child sample

Table C-1. Absolute number of expressions per TMA domain in EVE's speech

EVE	**Age**			
Domain	**1;6**	**1;9**	**2;0**	**2;3**
Aspect (π1)	4	50	46	50
Participant-oriented modality (π1)	0	0	28	28
Tense (π2)	2	9	106	178
Irrealis (π2)	0	0	0	2
Event quantification (π2)	0	0	0	0
Event-oriented modality (π2)	0	0	0	0
Proposition-oriented modality (π3)	0	0	0	0
N =	6	59	180	258

Table C-2. Absolute number of expressions per TMA domain in PETER's speech

PETER	**Age**				
Domain	**1;9**	**2;0**	**2;3**	**2;6**	**3;0**
Aspect (π1)	2	1	27	67	43
Participant-oriented modality (π1)	0	1	12	21	27
Tense (π2)	0	51	150	262	356
Irrealis (π2)	0	0	0	1	0
Event quantification (π2)	0	0	0	0	0
Event-oriented modality (π2)	0	0	0	0	3
Proposition-oriented modality (π3)	0	0	0	0	1
Modality, unclassified					1
N =	2	53	189	351	431

Table C-3. Absolute number of expressions per TMA domain in NINA's speech

NINA	**Age**			
Domain	**2;0**	**2;3**	**2;6**	**3;0**
Aspect (π1)	11	47	19	47
Participant-oriented modality (π1)	0	7	20	41
Tense (π2)	38	172	196	280
Irrealis (π2)	0	0	0	0
Event quantification (π2)	0	0	0	0
Event-oriented modality (π2)	0	0	0	0
Proposition-oriented modality (π3)	0	0	0	0
N =	49	224	239	368

Table C-4. Absolute number of expressions per TMA domain in NAOMI's speech

NAOMI	**Age**							
Domain	**1;6**	**1;9**	**2;0**	**2;3**	**2;6**	**3;0**	**3;6**	**4;6**
Aspect (π1)	0	37	55	45	43	41	54	26
Participant-oriented modality (π1)	0	7	11	22	21	36	71	59
Tense (π2)	2	53	108	165	208	232	305	378
Irrealis (π2)	0	0	0	0	0	0	2	5
Event quantification (π2)	0	0	0	0	0	0	0	1
Event-oriented modality (π2)	0	0	0	0	0	0	0	3
Proposition-oriented modality (π3)	0	0	0	0	0	0	1	0
Modality, unclassified			2					
N =	2	97	176	232	272	309	433	472

Table C-5. Absolute number of expressions per TMA domain in ADAM's speech

ADAM	**Age**						
Domain	**2;3**	**2;6**	**2;9**	**3;0**	**3;6**	**4;0**	**4;6**
Aspect (π1)	1	32	38	51	77	80	105
Participant-oriented modality (π1)	3	0	3	16	55	56	56
Tense (π2)	14	38	51	164	311	344	434
Irrealis (π2)	0	0	0	0	2	1	1
Event quantification (π2)	0	0	0	1	1	1	0
Event-oriented modality (π2)	0	0	0	0	0	12	2
Proposition-oriented modality (π3)	0	0	0	0	0	0	1
Modality, unclassified							1
N =	18	70	92	232	446	494	600

Table C-6. Absolute number of expressions per TMA domain in SARAH's speech

SARAH	**Age**									
Domain	**2;3**	**2;6**	**2;9**	**3;0**	**3;3**	**3;6**	**3;9**	**4;0**	**4;6**	**5;0**
Aspect (π1)	3	1	0	9	11	38	51	50	30	28
Participant-oriented modality (π1)	3	0	4	6	20	45	25	43	63	54
Tense (π2)	24	26	61	121	161	244	227	239	317	340
Irrealis (π2)	0	0	0	0	0	0	1	1	1	2
Event quantification (π2)	0	0	0	0	0	0	0	0	0	2
Event-oriented modality (π2)	0	0	0	0	0	0	0	5	3	6
Proposition-oriented modality (π3)	0	0	0	0	0	0	0	2	0	0
N =	30	27	65	136	192	327	304	340	414	432

Table C-7. Absolute number of expressions per TMA domain in ABE's speech

ABE	**Age**					
Domain	**2;6**	**3;0**	**3;6**	**4;0**	**4;6**	**5;0**
Aspect (π1)	37	55	81	67	81	77
Participant-oriented modality (π1)	74	85	65	84	74	68
Tense (π2)	380	483	541	564	585	520
Irrealis (π2)	0	4	5	15	26	40
Event quantification (π2)	0	0	1	2	1	3
Event-oriented modality (π2)	1	5	5	8	8	6
Proposition-oriented modality (π3)	0	2	1	5	5	2
N =	492	634	699	745	780	716

Table C-8. Absolute number of expressions per TMA domain in ROSS' speech

ROSS	**Age**								
Domain	**2;6**	**3;0**	**3;6**	**4;0**	**4;6**	**5;6**	**6;0**	**6;6**	**7;6**
Aspect (π1)	67	59	32	33	41	36	51	48	19
Participant-oriented modality (π1)	30	35	18	34	50	49	55	44	39
Tense (π2)	274	484	440	457	496	513	451	406	419
Irrealis (π2)	0	1	1	1	16	9	7	5	12
Event quantification (π2)	0	0	0	1	1	0	2	0	3
Event-oriented modality (π2)	3	5	2	5	11	8	9	6	7
Proposition-oriented modality (π3)	0	1	2	4	0	5	2	2	3
N =	374	590	495	535	611	620	577	511	502

Appendix D Overview of all the utterances with a TMA expression in the sample of Peter at 2;3

SEMANTIC FUNCTION	
Prospective (π1)	
going get paper # right # there.	I'm gonna put it on my head
Progressive (π1)	
I'm getting my cups.	fixing a barrels.
I'm getting the Frisbee.	getting Patsy's keys.
I'm going home.	hurting the microphone.
I'm going shopping right now.	looking.
I'm going store. (3 times)	missing a piece.
I'm going to the tops.	playing this .
I'm looking for something.	playing twelve. (2 times)
I'm looking Patsy's pencil.	what're you doing.
I'm putting the wheel on.	what's Mommy doing?
I'm writing my name on bag.	it's dumping over.
	it's op(en)ings [= opening] and uh op(en)ing a door.
Participant-oriented modality (π1)	
Potentiality:	I can put it to my head.
can we do it again.	I can't reach it.
can't do this.	Jenny can't have that.
can't have that.	***Necessity:***
can't have yyy box.	got ta get a book.
can't rip it.	I got ta give Patsy # one.
Past tense (π2)	
baby went down the hall.	fell down.
went down a chair.	did it!

Future tense (π2)	
I'll go get it.	I'll get another one.
I'll go get the Frisbee.	I'll get it.
I'll go get them.	I'll get another one
Present tense on main verb (π2)	
choo+choo+train goes on the rug.	key goes in here.
goes again!	tape goes round.
goes around.	Eric has it.
goes in door.	I want a bite.
goes in that.	I want some more.
goes in the hair.	I want the Eric.
goes in this.	I want to blow.
goes round.	here comes choo+choo+train.
goes there.	here comes Jenny again.
Present tense on auxiliary (π2)	
I'm getting my cups.	I'm looking for something.
I'm getting the Frisbee.	I'm looking Patsy's pencil.
I'm going home.	I'm putting the wheel on.
I'm going shopping right now.	I'm writing my name on bag.
I'm going store. (3 times)	
I'm going to the tops.	it's op(en)ings [=opening]
I'm gonna put it on my head.	it's dumping over.
Present tense on copula (π2)	
it's a # take away paper.	it's yyy bolt
it's a b(ar)ette . (3 times)	it's yyy top.
it's a big throw.	here's another one.
it's a bigger one.	that's a bigger throw.
it's a choo+choo+train.	that's a cake.
it's a donkey. (2 times)	that's a can.
it's a egg.	that's a football.

it's a green.	that's a red one.
it's a hair something.	that's a xxx.
it's a microphone.	that's hamburger.
it's a monkey. (2 times)	that's orange.
it's a Peter.	that's Patsy's pills.
it's a pillow.	that's very nice.
it's a red.	there's a piece a gum.
it's a screwdriver.	there's another one. (3 times)
it's a take away paper.	this is mine.
it's a triangle. (3 times)	what're you doing.
it's empty.	what's [!!] this?
it's Eric's. (2 times)	what's happen another one.
it's girls.	what's Mommy doing?
it's inside the barrels.	what's that. (10 times)
it's Lois's.	what's this. (6 times)
it's Mommy.	where's (a)nother flower +...
it's my paper.	where's a b(ar)ette .
it's my turn.	where's a pencil.
it's not a toy .	where's another one. (3 times)
it's Patsy Lois (3 times)	where's o(ther) # one piece.
it's smoke.	where's other top.
it's uh mine.	where's the Frisbee.
it's uh Patsy!	where's the other top.
it's uh toy.	where's the top.
it's yyy # right?	where's yyy piece.

Appendix E Absolute frequency of TMA expressions per domain for the input files

Table E-1. Absolute number of expressions per TMA domain in INPUT to NAOMI

Input to NAOMI	**Input at**							
Domain	**1;6**	**1;9**	**2;0**	**2;3**	**2;6**	**3;0**	**3;6**	**4;6**
Aspect (π1)	43	92	26	82	62	74	29	30
Participant-oriented modality (π1)	21	50	18	45	30	29	43	36
Tense (π2)	438	433	119	462	405	424	231	266
Irrealis (π2)	0	8	0	8	2	10	9	30
Event quantification (π2)	0	1	0	1	1	1	0	0
Event-oriented modality (π2)	2	2	1	2	0	0	0	4
Proposition-oriented modality (π3)	0	1	0	0	0	0	0	1
N =	504	587	164	600	500	538	312	367

Table E-2. Absolute number of expressions per TMA domain in INPUT to NINA

Input to NINA	**Input at**			
Domain	**2;0**	**2;3**	**2;6**	**3;0**
Aspect (π1)	62	148	174	90
Participant-oriented modality (π1)	39	56	97	46
Tense (π2)	439	623	805	661
Irrealis (π2)	2	19	3	10
Event quantification (π2)	0	0	2	1
Event-oriented modality (π2)	3	4	2	3
Proposition-oriented modality (π3)	0	1	4	3
N =	545	851	1087	814

Table E-3. Absolute number of expressions per TMA domain in INPUT to ABE

Input to ABE	**Input at**			
Domain	**2;6**	**3;0**	**3;6**	**4;6**
Aspect (π1)	57	61	38	31
Participant-oriented modality (π1)	57	79	37	26
Tense (π2)	483	543	383	281
Irrealis (π2)	7	23	3	15
Event quantification (π2)	0	0	0	0
Event-oriented modality (π2)	4	4	9	3
Proposition-oriented modality (π3)	2	4	3	2
N =	608	714	470	358

Appendix F Languages included in the crosslinguistic study of TMA acquisition

Family	Language(s)
Altaic	Turkish
Australian	
Pama-Nyungan	Warlpiri
Bantu	Sesotho
Eskimo-Aleut	West-Greenlandic
Finn-Oegric	Finnish
Indo-European	
Baltic	Lithuanian
Germanic	Dutch
	German
	Swedish
Greek	Greek
Romance	French
	Italian
	Spanish
Slavic	Polish
	Russian
Japanese	Japanese
Kartvelian	Georgian
Korean	Korean
Mayan	Quiché / K'iche' Maya
	Yucatan / Yucatec Maya
Semitic	Hebrew
Sino-Tibetan	Mandarin
	Cantonese
Trans-New Guinea	Kaluli

Appendix G Inventory of TMA expressions in the GRAMCATS sample

The TMA expressions are presented for each language, in the same order as in Appendix A, using the language numbers from Bybee et al. (1994). The third column presents the expression form (aux = auxiliary; inf = infix; peri = periphrasis; pre = prefix; ptcl = particle; redup = reduplication; stch = stem change; suf = suffix; tnch = tone change; zero = zero). The fourth column presents the TMA domain (A = aspect; T = tense; M = modality; I = irrealis; Q = quantification; E = evidential). The numbers in the rightmost column are the numbers attributed to the expressions in Bybee et al. (1994). Hyphens in this column indicate that the form was not included in the inventory of Bybee et al. (1994).

Orthographic Shape	*Semantic function*	*Form*	*Domain*	*Scope*	*Source*	*No.*
Inuit (1)					**Fortescue (1984)**	
sima	perfect	suf	A	1	265-66, 272-73	5
sima	evidential	suf	E	3	265-66, 272-73	5
riir	perfect	suf	A	1	278	20
riar	progressive	suf	A	1	279	21
qqammir	immediate past	suf	T	2	273	13
riikatag	remote past	suf	T	2	273	14
sar	habitual	suf	Q	2	279, 283-84	10
sar	iterative	suf	Q	1	279, 283-84	10
juaar	continuative	suf	A	1	281f	29
jaallu	habitual	suf	Q	2	279-80	50

Orthographic Shape	*Semantic function*	*Form*	*Domain*	*Scope*	*Source*	*No.*
ssaar	egressive	suf	A	1	283	-
junnaar	egressive	suf	A	1	283	-
lir	ingressive	suf	A	1	282	-
qattaar	iterative	suf	Q	1	279, 283	37
usaar	continuative	suf	A	1	282	30
giartur / giartuaar	progressive	suf	A	1	282	31/32
sariaqar	obligation	suf	M	1	265	6
sariaqar	obligation	suf	M	2	265	6
sariaqar	certainty	suf	M	3	293	6
sinnaa	ability	suf	M	1	293	66
sinnaa	epistemic possibility	suf	M	2	293	66
sinnaa	uncertainty	suf	M	3	293	66
junnarsi	probability	suf	M	2	293-94	74
junnarsi	weak certainty	suf	M	3	293-94	74
ssa	future	suf	T	2	274-75, 64-67	16
ssa	obligation	suf	M	1	274-75, 64-67	16
ssa	obligation	suf	M	2	274-75, 64-67	16
ssa	certainty	suf	M	3	293	16
jumaar	future (indefinite)	suf	T	2	275, 325	18
niar	prospective	suf	A	1	274-75, 325	17
qqajar	prospective	suf	A	1	285	44

Orthographic Shape	*Semantic function*	*Form*	*Domain*	*Scope*	*Source*	*No.*
lirsaar	volition	suf	M	1	292	-
gunar	evidential	suf	E	3	293-94	-
qquur	certainty	suf	M	3	293-94	-
nnguatsiar	evidential	suf	E	3	293-94	-
llarumaar	prediction	suf	M	3	275, 296ff	89
sussaa	obligation	suf	M	1	292	65
sussaa	obligation	suf	M	2	292	65
Basque (2)					**Saltarelli, et al. (1988)**	
V-tu/-n/-ø/-i	perfective	suf	A	1	226	-
V-tzen/-ten	imperfective	suf	A	1	228	-
AUX- a/ø -	present	inf	T	2	222	-
AUX- e/i(n) - V-(e)n	past	inf	T	2	224	-
V-ko	future	suf	T	2	224-25	-
V-ko	probability	suf	M	2	224-25	-
V-ko	weak certainty	suf	M	3	224-25	-
ihardun / ari(tu)	progressive	aux	A	1	229	46
-ke	ability, root possibility, permission	suf	M	1	235-36	12
-ke	root and epistemic possibility, permission	suf	M	2	235-36	12
-ke	uncertainty	suf	M	3	235-36	12

Orthographic Shape	*Semantic function*	*Form*	*Domain*	*Scope*	*Source*	*No.*
Margi (3)					**Hoffman (1963)**	
aV(ə)ri	perfective	pre + suf	A	1	196-200	34
a-	imperfective	pre	A	1	190-96	32
a-	habitual	pre	Q	2	190-96	32
ghərà	perfect	aux	A	1	220-21	40
mə́ká	immediate perfect	aux	A	1	223-24	44
hyə́vər	perfect	aux	A	1	224	45
ʂə́vər	perfect	aux	A	1	224-25	46
kwia	perfect	aux	A	1	221-22	48
ə́vər	progressive	ptcl	A	1	175-77	27
bàtlkà	ability, root possibility	aux	M	1	222-23	49
bàtlkà	root possibility	aux	M	2	222-23	49
mbəgà	ability, root possibility	aux	M	1	222-23	50
mbəgà	root possibility	aux	M	2	222-23	50
cítú	ability, root possibility	aux	M	1	222-23	-
cítú	root possibility	aux	M	2	222-23	-
REDUP	iterative	redup	Q	1	157	-
REDUP	frequentative	redup	Q	2	157	-
bə́rá	repetitive	aux	Q	2	217	-
lə́gə́rí	prospective	aux	A	1	222	42
ra	future	aux	T	2	212-17	37

Orthographic Shape	*Semantic function*	*Form*	*Domain*	*Scope*	*Source*	*No.*
Kanakuru (4)					**P. Newman (1974)**	
TNCH / á	perfective	tnch	A	1	45ff	9
-má	imperfective	suf	A	1	50f	11
à-PRONOMEN V-má	future (imperfective)	peri	T	2	51	-
jí- PRONOMEN V-má	past habitual	peri	Q/T	2/2	55	13
jí- PRONOMEN V-má	past imperfective	peri	A/T	1/2	55	13
Agau (5)					**Hetzron (1969)**	
-a	perfect	suf	A	1	13f	8
-əmba	resultative	suf	A	1	23f	46
-γasəŋ	perfect	suf	A	1	27f	29
-γ^{w}à	past	suf	T	2	13f	10
-šiŋ	past imperfective	suf	A/T	1/2	28f	30
-šiŋ	past habitual	suf	Q/T	2/2	28f	30
é	non-past	suf	T	2	13	7
-áγá	prospective	suf	A	1	12-13	-
Touareg (6)					**Cortade (1969)**	
nam	completive	pre	A	1	57-59	17
STCH	perfective (past / future)	stch	A	1	29-30, 189-90	2
t	imperfective	pre	A	1	29-30	3
ed	future	ptcl	T	2	38-40	15

Orthographic Shape	*Semantic function*	*Form*	*Domain*	*Scope*	*Source*	*No.*
Tigre (8)					**Raz (1983)/Leslau (1945)***	
ʻəndo V(PERFECTIVE) ʻala/ṣanḥa	perfect	peri	A	1	6, 199	27
V(PERFECTIVE) ka-halla/ ʔala/ sanha	perfect	peri	A	1	73-74	38/39/40
STCH	perfective	stch	A	1	67	20
STCH	imperfective	stch	A	1	67	21
näbrä	habitual	aux	Q	2	72	16
gäbbə'	weak certainty	aux	M	3	47 / 6*	15
gäbbə'	irrealis: hypothetical, probability	aux	I	2	47 / 6*	15
halla ʻəl-...PN	obligation	peri	M	1	51	-
halla ʻəl-...PN	obligation	peri	M	2	51	-
ʔəgəl V(JUSSIVE) tu	prospective	peri	A	1	68-69 / 8*	41
ʔəgəl V(JUSSIVE) tu	future	peri	T	2	68-69 / 8*	41
Cheyenne (9)					**Leman (1980)**	
s / h / t	past	pre/inf	T	2	191	64
hta / sta	past	pre/inf	T	2	191	67
-nêh-	remote past	inf	T	2	191	65
áh	weak obligation	pre	M	1	110	39
áh	weak obligation	pre	M	2	110	39
hta / sta	future	inf	T	2	191	63

Orthographic Shape	*Semantic function*	*Form*	*Domain*	*Scope*	*Source*	*No.*
het / stse	future	inf	T	2	191	66
vé?	hypothetical	pre	I	2	110	-
to?se	prospective	pre	A	1	110	-
móho?no	certainty (+ negation)	pre	M	3	110	-
móná	certainty	pre	M	3	37, 79	-
ná	evidential	pre	E	3	38, 81	-
ø	non-future	zero	T	2	191	-
Island Carib (10)					**D. Taylor (1956a) / (1956b)***	
halla	perfect	suf	A	1	6, 20, 24, 30	18
ti	perfective	suf	A	1	7, 9, 19, 22-25	21
-ba	imperfective	suf	A	1	6, 20, 23-24, 42f, xxiv	16
gi/ge-	continuative	suf	A	1	7, 23	-
ia,	progressive	suf	A	1	6f, 23f	17
buga	past	ptcl	T	2	144f*	41
me	irrealis	ptcl	I	2	144-45*	42
me	uncertainty	ptcl	M	3	144-45*	42
nége	evidential	ptcl	E	3	144*	-
kabási	evidential	ptcl	E	3	145*	-
káimą	evidential	ptcl	E	3	145*	-

Orthographic Shape	*Semantic function*	*Form*	*Domain*	*Scope*	*Source*	*No.*
Cocama (11)					**Faust Wille (1972) / Faust (1971)***	
pa	completive	suf	A	1	113	23
úcu	perfective	ptcl	A	1	72	14
ahue	perfective	ptcl	A	1	72	15
ai	perfective	ptcl	A	1	72	-
úi-	immediate past	suf	T	2	12	1
cúri	remote past	suf	T	2	42	4
ikuá	prehodiernal past	suf	T	2	42	3
á	future	suf	T	2	42, 95-96	2
ø	present	zero	T	2	based on translations	-
yuti	progressive	aux	A	1	55	8
iára	volition	aux	M	1	56	-
úkua	habitual	aux	Q	2	56	-
ya	evidential (reportative)	suf	E	3	90*	-
era	uncertainty	suf	M	3	58	-
mia	root possibility	suf	M	1	58	13
mia	root and epistemic possibility	suf	M	2	58	13
mia	uncertainty	suf	M	3	58	13

Orthographic Shape	*Semantic function*	*Form*	*Domain*	*Scope*	*Source*	*No.*
Chacobo (12)					**Prost (1962) / (1967)***	
kï	perfective	suf	A	1	118 / 339*	41
ya	hodiernal past	suf	T	2	117	35
ʔita	hesternal past	suf	T	2	117	36
yami	immediate past	suf	T	2	118	37
ni	remote past	suf	T	2	118	38
ca/ci	progressive	suf	A	1	116	19/20
ø	non-past	zero	T	2	116-18	-
pari	prospective	suf	A	1	116	-
šari	future	suf	T	2	116	-
ki	imperfective	suf	A	1	118	42
pao	past habitual	suf	Q/T	2/2	117	34
rabï	iterative	suf	Q	1	116	9
rabï	frequentative	suf	Q	2	116	9
ria	iterative	suf	Q	1	116	-
tikï	repetitive	suf	Q	2	116	-
kas	volition	suf	M	1	116	-
kara	evidential ('belief')	suf	E	3	116	-
mica	epistemic possibility	suf	M	2	336*	48
mica	uncertainty	suf	M	3	336*	48
tiari	probability	suf	M	2	116	23

Orthographic Shape	*Semantic function*	*Form*	*Domain*	*Scope*	*Source*	*No.*
Jivaro (13)					**Turner (1958), in Bybee et al. (1994)**	
ø	present perfect	zero	A/T	1/2	64, 93	25
ma	past	suf	T	2	64, 93	27
sa	progressive	suf	A	1	66, 80, 111	68
a	present	suf	T	2	64	24
tat	future	?	T	2	64, 71	29
aint	probability	?	M	2	64, 72, 89	30
aint	weak certainty	?	M	3	64, 72, 89	30
Tucano (14)					**Ramirez (1997)**	
ø	evidential (visual evidence)	zero	E	3	120-21	-
-sa/-kã	evidential (other sensory evidence)	suf	E	3	120-21	34 / -
-pa	evidential (inferential)	suf	E	3	120-21	-
-pá	evidential (reportative)	suf	E	3	120-21	-
ø	present	suf	T	2	120-21	-
-a	recent past	suf	T	2	120-21	2?
-FUSIONAL	remote past	suf	T	2	120-21	1?
-ʼkũ	imperfective	suf	A	1	158	-
-ʼkũ	habitual	suf	Q	2	158	-
-sa	epistemic possibility	suf	M	2	159	34

Orthographic Shape	*Semantic function*	*Form*	*Domain*	*Scope*	*Source*	*No.*
-sa	uncertainty	suf	M	3	159	34
-sa / -ti	future (-1p/1p)	suf	T	2	166-67	34 / -
-ti	prospective	suf	A	1	168	-
Gugada (15)					**Platt (1972)**	
ṇuŋ	past	suf	T	2	29	4
ṇi	non-past	suf	T	2	29	3
(a/i)ṇdjagu	volition	suf	M	1	32	8
(a/i)ṇdjagu	prospective	suf	A	1	28, 32	8
-/A:N/-	progressive	suf	A	1	28, 34	-
-djibi	epistemic possibility	suf	M	2	38	-
-djibi	uncertainty	suf	M	3	38	-
Gugu-Yalanji (16)					**Patz (2002)/Herschberger (1964)***	
ny	past	suf	T	2	153-54	1
REDUP	quantification	redup	Q	1	39-43	8
REDUP	aspect	redup	A	1	39-43	8
REDUP	quantification	redup	Q	2	39-43	8
l / -y	non-past	suf	T	2	153	2
ṇyaku	irrealis	suf	I	2	37	20
ṇyaku	weak obligation	suf	M	1	37*	20
ṇyaku	weak obligation	suf	M	2	37*	20

Orthographic Shape	*Semantic function*	*Form*	*Domain*	*Scope*	*Source*	*No.*
-nkV	obligation	suf	M	1	273-82 / 36*	21
-nkV	prospective	suf	A	1	36*	21
-ja	immediate prospective	suf	A	1	37*	-
-nji	epistemic possibility	suf	M	2	36*	-
-nji	uncertainty	suf	M	3	36*	-
-n	completive	suf	A	1	35-36*, 52*	16
Alyawarra (17)					**Yallop (1977)**	
ikala	past perfect	suf	A/T	1/2	51	3
ika	past perfective	suf	A/T	1/2	49-52	1
ina	past imperfective	suf	A/T	1/2	50-53	2
iyna	iterative	suf	Q	1	61-62	16
iyna	continuative	suf	A	1	61-62	16
iyna	frequentative	suf	Q	2	61-62	16
imira	epistemic possibility	suf	M	2	56	11
imira	uncertainty	suf	M	3	56	11
ima	non-past	suf	T	2	49, 52-53	4
iyla	non-past	suf	T	2	51-52	5
iya	prospective	suf	A	1	54f	9
ikirra	epistemic possibility	suf	M	2	55	-
ikirra	uncertainty	suf	M	3	55	-
itjika	modality	suf	M	1	53	-

Orthographic Shape	*Semantic function*	*Form*	*Domain*	*Scope*	*Source*	*No.*
Maung (18)					**Capell & Hinch (1970)**	
i-V-nuŋ	past perfective	pre+suf	A/T	1/2	67ff, 73ff, 78ff	5
i-V-niŋ	past imperfective	pre+suf	A/T	1/2	67ff, 73, 78	6
gi-V	present	pre	T	2	73ff, 67ff	4
CV # REDUP	frequentative	redup	Q	2	81f	9
-i / -ŋ	epistemic possibility	suf	M	2	67-68, 78f	-
-nji	hypothetical	suf	I	2	67-68, 78f	-
i-wa-V	future	pre	T	2	73, 74, 67ff	3
Worora (19)					**Love (2000)**	
'ŋanina	past	suf	T	2	33-35	13
'ŋenu	future	suf	T	2	33-35	14
ŋa'nuŋ	present	suf	T	2	33-35	-
-iri/-eri	progressive	suf	A	1	35	-
-ŋun-	hypothetical	inf	I	2	38-39	-
ŋana	epistemic possibility	ptcl	M	2	40-41	20
ŋana	uncertainty	ptcl	M	3	40-41	20
gole	ability, root possibility	ptcl	M	1	40-41	19
gole	root possibility	ptcl	M	2	40-41	19
-da	habitual	suf	Q	2	106	31
-ba	iterative	suf	Q	1	106	32
-ba	frequentative	suf	Q	2	106	32

Orthographic Shape	*Semantic function*	*Form*	*Domain*	*Scope*	*Source*	*No.*
pa-V-in	obligation	pre+suf	M	1	36	18
pa-V-in	obligation	pre+suf	M	2	36	18
kạdjinba	epistemic possibility	ptcl	M	2	41	-
Alawa (20)					**Sharpe (1972)**	
wun / ya	past perfective	suf	A/T	1/2	79, 87-90	29
na	past imperfective	suf	A/T	1/2	87ff	33
ni	present	suf	T	2	87ff	34
yi	future	suf	T	2	87ff	30
kay	habitual (only with past)	suf	Q	2	77-78	2
REDUP	iterative	redup	Q	1	37, 58, 77	36
yar / CVř	epistemic possibility	suf	M	2	87ff	31
yar / CVř	uncertainty	suf	M	3	87ff	31
Ciři	ability, root possibility	suf	M	1	87ff	-
Ciři	root possibility	suf	M	2	87ff	-
řiña	ability, root possibility	suf	M	1	87ff, 51	35
řiña	root possibility	suf	M	2	87ff, 51	35
Koho (22)					**Manley (1972)**	
pal	strong obligation	aux	M	1	192f	7
pal	strong obligation	aux	M	2	192f	7
rəgəy	ability, root possibility	aux	M	1	192f	6
rəgəy	root possibility	aux	M	2	192f	6

Orthographic Shape	*Semantic function*	*Form*	*Domain*	*Scope*	*Source*	*No.*
di	permission	aux	M	1	192f	8
di	permission	aux	M	2	192f	8
màŋ	habitual	aux	Q	2	192f	-
lòc	completive	aux	A	1	192f	10
nɛh	perfect	aux	A	1	215	-
rəp	prospective	aux	A	1	215	-
Palaung (23)					**Milne (1921)**	
pɛt	completive	aux	A	1	77	15
ø	present	aux	T	2	67	-
chặ/chặng/dī	future	aux	T	2	68	-
hwq-I	past	aux	T	2	67	5
la / taik	weak obligation	aux	M	1	71, 77	10/13
la / taik	weak obligation	aux	M	2	71,77	10/13
Car (24)					**Braine (1970)**	
-ŋ	perfective	suf	A	1	176-77	6
-k	imperfective	suf	A	1	171-72	-
-haka	progressive	suf	A	1	192	-
-hɛ́	perfect	suf	A	1	194-95	14
Tahitian (25)					**Iorss (1963)**	
ua	resultative	aux	A	1	62-63	3
i V na	past perfective	peri	A/T	1/2	64, 72	7

Orthographic Shape	*Semantic function*	*Form*	*Domain*	*Scope*	*Source*	*No.*
te V ra	past imperfective	peri	A/T	1/2	62	2
te V nei	present	peri	T	2	62	1
e	irrealis	aux	I	2	63	4
Motu (26)					**Lister-Turner & Clark (n.d.)**	
vada	perfect	ptcl	A	1	14, 16, 17	11
na/o/e	non-future	ptcl	T	2	11	-
baina/ba/baine	future	ptcl	T	2	11, 18	7
aina/a/aine	immediate future	ptcl	T	2	12, 16f	8
ba/bo/be (V-mu)	prospective	ptcl	A	1	17	36
bama/boma/bema	hypothetical	ptcl	I	2	17	-
-va	past continuative	suf	A/T	1/2	12	-
-mu	present continuative	suf	A/T	1/2	12	-
do-	perfect	ptcl	A	1	12	-
ina/ena/una (+/- non-future)	progressive	ptcl	A	1	14	32
Atchin (27)					**Capell & Layard (1980)**	
m-	past	aux	T	2	75ff	1
e-	present	aux	T	2	75ff	2
p-	future	aux	T	2	75ff	3
ok / m'ok	frequentative	ptcl	Q	2	81, 83	17
ok / m'ok	continuative	ptcl	A	1	81, 83	17
ko	completive	ptcl	A	1	74	-

Orthographic Shape	*Semantic function*	*Form*	*Domain*	*Scope*	*Source*	*No.*
-ar	repetitive	ptcl	Q	2	82	-
REDUP	continuative	redup	A	1	75	-
Halia (28)					**Allen & Allen (1965)**	
-hakapa	egressive	suf	A	1	32	45
-hataniya	ingressive	suf	A	1	32	-
-na	present	suf	T	2	13	-
-nama (3p)	immediate past (hodiernal)	suf	T	2	18, 20	21
u / tu	remote past (prehodiernal)	pre	T	2	18, 34	23
-moto	remote future	suf	T	2	31	17
-ow	immediate future	suf	T	2	31	19
tate	ability, root possibility	ptcl	M	1	14	3
tate	root possibility	ptcl	M	2	14	3
go/gỳ	strong obligation	ptcl	M	1	21, 29, 33, 42	22
go/gỳ	strong obligation	ptcl	M	2	21, 29, 33, 42	22
Tanga (30)					**Bell (1977)**	
gi	past	ptcl	T	2	xvi, xvii	8
ø / i (= 3PSG)	present	zero	T	2	xvii	-
rokok/nar/sang/rong	prospective	ptcl	A	1	xvi-xxvii	5
ku	future	ptcl	T	2	xvi-xxi	12
REDUP	iterative	redup	Q	1	xiii	1

Orthographic Shape	*Semantic function*	*Form*	*Domain*	*Scope*	*Source*	*No.*
Nakanai (32)					**R. Johnston (1980)**	
-ti	perfective	suf	A	1	129-30	2
REDUP	imperfective	redup	A	1	131	3
REDUP	habitual	redup	Q	2	131	3
REDUP(V)-ti	progressive	redup+suf	A	1	131-32	4
ga	prospective	ptcl	A	1	63-65	-
ge	potentiality-weak necessity	ptcl	M	2	63-65	13
ge	potentiality-weak necessity	ptcl	M	3	63-65	13
Trukese (33)					**Dyen (1965) / Goodenough & Sugita (1980)***	
ja	perfective	ptcl	A	1	24	1
REDUP (first syll)	habitual	redup	Q	2	xxii-xxv*	41
REDUP (first syll)	iterative	redup	Q	1	xxii-xxv*	41
REDUP (base)	continuative	redup	A	1	xxiii-xxv*	42
kan	evidential	ptcl	E	3	25	-
ccinen	continuative	ptcl	A	1	25	-
fo:kkun	completive	ptcl	A	1	25	-
qan	repetitive	ptcl	Q	2	25	-
nüisen	obligation	ptcl	M	1	25	14
nüisen	obligation	ptcl	M	2	25	14
qe	epistemic possibility	ptcl	M	2	24	3

Orthographic Shape	*Semantic function*	*Form*	*Domain*	*Scope*	*Source*	*No.*
qe	uncertainty	ptcl	M	3	24	3
qe	future	ptcl	T	2	24	3
Pangasinan (34)					**Benton (1971)**	
CV- REDUP	progressive	redup	A	1	126-27	2
REDUP	iterative	redup	Q	1	127	3
man	distributive	pre	Q	2	133	20
nai	weak obligation	pre	M	1	136	22
nai	weak obligation	pre	M	2	136	22
inm	perfective	pre/inf	A	1	125, 123, 128	6
on	imperfective	pre	A	1	133ff, 196-97	5
na	prospective	pre	A	1	134	10
maka	ability, root possibility	pre	M	1	124, 132	7
maka	root and epistemic possibility	pre	M	2	124, 132	7
maka	uncertainty	pre	M	3	124, 132	7
makaka	volition , desirability	pre	M	1	124, 133	7
makaka	desirability	pre	M	2	124, 133	7
Rukai (35)					**P.J.K. Li (1973)**	
na	perfect	suf	A	1	81,150,156, 160, 265	1
wa	past	pre	T	2	156, 193	5
ai	future	pre	T	2	156f	6
REDUP	habitual	redup	Q	2	156f, 267f, 177f, 208	4

Orthographic Shape	*Semantic function*	*Form*	*Domain*	*Scope*	*Source*	*No.*
REDUP	imperfective	redup	A	1	156f, 267f, 177f, 208	4
REDUP	iterative	redup	Q	1	156f, 267f, 177f, 208	4
ø	present	zero	T	2	examples	8
Buli (37)					**Maan (1951)**	
tòtò	completive	ptcl	A	1	85	25
fonla	egressive	aux	A	1	85	26
tò	perfective	ptcl	A	1	85	17
subé	imperfective	ptcl	A	1	85	-
bo-	future	pre	T	2	84ff	15
bo-	disposition-necessity	pre	M	1	84ff	15
bo-	obligation	pre	M	2	84ff	15
O'odham/Papago (38)					**Mathiot (1973-78)**	
ø	quantification	zero	Q	2	49	-
REDUP I	frequentative	suf	Q	2	49	-
REDUP II	distributive	suf	Q	2	49	-
-n/ñ/ø	semelfactive	suf	Q	1	50	-
-x/xa, -ke/e	iterative	suf	Q	1	50	-
-him/hi	quantification	suf	Q	1	57	-
-o/ok/oho	completive	suf	A	1	58	10
da	progressive	suf	A	1	59	12
-kaʔl-	immediate perfect	suf	A	1	59	-

Orthographic Shape	*Semantic function*	*Form*	*Domain*	*Scope*	*Source*	*No.*
-t/-d	immediate tense	aux	T	2	92	39
-ɖ	remote tense	aux	T	2	92	38
-ḳi/ḳï/-ḳ	evidential (witnessed)	aux	E	3	90	-
-x	evidential (quotative)	aux	E	3	90	-
p	epistemic possibility	aux	M	2	90-91	37
Abkhaz (39)					**Hewitt (1979)**	
-la	ingressive	suf	A	1	182	-
-x'a	perfect	suf	A	1	175, 180-81	47
-x'a	irrealis	suf	I	2	175, 180-81	47
-ʒa-n	irrealis	suf	I	2	178	-
-rə-n	irrealis	suf	I	2	178	-
p'	future	suf	T	2	176ff	49
-yt	past perfective	suf	A/T	1/2	173	46
-wa-n	past imperfective	suf	A/T	1/2	173	46
-wa-n	counterfactual	suf	I	2	173	46
-ɕ'ə	progressive	aux	A	1	128, 181-82	53
-w+p' / wa-yt	non-past	suf	T	2	167, 172, 181	1
-ʐaa-we-yt'	future	suf	T	2	176	48
-ḳa	frequentative	suf	Q	2	183, 212	55
-r-a	strong obligation	suf+aux	M	1	27, 184, 192, 195	56
-r-a	strong obligation	suf+aux	M	2	27, 184, 192, 195	56

Orthographic Shape	*Semantic function*	*Form*	*Domain*	*Scope*	*Source*	*No.*
-r-a	certainty	suf+aux	M	3	27, 184, 192, 195	56
a-l-sa-ra	ability, root possibility	aux	M	1	194-95	61
a-l-sa-ra	root and epistemic possibility	aux	M	2	194-95, 197	61
a-l-sa-ra	uncertainty	aux	M	3	197	61
a-q'a-la-ra	epistemic possibility	aux	M	2	197	65
a-q'a-la-ra	uncertainty	aux	M	3	197	65
-s+t'	probability	suf	M	2	176-77	50
-s+t'	weak certainty	suf	M	3	176-77	50
a-q'a-ẓaa-ra + V-nə	volition	peri	M	1	191-92, 199-201	59
Guaymi (40)					**Kopesec (1975)**	
ra	perfect	ptcl	A	1	45	10
-ani	perfect	suf	A	1	24	8
-di	probability	suf	M	2	23	4
-di	weak certainty	suf	M	3	23	4
-ri	imm. non-future perfective	suf	A/T	1/2	22	1
-ba	remote non-future perfective	suf	A/T	1/2	22	2
-e/a	imm. non-future imperfective	suf	A/T	1/2	22	-
-bare	remote non-future imperfective	suf	A/T	1/2	22	-
-adi	imm. future perfective	suf	A/T	1/2	45	-
-ai	remote future perfective	suf	A/T	1/2	23, 45	8
-adre	imm. future imperfective	suf	A/T	1/2	45	-

Orthographic Shape	*Semantic function*	*Form*	*Domain*	*Scope*	*Source*	*No.*
-are	remote future imperfective	suf	A/T	1/2	23	-
Kui (42)					**Winfield (1928)/ Subrahmanyam (1971)***	
(i)t	past	suf	T	2	157-60*	6
-a (ma-)	perfective	suf	A	1	86-87	25/26
-ai (ma-)	imperfective	suf	A	1	85-7	23/24
-ai ma-s	past habitual	peri	Q/T	2/2	87	24
k	iterative	suf	Q	1	142-5*	20
(i)n	non-past	suf	T	2	50-85, 67	2
-a duhpa	frequentative	peri	Q	2	125	30
-a duhpa	continuative	peri	A	1	125	30
-ai duhpa	habitual	peri	Q	2	125	30
duhpa	epistemic possibility	aux	M	2	125	30
duhpa	uncertainty	aux	M	3	125	30
Abipon (43)					**Najlis (1966), in Bybee et al. (1994)***	
aage	habitual	suf	Q	2	38	12
am	future	suf	T	2	37	7
?	progressive	suf	A	1	119*	-

Orthographic Shape	*Semantic function*	*Form*	*Domain*	*Scope*	*Source*	*No.*
Karok (46)					**Bright (1957)**	
ø	present	zero	T	2	124-25	-
-at / -hat	past	suf	T	2	67	16
-anik	remote past	suf	T	2	125	-
-fip	completive	suf	A	1	106	24
-ahe·n	past perfect	suf	A/T	1/2	125	40
tah	perfect	aux	A	1	138-39	42
-o·	habitual	suf	Q	2	109	29
ip-	iterative	pre	Q	1	88-89	17
REDUP	iterative	redup	Q	1	89-91	19
-va	quantification	suf	Q	1	92-93	20
-Tih	progressive	suf	A	1	113	-
-aviš	prospective	suf	A	1	124	15
-aviš	future	suf	T	2	124	15
Latin (47)					**Kühner & Holzweissig (1974)**	
-ø-PN	present imperfective	suf	A/T	1/2	706	7
-bi-PN / -V-PN	future imperfective	suf	A/T	1/2	706	9
-ba-PN	past imperfective	suf	A/T	1/2	706	8
-v-i-PN	present perfect	suf	A/T	1/2	706	10
-v-eri-PN	future perfective	suf	A/T	1/2	706	-
-v-era-PN	past perfective	suf	A/T	1/2	706	-

Orthographic Shape	*Semantic function*	*Form*	*Domain*	*Scope*	*Source*	*No.*
Maithili (48)					**Jha (1958)**	
STCH (=PPTC)	perfective	stch	A	1	527-28	35
STCH (=PRPTC)	imperfective	stch	A	1	526	34
V(PPTC)-ane/-ala ach(+TENSE)	resultative	peri	A	1	526	34
V(PPTC) rā	perfect	peri	A	1	511ff	21
hũ/āh^{a}	past	suf	T	2	502ff	20
V(PRPTC)-t^{a} ach(+PRESENT)	non-past	peri	T	2	482f, 522f, 603.	15
rah V(PRPTC)	continuative	peri	A	1	525	32
ho	epistemic possibility	aux	M	2	523, 528	29/36
ho	uncertainty	aux	M	3	523, 528	29/36
rah-ait/-it V(PRPTC)-t^{a}/-ane	irrealis	peri	I	2	524-25	-
ja / ga	completive	aux	A	1	535-36	44 / 61
cuk	completive	aux	A	1	540	55
cah	weak obligation	aux	M	1	534	43
cah	weak obligation	aux	M	2	534	43
bujh	weak obligation	aux	M	1	539	50
bujh	weak obligation	aux	M	2	539	50
pār	root possibility	aux	M	1	539	51
pār	root and epistemic possibility	aux	M	2	538-39	51
pār	uncertainty	aux	M	3	538-39	49
sak	ability	aux	M	1	539	52

Orthographic Shape	*Semantic function*	*Form*	*Domain*	*Scope*	*Source*	*No.*
Baluchi (49)					**Barker & Mengal (1969)**	
V(PASTFORM)-əg	perfect	suf	A	1	336ff	13
ø	non-past	zero	T	2	129-30	1
V(PASTFORM)-yt	past	suf	T	2	282ff	11
V(PASTFORM)-ət	past	suf	T	2	338-39	14
V-ətət	remote past	suf	T	2	340-41	15
V-ətət	certainty	suf	M	3	340-41	15
V-əg-a bu-əg	progressive	peri	A	1	233-34	9
V-an bu-əg	iterative	peri	Q	1	237	19
V-an bu-əg	continuative	peri	A	1	237	19
V-an bu-əg	frequentative	peri	Q	2	237	19
by'	probability	pre	M	2	179-90	3
by'	weak obligation	pre	M	1	179-90	3
by'	weak obligation	pre	M	2	179-90	3
V-əg-i bu-əg	potentiality - weak necessity	peri	M	1	239	10
V-əg-i bu-əg	potentiality - weak necessity	peri	M	2	239	10
by'-V(PASTFORM)-en	counterfactual	pre+suf	I	2	459-60	21
V-əg kəp-	strong obligation	aux	M	1	197-98	8
V-əg kəp-	strong obligation	aux	M	2	197-98	8
V-əg loT-	volition	aux	M	1	196	-
V-əg-a zan-	ability	peri	M	1	197	6

Orthographic Shape	*Semantic function*	*Form*	*Domain*	*Scope*	*Source*	*No.*
V-əg-a kyll-	egressive	peri	A	1	197	-
V-əg-a ləgg-	ingressive	peri	A	1	197	-
V(PASTFORM) kən-	ability, root possibility, permission	aux	M	1	343	16
V(PASTFORM) kən-	root and epistemic possibility, permission	aux	M	2	343	16
V(PASTFORM) kən-	uncertainty	aux	M	3	343	16
Modern Greek (50)					**Householder, Kazasis, & Koutsoudas (1964)**	
exo	perfect	aux	A	1	132	12
ɛ́	past	suf	T	2	116ff	8
STCH	perfective	stch	A	1	115ff	-
STCH	imperfective	stch	A	1	115ff	7
ø	present	zero	T	2	115ff	7
θa	future	ptcl	T	2	105ff	17
θa	prediction	ptcl	M	3	105ff	17
na	certainty	ptcl	M	3	107	14
as	weak certainty	ptcl	M	3	106-07	16
Danish (51)					**Koefoed (1958)**	
have V-et	perfect	peri	A	1	189ff	12
vaere V-et	perfect	peri	A	1	189ff	13
vaere V-et	resultative	peri	A	1	190ff	11

Orthographic Shape	*Semantic function*	*Form*	*Domain*	*Scope*	*Source*	*No.*
-ede	past	suf	T	2	181ff, 189ff	2
-r	present	suf	T	2	180f, 85	1
skulle	obligation	aux	M	1	192	4
skulle	obligation	aux	M	2	192	4
skulle	prospective	aux	A	1	192	4
ma:tte	obligation, permission	aux	M	1	192, 185	9
ma:tte	obligation, permission	aux	M	2	192, 185	9
kunne	ability, root possibility, permission	aux	M	1	192, 185	8
kunne	root and epistemic possibility, permission	aux	M	2	192, 185	8
kunne	uncertainty	aux	M	3	192, 185	8
ville	volition	aux	M	1	192	5
ville	prospective	aux	A	1	192	5
få	future	aux	T	2	192	6
komme til at	future	peri	T	2	18, 183, 185	18
Yagaria (52)					**Renck (1975)**	
-d	past	suf	T	2	92f,114f	21
bolo / -lo	completive	suf	A	1	94, 110	22
-mo o-	continuative	peri	A	1	133f	33
-du / -di	perfective	suf	A	1	110f, 116	31
STCH / ø	present	zero	T	2	86ff	19

Orthographic Shape	*Semantic function*	*Form*	*Domain*	*Scope*	*Source*	*No.*
no	progressive	pre	A	1	90ff, 108	20
(V-go) REDUP	habitual	redup	Q	2	134	46
gogo	iterative	suf	Q	1	120	34
go /-ge	continuative	suf	A	1	119ff, 135	35
s	future	suf	T	2	94,118	23
g	future	suf	T	2	95ff	23
Ono (56)					**Wacke (1930)**	
V-ø-PN	immediate past	suf	T	2	165	2
V-ko-PN(e)	remote past	suf	T	2	165	3
V-ko- PN(o)	hypothetical	suf	I	2	166	-
V-CVrap	counterfactual	suf	I	2	166	-
V-ge-	progressive	suf	A	1	168-69	17
V-mai- PN	present	suf	T	2	164	1
V-ke- PN	future	suf	T	2	165	4
V-okan- PN	habitual	suf	Q	2	169f	16
V-ma/-maŋ	frequentative	suf	Q	2	167ff	14
Nimboran (58)					**Anceaux (1965)**	
-k	past	suf	T	2	59f	7
-p	recent past	suf	T	2	60f, 79	8
-tiem	progressive	suf	A	1	107ff	32
-t	present	suf	T	2	58f, 61, 79f	5

Orthographic Shape	*Semantic function*	*Form*	*Domain*	*Scope*	*Source*	*No.*
-ka	iterative	suf	Q	1	97-103	28
-d	volition	suf	M	1	58f, 71, 79, 112	6
-d	prospective	suf	A	1	58f, 71, 79, 112	6
-d	future	suf	T	2	58f, 71, 79, 112	6
Bongu (59)					**Hanke (1909)**	
ġuratar̈	perfect	aux	A	1	53, 67	25
-man	present perfect	suf	A/T	1/2	44, 51	-
-émen	remote past ("aorist 1")	suf	T	2	44, 52, 57, 86f	8
-méren	remote past ("aorist 2")	suf	T	2	44, 52, 66, 86f	18
-mesen	progressive	suf	A	1	44, 51, 62ff, 86	17
-mem	present	suf	T	2	44, 51, 64	36
-er	iterative	suf	Q	1	20	5
-er	continuative	suf	A	1	20	5
REDUP	iterative	redup	Q	1	15	33
-(e)ram	root possibility	suf	M	1	45, 53, 87	11
-(e)ram	root and epistemic possibility	suf	M	2	45, 53, 87	11
-(ar̈)manbo	epistemic possibility	suf	M	2	54, 68, 88	23
-(ar̈)manbo	uncertainty	suf	M	3	54, 68, 88	23
-dun	irrealis	suf	I	2	45, 87	-
-(ar̈)mem	immediate future	suf	T	2	52f, 66, 87	9
-(ar̈)mem	volition	suf	M	1	52f, 66, 87	9

Orthographic Shape	*Semantic function*	*Form*	*Domain*	*Scope*	*Source*	*No.*
-(ar̈)man	remote future	suf	T	2	53, 87	10
-(ar̈)man	volition	suf	M	1	87	10
Yessan-Mayo (60)					**Foreman (1974)**	
-keyp	completive	suf	A	1	38	7
yuwa-INFL	completive	aux	A	1	99	26
-ye /-e/ -we	hodiernal past	suf	T	2	39-40	12
-im	pre-hodiernal past	suf	T	2	40	13
-bwa	present	suf	T	2	39	11
-bi	habitual	suf	Q	2	39	10
-bi	iterative	suf	Q	1	39	10
-wey	inability, root impossibility	suf	M	1	39	-
-wey	root impossibility	suf	M	2	39	-
-men	continuative	suf	A	1	39	-
REDUP	continuative	redup	A	1	95ff	24
REDUP	iterative	redup	Q	1	95ff	24
-n yi-SUFFIX	continuative	peri	A	1	136-37	31
kap	obligation (negation)	ptcl	M	1	24, 94	21
kap	obligation (negation)	ptcl	M	2	24, 94	21
-iti	future	suf	T	2	40-41	14
-iti nin- SUFFIX	prospective	peri	A	1	144-45	32
-tana	perfect	suf	A	1	41	-

Orthographic Shape	*Semantic function*	*Form*	*Domain*	*Scope*	*Source*	*No.*
Baining (63)					**Rascher (1904)**	
sa	perfect	ptcl	A	1	62ff	5
ø	non-future	zero	T	2	62ff	-
i-/ik-/ip-	future	ptcl	T	2	62ff	3
di-/du-/da-	future	ptcl	T	2	62ff	4
sa tu/ta/ti	habitual	ptcl	Q	2	70	-
!Kung / !Xũ (67)					**Köhler (1981)**	
kú:	ingressive	ptcl	A	1	571	1
≠áni	egressive	aux	A	1	595	2
Slave (68)					**Rice (1989)**	
yı̨lé / lé	past	ptcl	T	2	360	54
yı̨lé + V(OPTATIVE)	counterfactual	peri	I	2	360	54
ñ-	perfective	pre	A	1	429	10
ne	perfect	pre	A	1	591	-
ʔeléh	past	ptcl	T	2	415	-
ʔégı̨́h	immediate past	ptcl	T	2	414	48
de	ingressive	pre	A	1	587-88	11
gha	prospective	ptcl	A	1	417, 419	51
ghu	irrealis	pre	I	2	429	-
ø	imperfective	zero	A	1	429	9
na-d-V	habitual	pre	Q	2	432	38/2

Orthographic Shape	*Semantic function*	*Form*	*Domain*	*Scope*	*Source*	*No.*
í	repetitive	pre	Q	2	594	16
sáná	obligation (negation)	ptcl	M	1	412	45
sáná	obligation (negation)	ptcl	M	2	412	45
álǫ́	obligation, counterfactual	ptcl	M/I	1/2	414	47
álǫ́	obligation, counterfactual	ptcl	M/I	2/2	414	47
góʔǫ	strong obligation	aux	M	1	415ff	50
góʔǫ	strong obligation	aux	M	2	415ff	50
góʔǫ	prospective	aux	A	1	415ff	50
wolénị	weak obligation, counterfactual	aux	M/I	1/2	418-19	53
wolénị	weak obligation, counterfactual	aux	M/I	2/2	418-19	53
wolénị	future	aux	T	2	418-19	53
wolé	volition	ptcl	M	1	418	-
duyíle	ability, root possibility, permission	ptcl	M	1	406	-
duyíle	root possibility, permission	ptcl	M	2	406	-
dúyé	inability, root impossibility, no permission	ptcl	M	1	405-06	-
dúyé	root impossibility, no permission	ptcl	M	2	405-06	-
ʔesíá	evidential	ptcl	E	3	397	43
lǭǫ	evidential	ptcl	E	3	408	-
sóni	uncertainty	ptcl	M	3	413	-
sii	hypothetical	ptcl	I	2	412-13	-

Orthographic Shape	*Semantic function*	*Form*	*Domain*	*Scope*	*Source*	*No.*
gohtę	epistemic possibility	ptcl	M	2	407	-
gohtę	uncertainty	ptcl	M	3	407	-
ʔéhsíi	epistemic possibility	ptcl	M	2	404	-
ʔéhsíI	uncertainty	ptcl	M	3	404	-
Krongo (69)					**Reh (1985)**	
HIGH TONE	imperfective	tnch	A	1	188-90	5
LOW TONE	perfective	tnch	A	1	188f	6
áalá	continuative	aux	A	1	190f	9
ànká	prospective	aux	A	1	191-92	-
Á(k)-	past	pre	T	2	188f	7
ø	present	zero	T	2	188f	-
àdìyà	future	aux	T	2	191	12
ákkà	future	aux	T	2	188-89	8
ì, LOW TONE, REDUP	iterative	pre/tnch	Q	1	201-09	18/45/46
ì, LOW TONE, REDUP	frequentative	pre/tnch	Q	2	201-09	18/45/46
Temne (71)					**W.A.A. Wilson (1961)**	
po	egressive	aux	A	1	26	19
TNCH	past	tnch	T	2	25	9
TNCH	present	tnch	T	2	23, 25	8
bo	past imperfective	aux	A/T	1/2	27	-
yema	volition	aux	M	1	27	-

Orthographic Shape	*Semantic function*	*Form*	*Domain*	*Scope*	*Source*	*No.*
kạl	past repetitive	aux	Q/T	2/2	26	-
la	past habitual	aux	Q/T	2/2	26	17
s	iterative	suf	Q	1	48, 27	29
s	frequentative	suf	Q	2	48, 27	29
ba kə-	obligation	peri	M	1	29	34
ba kə-	obligation	peri	M	2	29	34
gbəli	ability	aux	M	1	26	16
tə	non-past	suf	T	2	25	10
Mwera (72)					**Harries (1950)**	
-ilila	completive	suf	A	1	76	9
mala	perfect	aux	A	1	110	44
ci-	immediate perfective	pre	A	1	94-97	31
-ile	remote perfective	suf	A	1	79-83	13
-ga	imperfective	suf	A	1	87-109	15
li	progressive	aux	A	1	110	47
-aci	remote past	suf	T	2	95ff	32
â	past	suf/pre	T	2	96-97	55
nâ-	present	pre	T	2	92ff	-
ci-	hodiernal/crasternal future	pre	T	2	98	34
cika-	post-crasternal future	pre	T	2	98f	35
jiya	future	pre	T	2	99	36

Orthographic Shape	*Semantic function*	*Form*	*Domain*	*Scope*	*Source*	*No.*
REDUP	iterative	redup	Q	1	77	12
wandicila	strong obligation	aux	M	1	109	42
wandicila	strong obligation	aux	M	2	109	42
wandicila	prospective	aux	A	1	109	42
pinga	volition	aux	M	1	110	-
pinga	prospective	aux	A	1	110	-
malila	prospective	aux	A	1	110	-
manya	ability	aux	M	1	110	46
Tem (73)					**Der-Houssikian (1980), in Bybee et al. (1994)**	
tɛ	completive	aux	A	1	68-69	19
REDUP	perfect	redup	A	1	68-69	17
ngbɛdi	immediate perfect	aux	A	1	68-69	18
ø	perfective	zero	A	1	64f	15
bamaa	progressive	aux	A	1	68	16
n	imperfective	pre	A	1	13	13
ghiizi	past habitual	aux	Q/T	2/2	71	20
ngoni	prospective	aux	A	1	64f	14

Orthographic Shape	*Semantic function*	*Form*	*Domain*	*Scope*	*Source*	*No.*
Engenni (74)					**Thomas (1978)**	
dhe	completive	ptcl	A	1	170f	6
nì / nù	perfect	ptcl	A	1	73, 170, 174-75	9
nà	progressive	ptcl	A	1	73-74	-
TNCH	perfective	tnch	A	1	70-71	14
TNCH	imperfective	tnch	A	1	71-72	15
ru	iterative	suf	Q	1	143	12
TNCH	future	tnch	T	2	70	13
sì	future	ptcl	T	2	68	25
Mano (75)					**Becker-Donner (1965)**	
kè	past	aux	T	2	41ff	7
tò	continuative	aux	A	1	41	6
-á	perfective	suf	A	1	38f	4
-á	irrealis	suf	I	2	38f	4
pèá	imperfective	ptcl	A	1	36f	2
nù pèá	future (imperfective)	aux	T	2	37f.	3
ḷò	future	aux	T	2	40f	5
nyè	egressive	aux	A	1	43	-
Bari (76)					**Spagnolo (1933)**	
ado / aje / ajo	past perfect	ptcl	A/T	1/2	105	7
a-	past	pre	T	2	105	6

Orthographic Shape	*Semantic function*	*Form*	*Domain*	*Scope*	*Source*	*No.*
ø	present	zero	T	2	104, 106	8
REDUP	frequentative	redup	Q	2	140-41	30
REDUP	progressive	redup	A	1	99, 105	1
kɔ́	obligation	ptcl	M	1	105	4
kɔ́	obligation	ptcl	M	2	105	4
bulö	ability	aux	M	1	186f	24
agi	obligation	aux	M	1	186	-
agi	obligation	aux	M	2	186	-
tu	prospective	ptcl	A	1	105	5
dɔ́ya	prospective	partcpl	A	1	186	23
dé	future	ptcl	T	2	105	3
Ngambay (77)					**Vandame (1963)**	
ø	perfective	zero	A	1	94ff	1
isi	imperfective	aux	A	1	95	2
isi mba k-V	imperfective	peri	A	1	95	3
ar	imperfective	aux	A	1	95	4
ar mba k-V	imperfective	peri	A	1	95	5
a k-V	future	peri	T	2	97-99	6
a k-V	epistemic possibility	peri	M	2	97-99	6
a k-V	uncertainty	peri	M	3	97-99	6

Orthographic Shape	*Semantic function*	*Form*	*Domain*	*Scope*	*Source*	*No.*
Kanuri (78)					**Lukas (1937)**	
ənà	perfect	suf	A	1	43-44	6
gè + TONE	modality (desirability -obligation)	suf	M	1	35, 42	-
gè + TONE	modality (desirability -obligation)	suf	M	2	35, 42	-
gi	perfective	suf	A	1	35, 47	7
gosko	past	suf	T	2	40-41	3
in	imperfective	suf	A	1	35-36, 48, 50ff	1
zosko	future	suf	T	2	36	-
Palantla (79)					**Merrifield (1968)**	
mi3-	imperfective	pre	A	1	25	-
ma2-	perfective	pre	A	1	25	3
na2-	hodiernal past	pre	T	2	25	6
ka1-	hesternal/remote past	pre	T	2	25	7
u1-/nyi1-	completive	pre	A	1	22, 23	-
ha1-/nyi1-	progressive	pre	A	1	22, 23	-
hi1-/za1-	prospective	pre	A	1	22, 23	-
ha2 / za2	habitual	pre	Q	2	23, 24	-
Tojolabal (80)					**Furbee-Losee (1976)**	
uneh	perfect	suf	A	1	129, 133-34	8
ø	perfective	zero	A	1	129, 134	3
ʔahyi	completive	suf	A	1	145	-

Orthographic Shape	*Semantic function*	*Form*	*Domain*	*Scope*	*Source*	*No.*
wa-s-V	progressive	pre	A	1	129, 135	1
š / la	imperfective	pre	A	1	129, 134	2
š / la	habitual	pre	Q	2	129, 134	2
ʔoh	prospective	ptcl	A	1	129,135	4
Zuni (81)					**S. Newman (1965)**	
V(PASTFORM)-ka	past	suf	T	2	37	1
V(PASTFORM)-ye· / e·	progressive	suf	A	1	52-53	20
y- / -ti	ingressive	pre/suf	A	1	50	-
V(PRESENTFORM)-ʔa	present	suf	T	2	37	2
V(PRESENTFORM)-nka	counterfactual	suf	I	2	38	4
V(PASTFORM)-šukʷa	future (neg)	suf	T	2	38	5
V(PASTFORM)- šukʷa	hypothetical (neg)	suf	I	2	38	5
V(PASTFORM)- šukʷa	counterfactual (neg)	suf	I	2	38	5
ʔanna	future	suf	T	2	37	3
ʔanna	hypothetical	suf	I	2	37	3
Maidu (82)					**Shipley (1964)**	
-ø -	non-future	zero	T	2	46-47	-
-ʔ -	past	suf	T	2	48	-
-má-	future	suf	T	2	47	42
-k	imperfective	suf	A	1	46-47	41
-ø	perfective	zero	A	1	46-47	-

Orthographic Shape	*Semantic function*	*Form*	*Domain*	*Scope*	*Source*	*No.*
-ʔ-us	habitual	suf	Q	2	48	43
kyʔým + ʔ	remote past	peri	T	2	53	62
wono	remote past	suf	T	2	52	63
paʔáje	ancient past	suf	T	2	52	64
-dom (+ ka)	progressive	suf	A	1	53	70
jo	iterative	suf	Q	1	41	3
jak-ke	epistemic possibility	aux	M	2	48-49, 54	45
jak-ke	uncertainty	aux	M	3	48-49, 54	45
jak-ke	hypothetical	aux	I	2	48-49, 54	45
na-ke	probability	aux	M	2	48-49, 54	46
na-ke	weak certainty	aux	M	3	48-49, 54	46
na-ke	hypothetical	aux	I	2	48-49, 54	46
bos	completive	suf	A	1	44	25
ćýj	inability, root impossibility	suf	M	1	44	-
ćýj	root impossibility	suf	M	2	44	-
dój	ingressive	suf	A	1	44	-
nú	continuative	suf	A	1	44	28
-b-y(ʔy)	epistemic possibility	suf	M	2	49	-
-b-y(ʔy)	uncertainty	suf	M	3	49	-
-b-ae-	prospective	suf	A	1	50	-
ćój	evidential (quotative)	suf	E	3	45	-

Orthographic Shape	*Semantic function*	*Form*	*Domain*	*Scope*	*Source*	*No.*
wéw	evidential	suf	E	3	45	-
kɣ́	evidential	suf	E	3	45	-
Shuswap (83)					**Kuipers (1974)**	
m-	perfective	pre	A	1	74, 80	45
ʔex	progressive	peri	A	1	44-45, 79-80	8
c	imperfective	pre	A	1	51, 53, 71	27
c	habitual	pre	Q	2	51, 53, 71	27
əmíʔ	frequentative	suf	Q	2	62	29
əmíʔ	continuative	suf	A	1	62	29
meʔ	future	ptcl	T	2	83	-
Lao (84)					**Yates & Sayasithsena (1970)**	
lɛ́ɛw	completive	aux	A	1	318ff	39
tɔ̀ɔn	strong obligation	aux	M	1	390	33
tɔ̀ɔn	strong obligation	aux	M	2	390	33
khúan	weak obligation	aux	M	1	390	34
khúan	weak obligation	aux	M	2	390	34
daj	root possibility	aux	M	1	70, 16, 186	12
daj	root possibility	aux	M	2	70, 16, 186	12
âat	epistemic possibility	aux	M	2	390	35
âat	uncertainty	aux	M	3	390	35
pen	ability	aux	M	1	163, 153	41

Orthographic Shape	*Semantic function*	*Form*	*Domain*	*Scope*	*Source*	*No.*
khýy	epistemic possibility	aux	M	2	390	36
khýy	uncertainty	aux	M	3	390	36
khón	probability	aux	M	2	390	37
khón	weak certainty	aux	M	3	390	37
si	non-past	aux	T	2	19f, 161	1
ø	past	zero	T	2	59, 70	-
Chepang (85)					**Caughley (1982)**	
-jeʔ	completive	suf	A	1	112	29
-ʔataʔ	immediate perfect	suf	A	1	108-09	39
-ʔak	perfect	suf	A	1	109	40
-ʔaka- / -ʔa-	perfective	suf	A	1	49, 104-11	13
-ʔaka / -ʔa	past	suf	T	2	49, 104-11	13
-naʔ	imperfective	suf	A	1	49, 104-11	11
-naʔ	non-past	suf	T	2	49, 104-11	11
-jhun	frequentative	suf	Q	2	110	43
*-sa (+khe*ʔ*-SUFFIX)*	obligation	peri	M	1	94-95	26
*-sa (+khe*ʔ*-SUFFIX)*	obligation	peri	M	2	94-95	26
-caʔ	irrealis	suf	I	2	49, 104-11, 92-93	12
-caʔ	uncertainty	suf	M	3	49, 104-11, 92-93	12
*-khe*ʔ *(+ -ʔa/-naʔ)*	prospective	suf	A	1	109	41
-dhan (+ -caʔ/-naʔ)	prospective	suf	A	1	108, 101, 124	38

Orthographic Shape	*Semantic function*	*Form*	*Domain*	*Scope*	*Source*	*No.*
Lahu (87)					**Matisoff (1973)**	
pə̀	completive	aux	A	1	237, 241	29
tàʔ/tā/tá	perfect	ptcl	A	1	322ff	48
ò	resultative	ptcl	A	1	335, 341f	56
chɛ	continuative	aux	A	1	237, 240, 255	24
qɔ̀ʔ	iterative	aux	Q	1	212	-
qɔ̀ʔ	repetitive	aux	Q	2	212	-
tā	ingressive	aux	A	1	212	-
cɨ́	continuative	aux	A	1	213	-
g̈a V	obligation	aux	M	1	211ff	4
g̈a V	obligation	aux	M	2	211ff	4
cɔ̌	weak obligation	aux	M	1	234f	20
cɔ̌	weak obligation	aux	M	2	234f	20
phɛ̀ʔ	root possibility, permission	aux	M	1	231ff, 221	16
phɛ̀ʔ	root possibility, permission	aux	M	2	231ff, 221	16
pɨ́	ability	aux	M	1	232, 247	17
V g̈a	ability	aux	M	1	233	18
V gà	ability	aux	M	1	233f	19
qay	continuative	aux	A	1	237-240	-
mɔ	continuative	aux	A	1	237-240	-
gâ	prospective	ptcl	A	1	332	51

Orthographic Shape	*Semantic function*	*Form*	*Domain*	*Scope*	*Source*	*No.*
gâ	volition	ptcl	M	1	332	51
Nung (88)					**Barnard (1934)**	
ngut / dang	perfect	ptcl	A	1	20-22, 27-28	11
ngut / dang	root possibility	ptcl	M	1	20-22, 27-28	11
bu: / am	past	ptcl	T	2	19	7
der ăl	progressive	peri	A	1	20	10
è	present	ptcl	T	2	19, 26	6
ra	strong obligation	ptcl	M	1	21f, 32	13
ra	strong obligation	ptcl	M	2	21f, 32	13
sha	ability	aux	M	1	16, 22	22
tang i	epistemic possibility	ptcl	M	2	19	9
tang i	uncertainty	ptcl	M	3	19	9
di	future	ptcl	T	2	19, 21, 28-29	8
hka/na/lam i è	future	ptcl	T	2	21, 29, 33	12
der ner	irrealis	peri	I	2	22	-
mǎV yù	volition	aux	M	1	16	-
Cantonese (89)					**Kwok (1971)**	
yùn	completive	suf	A	1	116-19	22
màai / sàai	completive	suf	A	1	117	24
gwō	perfect	suf	A	1	108-09	18
gwō̄	repetitive	suf	Q	2	108-09	-

Orthographic Shape	*Semantic function*	*Form*	*Domain*	*Scope*	*Source*	*No.*
héi (seŭg) lè'i	ingressive	peri	A	1	95	-
jó	perfective	suf	A	1	105-08	13
gán	progressive	suf	A	1	104-05	14
jyŭ	progressive	suf	A	1	104	28
lŏk heŭi	continuative	peri	A	1	110-11	17
ying goi	weak obligation	aux	M	1	77	5
ying goi	weak obligation	aux	M	2	77	5
ying goi	weak obligation	aux	M	3	77	5
nàng gāu	root possibility	aux	M	1	77-78	1
nàng gāu	root and epistemic possibility	aux	M	2	77-78	1
hó yĭ	root possibility, permission	aux	M	1	77-78	2
hó yĭ	root possibility, permission	aux	M	2	77-78	2
hó nàng	epistemic possibility	aux	M	2	77-78	3
hó nàng	uncertainty	aux	M	3	77-78	3
háng	volition	aux	M	1	78	-
dak	ability, root possibility	aux	M	1	73	-
dak	root possibility	aux	M	2	73	-
wŭi	ability	aux	M	1	77	4
wŭi	future	aux	T	2	77	4
dóu	ability, root possibility	suf	M	1	119	25
dóu	root possibility	suf	M	2	119	25

Orthographic Shape	*Semantic function*	*Form*	*Domain*	*Scope*	*Source*	*No.*
jău	prospective	pre	A	1	114	20
Dakota (90)					**Riggs (1893)**	
(íi)ḳoŋ	past perfect	ptcl	A/T	1/2	25	22
REDUP	iterative	redup	Q	1	22, 69	-
REDUP	frequentative	redup	Q	2	22, 69	-
uŋ	progressive	aux	A	1	70-71	25
ø	non-future	zero	T	2	25	-
ḳta / ḳte	prediction	ptcl	M	3	25, 67	3
ḳta / ḳte	irrealis	ptcl	I	2	25, 67	3
ḳta / ḳte	future	ptcl	T	2	25, 67	3
s'a	habitual	ptcl	Q	2	69	26
pica	root possibility	suf	M	1	66	-
pica	root possibility	suf	M	2	66	-
Udmurt (91)					**Winkler (2001)**	
-i- / -ø-	past	suf	T	2	47	5
-(e)m +POSS SUFFIX + vań	perfect	suf+ aux	A	1	47-48	7
-(sḳ)-(e)m	evidential	suf	E	3	50	7
ø	non-past	zero	T	2	46	-
šḳo	imperfective	suf	A	1	46	1
-o- / -lo	future	suf	T	2	48	3
-o- / -lo	frequentative	suf	Q	2	48	3

Orthographic Shape	*Semantic function*	*Form*	*Domain*	*Scope*	*Source*	*No.*
-sal	irrealis	suf	I	2	52	-
luoz	probability	aux	M	2	52	-
luoz	probability	aux	M	3	52	-
kule	obligation	aux	M	1	52	-
kule	obligation	aux	M	2	52	-
jara	permission	aux	M	1	52	-
jara	permission	aux	M	2	52	-
lue	root possibility	aux	M	1	52	-
lue	root possibility	aux	M	2	52	-
Uigur (92)					**Nadzhip (1971)**	
jat-	progressive	suf	A	1	120	-
-maq-ci	prospective	suf	A	1	124	-
-gan	indefinite / uncertain past	suf	T/M	2/3	117-18	19
-di	definite / certain past	suf	T/M	2/3	118	18
-ğan	remote past	suf	T	2	118-19	22
-ivid	immediate past	suf	T	2	120	34
-ivati	present	suf	T	2	122	35
-a /-i /-ar	future	suf	T	2	123	27
-digan	quantification	suf	Q	2	121	26
REDUP	frequentative	redup	Q	2	108	36
-al	ability	suf	M	1	107, 117	31

Orthographic Shape	*Semantic function*	*Form*	*Domain*	*Scope*	*Source*	*No.*
-(gan)du	epistemic possibility	suf	M	2	119	23
-(gan)du	uncertainty	suf	M	3	119	23
-(gan)di	probability	suf	M	2	118	21
-(gan)di	weak certainty	suf	M	3	118	21
-miš	uncertainty	suf	M	3	120	-
-kän	evidential	suf	E	3	120	-
-ti	evidential	suf	E	3	119	-
Buriat (93)					**Poppe (1960)**	
aatai	resultative	suf	A	1	64	23
nxai	perfect	suf	A	1	64	24
ba	past	suf	T	2	56ff	2
-aa(-PRED SUFFIX)	past	suf	T	2	62f	22
han	past	suf	T	2	65	25
na	present	suf	T	2	56ff	1
uuža	future	suf	T	2	56f	3
-xa(-PRED SUFFIX)	future	suf	T	2	61f	21
-xa(-POSS SUFFIX)	strong obligation	suf	M	1	61f	21
-xa(-POSS SUFFIX)	strong obligation	suf	M	2	61f	21
aad	perfect	suf	A	1	103	-
xa	ingressive	suf	A	1	104	-
ža + bai-TENSE	progressive	peri	A	1	102	40

Orthographic Shape	*Semantic function*	*Form*	*Domain*	*Scope*	*Source*	*No.*
ʒa + bol-TENSE	epistemic possibility	peri	M	2	103	41
ʒa + bol-TENSE	uncertainty	peri	M	3	103	41
gša / aaša	habitual	suf	Q	2	103	43
dag	frequentative	suf	Q	2	103	44
Tok Pisin (94)					**Mühlhäusler (1985) / Hall (1943)***	
pinis	completive	aux	A	1	380-81	19
bin	past	aux	T	2	388-89	23
ø	present	zero	T	2	379, 389	-
bai	future	aux	T	2	335, 388	1
stap / i stap	progressive	aux	A	1	379-80	16
wok long	progressive	peri	A	1	380	18
save	habitual	aux	Q	2	339, 381	10
save	ability	aux	M	1	339, 381	10
REDUP	continuative	redup	A	1	383	13
REDUP	iterative	redup	Q	1	383	13
məs	strong obligation	aux	M	1	386	9
məs	strong obligation	aux	M	2	386	9
ken	ability, root possibility, permission	aux	M	1	385	2
ken	root possibility, permission	aux	M	2	385	2
inap / nap	ability, root possibility	ptcl	M	1	386-87	22

Orthographic Shape	*Semantic function*	*Form*	*Domain*	*Scope*	*Source*	*No.*
inap / nap	root possibility	ptcl	M	2	386-87	22
lajk	prospective	aux	A	1	339, 385 / 32-33*	7
lajk	volition	aux	M	1	339, 385 / 32-33*	7
Meithei (95)					**Chelliah (1997)**	
-niŋ	volition	suf	M	1	215	1
-kən	habitual	suf	Q	2	216	2
-həw	ingressive	suf	A	1	216-17	3
-ləm	evidential	suf	E	3	221-24	4
-lə	prospective	suf	A	1	229	5
-kə	epistemic possibility	suf	M	2	231	6
-loy	epistemic possibility (neg)	suf	M	2	231	7
-təw	weak obligation	suf	M	1	232	8
-təw	weak obligation, probability	suf	M	2	232	8
-təw	weak certainty	suf	M	3	232	8
-toy	volition, desirability	suf	M	1	233-34	9
-toy	desirability	suf	M	2	233-34	9
-tə	strong obligation	suf	M	1	235-36	10
-tə	strong obligation	suf	M	2	235-36	10
-tə	certainty	suf	M	3	235-36	10
-li	progressive	suf	A	1	239	11
-lə	perfective	suf	A	1	240	12

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Samenvatting (summary in Dutch)

Dit proefschrift behandelt de vraag in hoeverre begrenzingen aan taalvariatie in de talen van volwassenen en in stadia van eerste taalverwerving identiek zijn. Deze vraag wordt onderzocht binnen het semantische domein van tijd, modaliteit en aspect. Grammaticale uitdrukkingen van tijd, aspect en modaliteit (hierna TMA) verschillen in hun bereik, oftewel, het deel van een uiting dat ze modificeren. Deze verschillen in bereik leiden tot een hiërarchische ordening van grammaticale TMA-uitdrukkingen die naar verwachting gevolgen heeft voor de mogelijke variatie in TMA-systemen in talen van de wereld en in mogelijke stadia van kindertalen. De voorspellingen die uit de hiërarchie volgen worden getoetst in een typologisch onderzoek naar universele kenmerken van TMA-systemen en in een crosslinguïstisch onderzoek naar de verwervingsvolgorde van TMA-uitdrukkingen.

Hoofdstuk 1 beschrijft de rol van taaluniversalia in typologisch onderzoek en taalverwervingsonderzoek. Veel universalia m.b.t. de talen van volwassenen zijn, binnen een bepaald linguïstisch domein, te beschrijven als implicationele hiërarchieën van eigenschappen. Zo'n hiërarchie heeft de vorm $A \subset B \subset C$, waarin de aanwezigheid van eigenschap C de aanwezigheid van eigenschap B impliceert, en de aanwezigheid van eigenschap B de aanwezigheid van eigenschap A, maar niet omgekeerd. Een eigenschap die meer naar rechts staat in de hiërarchie is meer gemarkeerd in de talen van de wereld. Binnen een taal impliceert de aanwezigheid van meer gemarkeerde eigenschappen de aanwezigheid van minder gemarkeerde eigenschappen. Binnen het functionele paradigma wordt ervan uitgegaan dat de gemarkeerdheid van talige eigenschappen bepaald wordt door hun cognitieve complexiteit en communicatieve relevantie.

Kinderen hebben, net als volwassenen, beperkte cognitieve capaciteiten hebben en gebruiken taal, net als volwassenen, voor communicatieve doelen. Aangezien cognitieve capaciteiten en communicatieve behoeftes van grote invloed zijn op mogelijke taalsystemen, is het te verwachten dat de variatie in taalsystemen van kinderen en volwassenen op identieke wijze beperkt is. Dit betekent dat kinderen beginnen met de verwerving van de minst gemarkeerde eigenschappen, oftewel, de eigenschappen die cognitief het minst complex zijn en communicatief het meest relevant. Meer gemarkeerde eigenschappen worden alleen verworven als minder gemarkeerde eigenschappen aanwezig zijn in het taalsysteem van het kind. De hoofdvraag van dit proefschrift is of de

grenzen aan variatie in talen van de wereld identiek zijn aan de grenzen aan variatie in stadia van eerste taalverwerving. Met behulp van een implicationele hiërarchie wordt deze vraag onderzocht voor de grammaticale expressie van de semantische domeinen van tijd, aspect en modaliteit en de aanverwante domeinen van kwantificatie, irrealis en evidentialiteit.

In deel I van dit proefschrift (hoofdstuk 2 t/m 5) wordt de theorie uiteengezet met betrekking tot TMA. Hierin wordt een implicationele hiërarchie opgesteld op basis van de benadering van TMA in Functionele Grammatica, de zogenaamde Bereikhiërarchie. In deel II wordt bekeken in hoeverre de Bereikhiërarchie juiste voorspellingen doet voor kenmerken van TMA-systemen in volwassen talen en in deel III voor de verwervingsvolgorde van TMA-uitdrukkingen. Beide delen bevatten een taalspecifiek en een crosslinguïstisch onderzoek. In deel IV volgen de conclusies en implicaties van deze dissertatie.

DEEL I THEORIE

Hoofdstuk 2 zet de benadering uiteen van grammaticale expressie van TMA in de theorie van de Functionele Grammatica. In dit model worden grammaticale uitdrukkingen van TMA en aanverwante domeinen beschreven als operatoren die verschillende delen van een uiting modificeren. Het deel van de uiting dat gemodificeerd wordt ligt in het bereik van de operatoren. Op basis van het bereik van een operator zijn er drie belangrijke typen operatoren te onderscheiden, die aangeduid worden als π1-, π2- en π3-operatoren. Het eerste type, de π1-operatoren, heeft alleen het predikaat in zijn bereik. Het predikaat wordt uitgedrukt door het hoofdwerkwoord of door een niet-werkwoordelijk predikaat, zoals een nominale, adjectivische of adverbiale constituent. Het predikaat heeft als functie om de hoofdeigenschap of relatie te beschrijven die toegeschreven wordt aan de argumenten in de zin. π1-Operatoren specificeren deze eigenschap of relatie. Het tweede type operatoren, π2-operatoren, heeft de predikatie in zijn bereik. De predikatie wordt gevormd door het (gemodificeerde) predikaat, de argumenten en eventuele adjuncten en situeerteen gebeurtenis in de werkelijkheid of in een imaginaire wereld. π2-Operatoren specificeren de situering van situering van deze gebeurtenis. Ze geven bijvoorbeeld de temporele locatie van de gebeurtenis aan, de werkelijkheidsstatus, of de frequentie van de gebeurtenis. Het derde type operatoren dat relevant is voor deze dissertatie zijn de π3-operatoren. Zij hebben de gehele propositie in hun bereik. De propositie fungeert als de inhoud van de uiting die de spreker overbrengt aan de luisteraar en wordt gevormd door de gemodificeerde predikatie. π3-Operatoren modificeren de

overdracht van de inhoud van spreker naar luisteraar: ze geven aan hoe betrouwbaar de inhoud wordt geacht door de spreker.

Er bestaat een hiërarchische relatie tussen de drie typen operatoren. π1-Operatoren vallen binnen het bereik van π2-operatoren en π2-operatoren vallen op hun beurt binnen het bereik van π3-operatoren. Het bereik van π1-operatoren betreft dus een minder complexe eenheid dan het bereik van π2-operatoren en die betreft een minder complexe eenheid dan die van π3-operatoren. De functie van π1-operatoren (beschrijving van een eigenschap) kan beschouwd worden als cognitief minder abstract en communicatief relevanter dan de functie van π2-operatoren (situering van een gebeurtenis) of van π3-operatoren (overdracht van inhoud). Een groter bereik leidt dus tot een toename in gemarkeerdheid. Dit is samengevat in de Bereikhiërarchie:

π1-operatoren ⊂ π2-operatoren ⊂ π3-operatoren,

waarin wordt uitgedrukt dat π3-operatoren meer gemarkeerd zijn dan π2-operatoren, en die zijn op hun beurt meer gemarkeerd dan π1-operatoren. Naar verwachting heeft de Bereikhiërarchie invloed op de mogelijke variatie in TMA-systemen van volwassenen en kinderen.

In de hoofdstukken 3 en 4 worden de verschillende semantische domeinen van TMA besproken. Wat wordt precies verstaan onder aspect, tijd, modaliteit, kwantificering, evidentialiteit en irrealis en tot welk type operatoren behoren de specifieke semantische functies binnen deze domeinen?

Hoofdstuk 3 behandelt de domeinen van aspect, tijd en kwantificering. Hierbij wordt gebruik gemaakt van de notie van topic time: dit is het tijdsinterval waarop de uiting van de spreker betrekking heeft.

Grammaticale uitdrukkingen van aspect selecteren dat deel van de temporele structuur van een eigenschap of relatie dat relevant is voor de topic time. Een voorbeeld hiervan zijn de betekenisonderscheidingen tussen *is about to jump*, *is jumping* en *keeps jumping*. De temporele structuur van een eigenschap of relatie kan verdeeld worden in verschillende fasen of intervallen: er is een beginpunt en een eindpunt, een fase tussen deze punten in waarin de eigenschap van kracht is, en een fase voor en na de eigenschap: de prefase leidt tot de eigenschap of relatie en de postfase is het gevolg van de eigenschap of relatie. Aspectuele uitdrukkingen selecteren een van deze fasen of combinaties daarvan. Aspect geeft dus precies aan welk deel van de temporele structuur van de eigenschap betrekking heeft op het argument. Het draagt bij aan wat er precies geprediceerd wordt van de argumenten en fungeert dus als π1-operator.

Grammaticale uitdrukkingen van tijd plaatsen het deel van een gebeurtenis dat relevant is voor de conversatie (topic time) op de tijdslijn in relatie tot een referentietijd, in het algemeen de spreektijd. Een voorbeeld is het onderscheid

tussen *he is jumping* en *he was jumping*. Mogelijke onderscheidingen zijn verleden tijd, tegenwoordige tijd en toekomende tijd of combinaties daarvan, zoals verleden tijd tegenover niet-verleden tijd. Ook zijn er talen die binnen de verleden en/of toekomende tijd onderscheidingen maken tussen het verre of nabije verleden of de verre of nabije toekomst en talen die tijd helemaal niet grammaticaal uitdrukken. Het plaatsen van de gebeurtenis in de tijd betreft de gebeurtenis zoals die wordt beschreven door de argumenten, het (gemodificeerde) predikaat en eventuele adjuncten. Uitdrukkingen van tijd hebben dus de predikatie in hun bereik en fungeren als π2-operatoren.

Grammaticale uitdrukkingen van kwantificatie, ten slotte, kunnen verschillende betekenisveranderingen teweeg brengen. Er zijn kwantificerende uitdrukkingen die aangeven dat een bepaalde eigenschap of relatie zich herhalend voordeed of in intense mate, vergelijkbaar met het betekenisverschil tussen *he jumped* (*once*) of *he jumped up and down*. In dat geval is het bereik van de uitdrukking alleen het predikaat en fungeert als een π1-operator. Deze uitdrukkingen zijn gedefinieerd als predikaat-kwantificatie. Er zijn ook kwantificerende uitdrukkingen die aangeven dat er gerefereerd wordt aan een gebeurtenis die zich voordeed op meerdere momenten in de tijd, zoals *he was jumping every day* of *he used to jump*. In dit tweede geval is het bereik van de uitdrukkingen de hele predikatie omdat de kwantificering van de complete gebeurtenis wordt uitgedrukt: deze uitdrukkingen fungeren als π2-operatoren. Deze vorm van kwantificering wordt gebeurtenis-kwantificatie genoemd.

Concluderend zijn uitdrukkingen van aspect en predikaat-kwantificatie geanalyseerd als π1-operatoren, met bereik over het predikaat, en uitdrukkingen van tijd en gebeurtenis-kwantificatie als π2-operatoren, met bereik over de predikatie.

Hoofdstuk 4 behandelt het domein van modaliteit en aanverwante domeinen als evidentialiteit en irrealis. Modaliteit wordt geanalyseerd volgens drie parameters: betekenis, bereik en bron. Ten eerste voegt een modale uitdrukking een algemene betekenis toe, namelijk mogelijkheid (bijvoorbeeld *can* of *may*) of noodzakelijkheid (*must, have to*), of een betekenis tussen deze twee uitersten, zoals neiging (*want, would*) of gematigde noodzakelijkheid (*should, ought to*). De betekenis van modale uitdrukkingen kan betrekking hebben op verschillende delen van de uiting, oftewel, het bereik van modale uitdrukkingen is variabel. Als de modale uitdrukking alleen het predikaat in zijn bereik heeft, fungeert de uitdrukking als een π1-operator en drukt uit dat de eigenschap beschreven door het predikaat noodzakelijk of mogelijk betrekking heeft op het argument. Als de modale uitdrukking de predikatie in zijn bereik heeft dan fungeert de uitdrukking als een π2-operator en drukt uit dat de gebeurtenis noodzakelijk of mogelijk realiteit is. Als de modale uitdrukking de propositie in zijn bereik heeft, dan fungeert de uitdrukking als een π3-operator en drukt uit

dat de spreker de propositie noodzakelijk of mogelijk voor waar houdt. De derde parameter is de bron van de modaliteit: De noodzakelijkheid, mogelijkheid of neiging kan veroorzaakt worden door intrinsieke factoren van de participant (het argument), door externe factoren, of door epistemische (kennis). Er is geen een-op-een relatie tussen bron en bereik. De spreker kan epistemische modaliteit bijvoorbeeld presenteren als objectieve algemene kennis van de wereld (een π2-operator) of als subjectieve kennis van de spreker zelf (π3-operator).

Een aan modaliteit verwant domein, evidentialiteit, drukt uit hoe de spreker de informatie in de propositie heeft verworven. Dit kan bijvoorbeeld zijn door zintuiglijke waarneming, door deductie, of door van-horen-zeggen. Operatoren van evidentialiteit hebben de hele propositie in hun bereik en zijn dus π3-operatoren.

Het domein van irrealis tenslotte, is ook nauw verwant aan dat van modaliteit. Een uitdrukking van irrealis presenteert een bepaalde gebeurtenis als niet-feitelijk; de gebeurtenis is hypothetisch. Omdat het een objectieve presentatie van de realiteitsstatus van de gebeurtenis betreft behoort deze betekenis tot de π2-operatoren.

Concluderend kan gesteld worden dat modale uitdrukkingen fungeren als π1-, π2- of π3-operator, evidentiële uitdrukkingen als π3-operator en uitdrukkingen van irrealis als π2-operator.

In **hoofdstuk 5** worden uit de Bereikhiërarchie specifieke hypothesen afgeleid voor TMA-systemen in talen van volwassenen en kinderen. De eerste hypothese betreft de diachrone ontwikkeling van grammaticale TMA-uitdrukkingen. In het proces van grammaticalisatie vertoont de betekenis van een element altijd een toename en nooit een afname in abstractie, algemeenheid en interpersoonlijkheid. Omdat operatoren met een groter bereik een abstractere, algemenere en meer interpersoonlijke betekenis hebben dan operatoren met een kleiner bereik is de hypothese dat een specifieke uitdrukking in de diachrone ontwikkeling wel een groter bereik kan krijgen, maar niet een kleiner bereik (Hypothese 1).

De tweede hypothese betreft de frequentie van operatoren. Hierbij zijn twee factoren van belang. Ten eerste is de uitdrukking van operatoren met een groter bereik communicatief minder gemotiveerd dan de uitdrukking van operatoren met een kleiner bereik. Ten tweede sterven met name uitdrukkingen met algemenere betekenissen (= groter bereik) uit door diachrone competitie. Om deze twee redenen is de verwachting (i) dat binnen een taal de token-frequentie van operatoren met een kleiner bereik groter is dan van operatoren met een groter bereik (Hypothese 2a); (ii) dat de klasse van operatoren met een kleiner bereik meer leden heeft dan de klasse van operatoren met een groter bereik

(Hypothese 2b) en (iii) dat operatoren met een kleiner bereik crosslinguïstisch vaker voorkomen dan operatoren met een groter bereik (Hypothese 2c).

De derde hypothese betreft de mogelijke synchrone configuraties van operatoren in een taal. Die worden direct bepaald door de Bereikhiërarchie die uitdrukt dat meer gemarkeerde operatoren alleen voorkomen in een taal wanneer de minder gemarkeerde operatoren ook voorkomen. Er zouden dus talen bestaan met alleen π1-operatoren, talen met π1- en π2-operatoren en talen met π1-, π2-, en π3-operatoren. Andere configuraties zijn naar verwachting niet mogelijk (Hypothese 3a). Een tweede hypothese met betrekking tot synchrone configuraties betreft de functies van polyseme en portmanteau uitdrukkingen. Er is evidentie dat de verandering van betekenissen bepaald wordt door universele conceptuele continua. Een bepaalde uitdrukking zal naar verwachting alleen gerelateerde velden van zo'n continuüm uit kunnen drukken. Met betrekking tot het bereik is de verwachting dat verschillende semantische functies van een uitdrukking altijd hetzelfde of een aangrenzend bereik hebben. Wat niet voor kan komen is een polyseme of portmanteau uitdrukking die wel fungeert als π1- en π3-operator, maar niet als π2-operator (Hypothese 3b).

De vierde hypothese betreft de expressievorm van operatoren. Tijdens het grammaticalisatieproces verandert niet alleen de betekenis van een element, maar ook de expressievorm: die raakt meer gebonden, wordt fonologisch gereduceerd en verliest kenmerken van de oorspronkelijke lexicale categorie. Uit de verwachting dat operatoren met een groter bereik verder liggen op diachrone ontwikkelingspaden (zie hypothese 1), volgt ook de verwachting dat operatoren met een groter bereik een hogere graad van formele grammaticalisatie vertonen dan operatoren met een kleiner bereik (Hypothese 4). In het algemeen kan inflectie beschouwd worden als de meest gegrammaticaliseerde expressievorm, vervolgens partikels, dan hulpwerkwoorden en ten slotte perifrastische uitdrukkingen.

De vijfde hypothese betreft de volgorde van uitdrukking van operatoren in volwassen talen. Aangezien taalgebruikers de neiging hebben om de semantiek iconisch in de syntaxis tot uitdrukking te brengen kan voorspeld worden dat operatoren met een kleiner bereik dichter bij het predikaat worden uitgedrukt dan operatoren met een groter bereik (Hypothese 5).

De hypotheses met betrekking tot stadia van taalverwerving zijn een toespitsing van hypotheses 3a en 3b. Aangezien iedere fase van kindertaal te beschouwen is als een mogelijk taalsysteem is hypothese 3a ook voor kindertaal van kracht. Met betrekking tot de verwervingsvolgorde van TMA-uitdrukkingen houdt dat in dat kinderen de Bereikhiërarchie volgen: ze verwerven eerst π1-operatoren, tegelijkertijd daarmee of daarna π2-operatoren en tegelijkertijd daarmee of daarna π3-operatoren (Hypothese 6). Alleen in deze volgorde van verwerving voldoet ieder taalstadium aan de mogelijke

configuraties. Bovendien zullen polyseme en portmanteau uitdrukkingen in kindertaal net als in volwassen taal betekenissen hebben die hetzelfde bereik of een aangrenzend bereik hebben (Hypothese 7).

DEEL II TYPOLOGIE

In **hoofdstuk 6** worden hypothese 1 tot en met 5 getoetst met betrekking tot het Engels. Eerst wordt een overzicht gegeven van de verschillende TMA-uitdrukkingen in het Engels. Op basis van corpusonderzoek worden de verschillende specifieke semantische functies besproken.

Om hypothese 1 te testen is van alle TMA-uitdrukkingen de diachrone ontwikkeling onderzocht op basis van bestaande literatuur. Alle bekende ontwikkelingspaden ondersteunen de hypothese dat het bereik van operatoren groter wordt en niet kleiner.

Om hypothese 2a te testen is de frequentie van de verschillende operatoren (*N* = 2502) bestudeerd in spontane conversatie van acht sprekers van het Amerikaans Engels uit het Santa Barbara Corpus of Spoken American English (SBCSAE). Hieruit blijkt dat π2-operatoren in het Engels verreweg het frequentst zijn. Ze vormen 83% van alle operatoren, terwijl π1-operatoren 16% vormen en π3-operatoren 1%. Dit gaat tegen de hypothese in. Een verklaring hiervoor ligt in de verplichting om tijd uit te drukken in het Engels. Het overgrote deel van de π2-operatoren bestaat uit tijdsuitdrukkingen, terwijl de andere categorieën heel marginaal voorkomen. Wanneer alleen de modale uitdrukkingen (N = 228) worden vergeleken, die geen van allen verplicht worden uitgedrukt, dan blijkt de token-frequentie van π1-operatoren (67%) wel groter te zijn dan van π2-operatoren (20%), en is de frequentie van π3-operatoren (13%) het kleinst. Dit suggereert dat bereik weliswaar een factor van betekenis is in de token-frequentie, maar dat de verplichting van uitdrukken van grotere invloed is. Hypothese 2b wordt voor het Engels deels bevestigd: de klasse van π3-operatoren is veel kleiner dan van π1- en π2-operatoren. Echter, de klasse van π2-operatoren is net iets groter dan van π1-operatoren, wat niet in overeenstemming is met de hypothese. Dit suggereert dat π1- en π2-operatoren niet veel verschillen in gemarkeerdheid. In het crosslinguïstisch onderzoek in hoofdstuk 7 wordt hier nader op ingegaan.

Hypothese 3a en 3b worden beide ondersteund door het Engels: ten eerste blijkt de configuratie van aanwezige operatoren in overeenstemming met de voorspelde mogelijke configuraties. Er zijn namelijk π1-, π2- en π3-operatoren. Deze hypothese behoeft echter verdere ondersteuning in crosslinguïstisch onderzoek (hoofdstuk 7). Ten tweede blijkt dat de polyseme en portmanteau elementen in het Engels hypothese 3b ondersteunen: de verschillende

betekenissen van een bepaalde uitdrukking hebben steeds hetzelfde bereik of een aangrenzend bereik, bijvoorbeeld de past habitual *used to* is tegelijkertijd een operator van verleden tijd (π2) en van habitualiteit (π2) en het modale hulpwerkwoord *can* fungeert als π1-, π2- en π3-operator.

Hypothese 4 is getoetst door de expressievormen van TMA-uitdrukkingen, inflectie, hulpwerkwoord of perifrase, te vergelijken met hun bereik. De relatie blijkt niet geheel in overeenstemming met de hypothese. Tijd wordt (π2) bijvoorbeeld uitgedrukt door inflectie, maar de meeste π3-operatoren door middel van hulpwerkwoorden, die een lagere graad van formele grammaticalisatie hebben. Een alternatieve analyse laat zien dat er een veel sterker verband is tussen de leeftijd van de uitdrukking en de formele grammaticalisatie: hoe ouder de uitdrukking, hoe hoger de graad van formele grammaticalisatie. Er lijkt dus alleen een indirecte relatie te bestaan tussen bereik en expressievorm, omdat operatoren met een kleiner bereik vaak, maar niet per definitie, jonger zijn.

Hypothese 5 is getoetst door TMA-uitdrukkingen met verschillend bereik met elkaar te combineren. Hieruit blijkt dat de verschillende operatoren geplaatst worden conform de hypothese: operatoren met een kleiner bereik worden dichter bij het predikaat uitgedrukt dan operatoren met een groter bereik. Bijvoorbeeld in *he is going to read* staat de markering van aspect *going to* (π1) dichter bij het predikaat *read* dan de markering van tegenwoordige tijd *is* (π2)

Concluderend kan gesteld worden dat de Bereikhiërarchie in het Engels tot uiting komt in de diachrone ontwikkeling, in de synchrone configuratie en in de expressievolgorde. Verder is er een correlatie gevonden tussen een groter bereik en een lagere token-frequentie, maar blijkt de verplichting van uitdrukking van een bepaalde categorie van grotere invloed op de token-frequentie dan het bereik. De grootte van de klasse van operatoren ondersteunt de hypothese deels: er zijn veel minder π3-operatoren, maar het aantal π1- en π2-operatoren is vergelijkbaar. Ten slotte is er alleen evidentie gevonden voor een indirecte relatie tussen bereik en expressievorm. Een groter bereik correleert deels met de leeftijd van uitdrukkingen en de leeftijd correleert sterk met de expressievorm.

In **hoofdstuk 7** worden hypotheses 1 tot en met 5 crosslinguïstisch getoetst. Hypothese 1 wordt getoetst aan de hand van literatuuronderzoek. De crosslinguïstische studies van Bybee (1985), Dahl (1985) en Bybee et al. (1994) hebben diverse universele diachrone ontwikkelingen aangetoond in betekenissen van morfemen. Deze grammaticalisatieroutes of semantische paden zijn universeel omdat ze voorkomen in sterk uiteenlopende talen. Voorbeelden hiervan zijn: i) een progressief of continuatief krijgt geleidelijk de betekenis van imperfectief of tegenwoordige tijd; ii) perfect of completief

aspect ontwikkelt naar perfectief aspect en vervolgens naar verleden tijd; iii) een modale uitdrukking van wil ontwikkelt de betekenis van toekomende tijd. Het blijkt dat de betekenissen in de semantische paden ontwikkelen van operatoren met een klein bereik naar operatoren met een groter bereik en niet andersom. Aspectuele betekenissen (π1) ontwikkelen zich bijvoorbeeld tot tijd (π2), en modale betekenissen met alleen het predikaat in hun bereik (π1) kunnen zich ontwikkelen tot een modale uitdrukking met de predikatie (π2) en later de propositie (π3) in hun bereik. Dit ondersteunt hypothese 1. Een onverwachte ontwikkeling, hoewel niet strijdig met de hypothese, is die van perfect aspect (π1) naar een evidentiële uitdrukking (π3). Het bereik van de uitdrukking verandert dan dus direct van het predikaat naar de gehele propositie, zonder dat er noodzakelijk een stadium is waarin de predikatie het bereik van de uitdrukking vormt.

Het testen van de overige hypotheses is gebaseerd op een sample van 76 talen, het zogenaamde GRAMCATS sample (Bybee et al. 1994). Dit sample is samengesteld uit talen die geografisch en genetisch niet gerelateerd. Voor hypothese 2 en 3 is op basis van descriptieve grammatica's van alle talen in het sample een inventarisatie gemaakt van de aanwezige TMA-uitdrukkingen. Het blijkt dat alle talen (N = 76) uitdrukkingen hebben die als π1-operator fungeren, vrijwel alle talen (N = 73) π2-operatoren hebben en dat ongeveer de helft (N = 37) π3-operatoren heeft. Dit ondersteunt hypothese 2c. Vervolgens is de grootte van de klassen van operatoren onderzocht. In het sample is het totale aantal uitdrukkingen dat als π1-operator fungeert (N = 451) groter dan het aantal uitdrukkingen dat als π2-operator fungeert (N = 413) en het aantal π3-operatoren (N = 89) is verreweg het kleinst. Verder blijkt dat in veel, maar niet in alle talen de klasse van π1-operatoren groter is dan of even groot als de klasse van π2-operatoren (59%) en dat in het merendeel van de talen de klasse van π3-operatoren kleiner is dan van π1-operatoren (96%) en van π2-operatoren (99%). Dit ondersteunt deels hypothese 2b: net als in het Engels blijkt het verschil tussen π1- en π2-operatoren minimaal terwijl er een duidelijk verschil is tussen deze twee klassen enerzijds en π3-operatoren anderzijds.

Hypothese 3a wordt volkomen ondersteunt door de configuraties in de talen van het sample. Er zijn drie talen met alleen π1-operatoren, 36 talen met π1- en π2-operatoren en 37 talen met alle drie typen operatoren. Er is dus geen enkele taal met een configuratie die in strijd is met de hypothese, zoals bijvoorbeeld talen met alleen π2- of alleen π3-operatoren, of met π2- en π3-operatoren, maar geen π1-operatoren. Hypothese 3b wordt ook in hoge mate ondersteund door het sample: de verschillende betekenissen van polyseme en portmanteau uitdrukkingen hebben steeds hetzelfde of een aangrenzend bereik. De enige uitzondering hierop wordt gevormd door uitdrukkingen die zowel voor perfect aspect (π1) als voor evidentialiteit (π3) gebruikt worden. In deze configuratie

komt semantische ontwikkeling dus niet overeen met een gestage uitbreiding van bereik.

Hypothese 4 voorspelt dat operatoren met een groter bereik een hogere mate van formele grammaticalisatie vertonen. Na verschillende analyses blijkt dat er niet direct een verband bestaat tussen bereik en graad van formele grammaticalisatie, maar juist tussen bepaalde semantische functies en expressievormen. Talen met alleen ongebonden vormen hebben bijvoorbeeld relatief vaak modale betekenissen met een klein bereik (π1) terwijl talen waarin alleen inflectie wordt gebruikt relatief vaak tijd (π2) en evidentialiteit (π3) uitdrukken. Talen met verschillende uitdrukkingsvormen drukken relatief vaak aspect (π1) uit. Het morfologisch type van talen lijkt dus invloed te hebben op het soort betekenissen dat gemakkelijk grammaticaliseert.

Hypothese 5 tenslotte is getoetst door de volgorde van operatoren te bekijken in de talen. Voor 22 talen werd informatie gevonden over de uitdrukkingsvolgorde die de hypothese ondersteunt: π1-operatoren worden dichter bij het predikaat uitgedrukt dan π2-operatoren en die worden dichter bij het predikaat uitgedrukt dan π3-operatoren. Er zijn echter 9 talen waarin een of meer volgordes mogelijk zijn die strijdig zijn met de hypothese. De conclusie is dan ook dat er weliswaar een tendens bestaat dat bereik iconisch wordt uitgedrukt, maar dat dit niet de enige factor is die een rol speelt. De expressievorm van operatoren lijkt bijvoorbeeld ook van grote invloed te zijn.

Samengevat levert de Bereikhiërarchie juiste voorspellingen op voor de diachronie, de mogelijke configuraties van operatoren en de mogelijke betekenissen van polyseme elementen en portmanteau uitdrukkingen. Met betrekking tot de crosslinguïstische frequentie, de grootte van de klassen van operatoren en de expressievolgorde speelt het bereik van operatoren een rol, maar andere factoren blijken eveneens van belang. Er is geen evidentie dat de expressievorm samenhangt met bereik: de specifieke semantische functies zijn van grotere betekenis.

DEEL III TAALVERWERVING

In **hoofdstuk 8** wordt onderzocht hoe kinderen de grammaticale uitdrukkingen van TMA in het Engels verwerven. Daarvoor zijn de longitudinale data onderzocht van acht kinderen met het Amerikaans-Engels als moedertaal, in de leeftijd tussen 1;6 en 7;6 (CHILDES database). De onderzochte data bestaan uit samples van 750 kinduitingen om de drie (tot 2;6) of zes maanden (vanaf 2;6). Hierin zijn alle TMA-uitdrukkingen die de kinderen gebruiken gecodeerd naar semantische functie en bereik. Hypothese 6 voorspelt dat kinderen operatoren met een kleiner bereik eerder zullen verwerven dan operatoren met

een groter bereik; alleen in dat geval komt hun TMA-systeem in iedere fase overeen met de Bereik hiërarchie.

Het blijkt dat de snelheid waarmee kinderen de uitdrukkingen verwerven sterk uiteenloopt met verschillen tot meer dan een jaar. De kwalitatieve ontwikkeling vertoont echter grote overeenkomsten. De verwerving van TMA-uitdrukkingen kan globaal verdeeld worden in drie fasen. In de eerste fase, die begint tussen 1;6 en 2;3 (MLU < 2.5), gebruiken kinderen de Progressive *–ing* (progressief, π1) al productief en daarnaast veel vaste constructies waarin copula's voorkomen in de tegenwoordige tijd (π2), zoals *where's X*, *what's this*, *that's X*. De copula's in deze constructies lijken echter nog geen markeerders van tijd, omdat de constructies waarschijnlijk ongeanalyseerde vormen zijn voor de kinderen. Verder maken ze sporadisch gebruik van modale hulpwerkwoorden als *wanna* of *can't* (modaliteit, π1), prospectief aspect *gonna/going to* (π1) en tegenwoordige- en verledentijdsvormen (π2) zoals *I like X*, *I have X*, *I did it*, *I fell down*, die gebruikt worden om respectievelijk toestanden te beschrijven die relevant zijn op het moment van spreken of gebeurtenissen die zojuist zijn gebeurd. In de tweede fase, die begint tussen 2;0 en 3;0 (MLU 2.5-3.5) worden de sporadische vormen uit fase 1 productief. Kinderen gebruiken nu soms de tegenwoordige tijd ook om algemene standen van zaken te beschrijven, de verleden tijd om te verwijzen naar gebeurtenissen in een verder verleden, copula's in de verleden tijd om een toestand in het nabije verleden te beschrijven, en de vormen *will* of *'ll*. Deze laatste vormen worden met name gecombineerd met de eerste persoon, en drukken dan ook eerder intentie uit dan toekomende tijd. In de derde fase, die tussen 3;0 en 4;0 begint, worden de nieuwe vormen uit fase 2 productief. De toekomende tijd wordt nu vaker gebruikt om naar de toekomst te verwijzen. Verder verschijnen er geleidelijk nieuwe TMA uitdrukkingen: de hypothetische *if*-clause (π2), *have –ed* voor perfect aspect (π1), *used to* voor habitualiteit (π2), en modale hulpwerkwoorden met een groter bereik (π2 en π3). Al deze uitdrukkingen hebben een lage frequentie in het Engels van volwassenen. In de laatste samples van het onderzoek, tussen 5;0 en 7;6, is het gebruik van TMA-uitdrukkingen nog niet hetzelfde als in het volwassen stadium. Met name de laatst verworven vormen zijn minder frequent in kindertaal. Het algemene beeld laat zien dat π1-operatoren al vanaf zeer jong aanwezig zijn, en snel gevolgd worden door π2-operatoren. De specifieke semantische functies van deze uitdrukkingen zijn progressief en prospectief aspect (π1), participant-georiënteerde modaliteit (π1) en verleden en tegenwoordige tijd (π2). In een latere fase neemt het aantal functies van π2-operatoren toe met habitualiteit, gebeurtenis-georiënteerde modaliteit en irrealis. Dan verschijnen ook voor het eerst uitdrukkingen voor propositie-georiënteerde modaliteit (π3).

Om de precieze verwervingsvolgorde van TMA-uitdrukkingen vast te stellen is het noodzakelijk precieze criteria te hanteren voor verworvenheid: wanneer is een uitdrukking werkelijk verworven? Het eerste criterium dat hiervoor gebruikt wordt is de relatieve frequentie van typen operatoren in de samples van de kinderen, vergeleken met het volwassen stadium van het Engels en de input. Hiervoor is de frequentie van operatoren bepaald in de samples van de acht kinderen, in de uitingen van volwassenen gericht tot drie van de acht kinderen en in spontane conversaties tussen volwassenen onderling (acht volwassen moedertaalsprekers van het Amerikaans Engels, zie hoofdstuk 6). Het blijkt dat de relatieve frequentie van π1-operatoren in kindertaal vergeleken met het volwassen stadium significant hoger is, terwijl de relatieve frequentie van π2-operatoren significant lager is tot ongeveer 3;0 of zelfs 4;0 jaar. De relatieve frequentie van π3-operatoren in kindertaal is lager dan in volwassentaal tot in de laatst beschikbare samples, maar aangezien het aandeel van π3-operatoren op het totale aantal operatoren extreem klein is (circa 1%) leidt dit vaak niet tot significante verschillen. Ten tweede blijkt dat de distributie van operatoren in de input op een zelfde manier afwijkt als in de kindertaal. De verschillen met het volwassen stadium zijn echter minder groot. Terwijl π1-operatoren in kinduitingen een relatief groter aandeel uitmaken tot 3;0 jaar of ouder, is dit bij de ouders slechts het geval tot de kinderen ongeveer 2;6 jaar oud zijn. De relatieve frequentie van π3-operatoren blijft laag tot in de laatste samples, maar ook hier kan geen statistische significantie aangetoond worden. Op grond van deze resultaten moet hypothese 6 enigszins aangepast worden. Het is niet noodzakelijkerwijs het geval dat kinderen π1-operatoren eerder verwerven dan π2-operatoren: vaak beginnen ze tegelijkertijd beide typen operatoren te gebruiken, maar de verwerving van π1-operatoren verloopt vlugger dan van π2-operatoren. De verwerving van π3-operatoren begint wel duidelijk later.

Het tweede criterium om de verworvenheid vast te stellen van TMA-uitdrukkingen betreft het productieve gebruik. Op het moment dat een kind een bepaald TMA-morfeem met vijf verschillende predikaten heeft gebruikt, wordt het beschouwd als verworven. Hieruit blijkt dat kinderen de inflectionele morfemen (*-ing*, *-ed*, *-s*, *-ø*) eerder verwerven dan de hulpwerkwoorden (*can*, *could*, *wanna*, *will*, *would*, *have to*, etcetera). Alle kinderen verwerven de Progressive *–ing* (π1) eerder dan of tegelijk met de Simple past en Simple present inflecties (π2). Binnen de groep van hulpwerkwoorden worden hulpwerkwoorden die als π1-operator fungeren verworven voor of tegelijk met hulpwerkwoorden die als π2-operator fungeren. Het aantal π1-operatoren dat kinderen verworven hebben groeit sneller dan het aantal π2-operatoren. Er zijn vrijwel geen π3-operatoren in de samples die productief zijn volgens dit criterium. Slechts één van de kinderen gebruikt met 4;0 jaar *will* met vijf verschillende predikaten om voorspelling uit te drukken (een π3-operator).

Het derde criterium om het moment van verwerving van TMA-uitdrukkingen vast te stellen betreft het contrastieve gebruik van uitdrukkingen met een zelfde bereik (operatoren van dezelfde klasse): wanneer een kind twee TMA-uitdrukkingen met een zelfde bereik combineert met hetzelfde predikaat heeft het beide uitdrukkingen contrastief gebruikt. In alle beschikbare data van de kinderen in CHILDES is onderzocht welke contrasten de kinderen maken en hoe vaak: contrasteren ze vooral π1-operatoren of juist π2-operatoren? De eerste 50 contrastieve gebruiken zijn hiervoor onderzocht. Uit deze analyse blijkt dat kinderen gelijktijdig beginnen met contrastief gebruik van π1- en π2-operatoren, maar dat ze wel veel vaker contrasten maken met π1-operatoren. In de onderzochte data maken de kinderen geen enkel contrastief gebruik van π3-operatoren. Dit bevestigt de gegevens uit de eerdere analyses. De algemene conclusie van hoofdstuk 8 is dat kinderen π1-operatoren eerder of gelijktijdig met π2-operatoren beginnen te gebruiken, maar dat ze verschillende π1-operatoren in een hoger tempo verwerven dan π2-operatoren. π3-Operatoren worden duidelijk als laatste verworven.

In **hoofdstuk 9** wordt onderzocht of kinderen de inflectionele TMA-uitdrukkingen in het Engels met dezelfde semantische functies gebruiken als volwassenen. Daarvoor wordt bekeken met welke gebeurtenistypen tijd- en aspectvormen gecombineerd worden. Crosslinguïstisch is er vaak een relatie gevonden tussen (i) progressief of imperfectief aspect en dynamische, atelische gebeurtenissen, (ii) tegenwoordige tijd of imperfectief aspect en statische gebeurtenissen en (iii) de verleden tijd en telische (en punctuele) gebeurtenissen. In de data van drie van de kinderen uit hoofdstuk 8 is onderzocht hoe sterk de associatie is tussen de Progressive *–ing* en dynamische gebeurtenissen, tussen de Simple present *–s* en *–ø* en statische gebeurtenissen en tussen de Simple past *–ed* en telische gebeurtenissen. Vervolgens wordt onderzocht of deze associatie sterker is dan in de taal van volwassenen onderling en in de input aan de kinderen, de taal van volwassenen gericht tot kinderen. Hiervoor worden opnieuw de data van het SBCSAE gebruikt en ook de uitingen van de ouders in de samples van twee van de acht kinderen.

Uit deze analyses blijkt dat de associatie in het Engels van volwassenen onderling zeer sterk is: 75% van alle Simple present-vormen wordt gebruikt in combinatie met statische gebeurtenissen, 60% van alle Progressives met dynamische, niet-telische gebeurtenissen, en 59% van alle Simple past-vormen met telische gebeurtenissen. In de kindertaaldata is de associatie tussen Simple present en statische gebeurtenissen significant sterker dan in de taal van volwassenen onderling (tot meer dan 90%); ook is de associatie tussen Simple past en telische gebeurtenissen sterker in kindertaal tot circa 2;6. De associatie tussen Progressive en dynamische, niet-telische gebeurtenissen blijkt echter even sterk als in de taal van volwassenen. Ten slotte blijkt dat in de input de

associaties in dezelfde richting afwijken van het volwassen stadium maar in minder sterke mate dan in de kindertaaldata.

In de literatuur zijn verschillende verklaringen geopperd voor de sterke associaties tussen tijd en aspect enerzijds en gebeurtenistype anderzijds: die verklaringen gaan vaak uit van een afwijkende semantische representatie van de morfemen bij de kinderen, namelijk, dat deze geen tijd of aspect uitdrukken, maar het gebeurtenistype (zoals in de *Aspect-before-tense* hypothese en de *Prototype Account*). Echter, deze benaderingen geven geen verklaring voor verschillende associaties in de taal van volwassenen onderling en in de input. Een alternatieve verklaring wordt hier gezocht in een verschil in gespreksonderwerpen tussen kinderen en volwassenen. In conversaties die gericht zijn op het hier-en-nu, zoals de meeste uitingen van jonge kinderen, zijn de ongemarkeerde combinaties van tijd/aspect en gebeurtenistype over het algemeen de relevante taalvormen. Bij meer abstracte gespreksonderwerpen, zoals gebeurtenissen in het verleden en de wereld in het algemeen, is het gebruik van meer gemarkeerde combinaties noodzakelijk. Aangezien volwassenen onderling veel vaker over deze onderwerpen praten dan kinderen, maken ze meer gebruik van de gemarkeerde combinaties. Volwassenen die met kinderen praten passen echter hun gespreksonderwerpen aan de belevingswereld van het kind aan en daarom gebruiken ze de gemarkeerde combinaties minder dan volwassenen onderling. Doordat ze kinderen met hun hulp proberen te laten vertellen over onderwerpen buiten het hier-en-nu gebruiken ze de gemarkeerde combinaties echter wel vaker dan hun kinderen. Er is dus geen evidentie voor een alternatieve semantische representatie bij kinderen: de verschillen in gespreksonderwerp verklaren de mate van associatie.

In **hoofdstuk 10** wordt onderzocht of het verwervingspatroon in het Engels taalspecifiek is of universeel. Uit de bestaande literatuur zijn gegevens verzameld over de verwerving van tijd, aspect en modaliteit in 24 talen uit 13 taalfamilies. Hieruit blijkt dat er formeel gezien verschillen bestaan tussen de verwervingsvolgordes: in sommige talen gebruiken kinderen als een van de eerste TMA-uitdrukkingen tegenwoordige en verleden tijd (bijvoorbeeld Fins), in andere juist prospectief en perfect aspect (bijvoorbeeld West Greenlandic) of combinaties van tijd en aspect, zoals perfectief verleden tijd en imperfectief tegenwoordige tijd (bijvoorbeeld Pools). Wanneer echter de functies van deze vroege TMA-uitdrukkingen worden bekeken, de contexten waarin deze vormen worden gebruikt, en de betekeniscontrasten die ze aangeven, dan zijn er opmerkelijke overeenkomsten. Het blijkt dat in al deze talen de vroege TMA-uitdrukkingen gebruikt worden om het onderscheid te markeren tussen gebeurtenissen die aan de gang zijn en gebeurtenissen die net gebeurd zijn of een duidelijk resultaat hebben opgeleverd. De vormen die gebruikt worden voor gebeurtenissen die aan de gang zijn, zijn, afhankelijk van de taal,

imperfectief of progressief aspect, tegenwoordige tijd of een gecombineerde vorm van imperfectieve of progressieve tegenwoordige tijd. De vormen die gebruikt worden voor gebeurtenissen die net gebeurd zijn, zijn, afhankelijk van de taal, perfectief of perfect aspect, (nabije) verleden tijd of een gecombineerde vorm van perfectief verleden tijd. Een derde betekenis wordt vaak iets later uitgedrukt, namelijk de markering van gebeurtenissen die op het punt staan te gebeuren, omdat het kind de intentie heeft ze uit te gaan voeren. Talige vormen die hiervoor gebruikt worden zijn, afhankelijk van de taal, prospectief aspect, modale uitdrukkingen van wil of intentie, of (nabije) toekomende tijd.

Dit eerste contrast dat kinderen maken lijkt primair een aspectueel onderscheid uit te drukken. De gebeurtenissen waarover kinderen praten vinden in deze fase altijd plaats in het hier-en-nu (de topic time). Kinderen markeren welke fase van een gebeurtenis relevant is voor het hier-en-nu: de postfase, het interval in het midden of de prefase. Pas wanneer kinderen spontaan over het verleden gaan vertellen en de topic time in het verleden ligt, wordt het zinvol te spreken over het relateren van gebeurtenissen in de tijd ten opzichte van het spreekmoment, dus echte markering van tijd. In talen waarin de vroege TMA-uitdrukkingen tijdsvormen zijn, worden deze dus in eerste instantie als aspectmarkeerder gebruikt. De betekenis van tijd ontwikkelt zich uit het gebruik als aspectmarkeerder: een perfectieve betekenis impliceert vaak verleden tijd, een imperfectieve betekenis vaak tegenwoordige tijd. In de context kan het kind de vormen interpreteren met een groter bereik en zodoende de betekenis van tijd afleiden als basisbetekenis. De crosslinguïstische gegevens ondersteunen dus hypothese 6. Het eerste contrast dat kinderen maken is aspectueel ($\pi 1$) en pas later wordt tijd ($\pi 2$) linguïstisch gemarkeerd.

DEEL IV CONCLUSIES EN IMPLICATIES

In **hoofdstuk 11** worden de conclusies en implicaties van het onderzoek besproken. De benadering vanuit FG is zeer vruchtbaar gebleken: de analyse van TMA-uitdrukkingen op het abstracte niveau van bereik heeft voorspellingen opgeleverd over kenmerken van TMA-systemen in talen van de wereld en in stadia van eerste taalverwerving die in hoge mate ondersteund zijn door de data. Opmerkelijk is dat grammaticale uitdrukkingen van TMA in alle talen van het sample voorkomen en ook al zeer vroeg aanwezig zijn in kindertaal. De vraag waarom juist deze betekenissen zo belangrijk zijn in taal verdient nader onderzoek. Verder is gebleken dat operatoren met een groter bereik alleen voor kunnen komen in een taal als er ook operatoren met een kleiner bereik zijn. In dit proefschrift is aangenomen dat dit veroorzaakt wordt door cognitieve capaciteiten en communicatieve behoeften van taalgebruikers.

De precieze relaties tussen bereik en cognitie en tussen bereik en communicatie zouden echter verder onderzocht moeten worden.

Het theoretisch onderzoek heeft een verfijnde definitie opgeleverd voor het domein tijd: tijd localiseert het **relevante** deel van een gebeurtenis in de tijd ten opzichte van een referentiepunt. Ook is er een nieuwe classificatie gemaakt van modaliteit, op basis van de parameters betekenis, bereik en bron. Dit heeft geleid tot een voorlopig ontwerp van een conceptuele ruimte van modaliteit.

Het typologisch onderzoek heeft aangetoond dat er relaties bestaan tussen morfologisch taaltype, expressievorm en de aanwezige TMA-categorieën. Dit is een belangrijk terrein voor verder onderzoek. Het zou kunnen leiden tot een groter begrip van grammaticalisatieprocessen: welke betekenissen en constructies zullen waarschijnlijk grammaticaliseren in een specifieke taal?

In het taalverwervingsonderzoek is aangetoond dat het van groot belang is om de stadia van taalverwerving steeds te vergelijken met inputdata en data van conversaties van volwassenen onderling. Alleen dan wordt duidelijk wat specifiek is voor kindertaal. Verder is gebleken dat het algemene gespreksonderwerp (hier-en-nu, gebeurtenissen in het verleden, of de wereld in het algemeen) van grote invloed is op de gebruikte taalvormen: er zou nauwkeuriger onderzocht moeten worden welke taalvormen samenhangen met welke gespreksonderwerpen en wat de precieze verschillen zijn tussen de gespreksonderwerpen van kinderen en van volwassenen. Ten slotte is gebleken dat het belangrijk is om crosslinguïstisch onderzoek niet te beperken tot formele categorieën. Juist de functies van die categorieën in de kindertaal blijken universele kenmerken te vertonen.

De vergelijking van typologische gegevens en taalverwervingsdata heeft aangetoond dat er universele relaties bestaan tussen bepaalde betekenissen. Zowel in de diachrone ontwikkeling, in combinaties van betekenissen in polyseme uitdrukkingen en in kindertaalontwikkeling bestaan er verbanden tussen: i) resultatief, perfect, perfectief en verleden tijd; ii) progressief, imperfectief en tegenwoordige tijd; iii) participant-georiënteerde modaliteit, prospectief, intentie en toekomende tijd; iv) irrealis, toekomende tijd en epistemische modaliteit; v) modaliteit met verschillende bereiken. Deze semantische relaties reflecteren universele conceptuele relaties.

Al met al ondersteunt het onderzoek de hypothese dat implicationele hiërarchieën niet alleen de grenzen beschrijven aan mogelijke variatie in talen van de wereld, maar ook in stadia van eerste taalverwerving. Een grotere samenwerking tussen de subdisciplines van taaltypologisch en psycholinguïstisch onderzoek zou dan ook tot een beter begrip kunnen leiden van taal en taalgebruikers.

Curriculum Vitae

Annerieke Boland was born in Emmen on the 17th of April 1974. She grew up in Barneveld, where she received her VWO diploma at the Johannes Fontanus College. From 1992 she studied Dutch Language and Literature at the Universiteit van Amsterdam and specialized in Historic Literature. From 1993 she also studied General Linguistics and specialized in first language acquisition and the Theory of Functional Grammar. In 1997 she obtained her MA degree in Dutch and in the next year she also obtained her teacher's degree. During her studies Annerieke taught Dutch as a second language, from literacy to advanced level. In 1999 she obtained a cum laude MA in Linguistics. Directly after this, she started a PhD-project at the Amsterdam Center of Language and Communication (ACLC) at the Universiteit van Amsterdam. In this project, Functional Grammar was the starting point for a study within the disciplines of typology and first language acquisition. It resulted in this dissertation.

During the project, Annerieke participated in the ACLC-groups of Functional Grammar and of Language Acquisition and Language Pathology. In the first year she took part in a project on the acquisition of verb clusters in Dutch and Hungarian at NIAS in Wassenaar. She gained a more extended view on functional linguistics at the Linguistic Institute of the LSA in Santa Barbara, 2001. For several years she was an active member of the Werkverband Amsterdamse Psycholinguïsten (WAP) and executive editor of the Working Papers in Functional Grammar.