

**Classifying hand configurations in
Nederlandse Gebarentaal
(Sign Language of the Netherlands)**

Published by
LOT
Trans 10
3512 JK Utrecht
The Netherlands

phone: +31 30 253 6006
fax: +31 30 253 6000
e-mail: lot@let.uu.nl
<http://www.lot.let.uu.nl/>

Cover illustration: Finish. Photo: Marco van Overbeek

ISBN 90-76864-37-3
NUR 632

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**Classifying hand configurations in
Nederlandse Gebarentaal
(Sign Language of the Netherlands)**

Classificerende handconfiguraties in de Nederlandse Gebarentaal

(met een samenvatting in het Nederlands)

PROEFSCHRIFT

ter verkrijging van de graad van Doctor
aan de Universiteit Utrecht
op gezag van de Rector Magnificus, Prof. Dr. W.H. Gispen,
ingevolge het besluit van het College voor Promoties
in het openbaar te verdedigen
op donderdag 12 juni 2003
des middags te 2.30 uur

door

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geboren op 25 augustus 1964, te Venray

Promotor: Prof.Dr. W. Zonneveld

Copromotor: Prof.Dr. A.E. Baker

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Acknowledgements

This book may form the end of a research project, but I hope that for me it is only the beginning of deeper investigations into sign language structure. The ideas presented here took some time to develop and brooded for a while before they took their final shape. When this finally happened, this thesis wrote itself with great speed. During all of the stages of my research, there have been many people and institutions that have helped me and contributed in some way. This is the time to thank them (again)!

Firstly, I am thankful to my promotors, Wim Zonneveld and Anne Baker, who helped me to keep on track with my research when there were so many interesting aspects of (sign) language that tempted me to look further into them. I am particularly grateful to Wim Zonneveld for not pressing me if I insisted on ‘peering’ at my data when, in his opinion, I should have started writing this thesis. I am very grateful for his ‘being there if I wanted to discuss something’. I would also like to thank the members of my promotion committee; Jan Don, Jan Kooij, Roland Pfau, Dan Slobin, and Fred Weerman, for their valuable comments in the dissertation manuscript.

I have benefitted greatly from my collaboration with Ingeborg van Gijn. We discussed research methods, developed and presented our agreement theories, which sharpened our own and each others minds. The best thing about this is that we had good times doing so. Onno Crasborn

and Els van der Kooij formed an anchor place for the exchange of ideas about NGT of great value.

Roland Pfau and Jan Don have been great discussion partners in my struggle with the theoretical part of my analysis. In this respect, I am also indebted to the people of the Morphology Group at UiL OTS, Oele Koornwinder, Peter Ackema, Maaïke Schoorlemmer, Jan Don, Wouter Kusters, Frank Drijkoningen and Mario van de Visser. Tanya Reinhart, Maaïke Schoorlemmer, Martin Everaert and Angeliek van Hout helped me in getting a grip on unaccusativity and unergativity.

My Fo-FoMo colleagues at the Trans have always been supportive and great company, although I completely fell outside of their field of research. Thanks are owed to Esther, Rianneke, Silke, Brigit, Maya, Koen, Judith, Annemarie, Elise, Elma, Ellen, Saskia, and Sandra. I owe them (especially Esther Janse) for providing me with a shelter against the acoustic violence coming from Dom Tower.

I am indebted to Karen Emmorey, Ursula Bellugi and their crew at the Salk Institute for Biological Studies, La Jolla, and to David Perlmutter at UCSD (San Diego), for their willingness to provide me with an inspiring environment for discussing sign linguistics and research methods, and for learning (some) ASL. Those discussions led me to a confirmation of my still developing ideas about the function of meaningful hand configurations. I am also grateful to NWO and UiL OTS for funding my stay in California and, moreover, several of my trips to Frankfurt, Vancouver, La Jolla, Antwerp, Tromsø, Lund, and Washington.

Regarding materials and facilities: many thanks are owed to the developers of the SignPhon database (University of Leyden) and to the people who entered the NGT data. Thanks to the developers of Evident (Viataal) for letting me use the signs in these materials and to the signers who provided them. I owe much to the Meertens Instituut, Amsterdam, and especially to Boudewijn van den Berg for helping me with the design and setting-up of the database. I thank Handicom, at Harderwijk, for their kind permission to use the computer programme SignPS while it was still in an initial stage of development, for the drawing of myriads of signs.

I cannot give enough thanks to the Max Planck Institut für Psycholinguistik in Nijmegen, especially to the Cognition Group, for the

hospitality, the friendly offers of the use of facilities and the stimulating discussions I have enjoyed during the course of my research. I have benefited greatly from the collaboration with David Wilkins in the initial stage of my research, for which I am most grateful. The meetings of the Sign Language Research Group and the Gesture Group were (and still are) most inspiring.

As for Irit Meir, Wendy Sandler, Scott Liddell, Ulrike Zeshan, Len Talmy, Adam Schembri, Karen Emmory, Gladys Tang, Ann Senghas, Lars Wallin, Britta Bergman, Elisabeth Engberg-Pedersen, Ted Supalla, Nini Hoiting, Gary Morgan, and Diane Brentari: we met at weird places (such as conferences), where we took the opportunity of breaks and meals to exchange ideas. Let's have another of these classifier dinners!

Besides theoretical discussions, NGT data and discussions about these data were needed for this research. These were provided by Alinda Höfer, Saskia Holierhoek, Joni Oyserman, Johan Ros, Eric Stoel, Corrie Tijsseling, and Joeri van Zuilen. Thank you all for your willingness to sit and sign silly stories for long hours in a small cabin, while outside the sun was shining. Thank you for coping with all of my (strange) questions. I am also very grateful to my NGT teachers: Wim Emmerik, Helge Koolhof, Johan Ros, Marijke Scheffener, Jan Vermeulen, and Bertha Wesemann. You have tried (and still try!) very hard to satisfy my never-ending curiosity. I am very happy that you were willing to share your beautiful language with me.

Jocelyn Ballantyne has painstakingly corrected the dissertation manuscript. Thank you so much! Any errors remaining are totally my responsibility.

I am grateful to my friends and family members for tolerating my unsocial behavior during the last year or so (to some extent). Also, I thank my fellow triathletes, who helped me to get my mind off sign linguistics now and again.

And finally, I feel a deep wish to present my gratitude to Jeroen for his support and unfailing confidence in me, and especially for giving me all the room I needed during the last two years.

Chapter 1

Introduction

1.1 Introduction

This thesis is a report on an extensive investigation into the use, the function, and the theoretical status of classifiers in Sign Language of the Netherlands (henceforth: NGT).¹ Many natural languages have elements called classifiers. Typically, these elements are morphemes that denote a salient characteristic of an entity, for instance, the characteristic of being human, being an animal, or having a particular shape. Classifiers are used in combination with nouns to refer to entities. The term *classifier* originates from the observation that noun referents indeed appear to be classified: classifiers divide these referents into groups of referents that share certain characteristics. In (1) are some examples of (numeral) classifiers in Japanese.

¹ All sign languages dealt with in this thesis will be indicated by abbreviations. The list of languages, including an explanation of their letter words, are in Appendix I.

- (1)a. Kinjo no ie ga ni-**ken** mizu ni tsukatta
 neighborhood GEN house NOM two-CLASS water DAT soaked

'Two houses in the neighborhood were flooded.'

- b. Boku wa empitsu o ni-**hon** kat-ta.

I TOP pencil ACC two-CLASS buy.PAST.

'I bought two pencils.'

(Matsumoto 1993:673,3b/685,7)

DPs that contain a numeral or a determiner always have a classifier in Japanese. Since Japanese nouns are always mass nouns, they cannot be enumerated. The classifier serves to individuate the noun referent so that it *can* be enumerated. The classifiers *ken* and *hon* in (1) indicate buildings and saliently one-dimensional objects, respectively.

Several different classifier systems have been described for natural languages (Aikhenvald 2000, Grinevald 2000), the system depending on the position in the sentence where the classifier occurs. Numeral classifier systems like that of Japanese, where the classifiers occur with numerals are the best known, but there are also systems of noun classifiers (where the classifiers occur juxtaposed to nouns), verbal classifiers (where the classifiers occur with verbs), relational classifiers, and possessed classifiers (where the classifiers occur in possessive constructions), locative classifiers (where the classifiers occur in locative adpositions), and deictic classifiers (where the classifiers occur with deictics and articles). Each classifier system serves a different function. Aikhenvald (2000:306) differentiates the following functions for the classifier systems:

Table 1 Functions of classifier systems

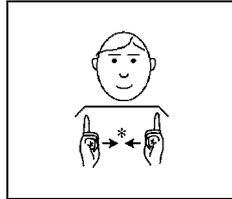
Classifier type	Semantic/Pragmatic Function
Numeral classifier	quantification, enumeration
Noun classifier	determination
Verbal classifier	Object/Subject agreement
Relational classifier	possession
Possessed classifier	possession
Locative classifier	spatial location
Deictic classifier	spatial location, determination

As far as I am aware, all sign languages investigated to date have elements that the researchers involved usually call classifiers.² These elements consist of particular hand configurations in signs, which hand configurations denote characteristics of noun referents. This was first observed for American Sign Language (ASL) by Frishberg (1975), who

² Classifiers do not seem to occur as abundantly in some sign languages as in others. Indo-Pakistani Sign Language, Bali Sign Language and Adamorobe Sign Language are reported as examples of languages in which classifiers are used sparsely (Zeshan 2000, Miller & Branson 1998, Nyst, p.c.). However, as is also indicated by Zeshan (2003), this may be due to the data on which this observation is based. Classifier constructions only marginally occur in spontaneous conversations and monologues, whereas they occur abundantly in narratives (especially those in which entities move through space).

noted that both hands in the ASL verb for ‘to meet’ (2), with the  handshape, act as classifiers for human beings.^{3, 4}

(2)

*‘to meet’*

ASL

Since Frishberg’s first observation, such hand configurations have been studied in many sign languages, and particularly in ASL. Some researchers (for instance: Supalla 1982,1986; Meir 2001) argue that these classifiers are similar to classifiers in spoken languages, especially to verbal classifiers (as in Table 1). However, not all researchers agree with this conclusion. Emmorey (2001), Schembri (2001), and Liddell (2003) and especially Cogill-Koez (2000) have challenged it, and Cogill-Koez doubts whether ‘sign language classifiers’ are linguistic elements at all. Other researchers do not enter into this discussion and analyse the classifier structures in their sign language in their own right, without

³ This sign was reconstructed in reference to its the prose description in Frishberg 1975:715-716.

⁴ As will be explained below, I use pictures to illustrate the examples. Since no pictures are available for many examples, or available pictures are not clear enough, have made pictures of these signs were generated with help of a programme that is especially designed for drawing sign pictures (SignPS). Explanation of the symbols used in these pictures can be found in Appendix II, subsection 1.2. Notice that these sign illustrations should not be seen as a signer who is facing the reader, but as the mirror image of the reader himself signing.

necessarily relating them to classifiers in spoken languages (for instance Shepard-Kegl 1985; Glück & Pfau 1998; Benedicto & Brentari to appear).

In this thesis I will focus on classifier constructions in sign languages, particularly in NGT. There is little preliminary work available on this topic for NGT (Fortgens *et al.*; De Clerck 1995; Nijhof 1996; Zwitserlood 1996). Even though NGT may be historically related to ASL and perhaps to German Sign Language (DGS) and Israeli Sign Language (ISL),⁵ it is a separate language and the analyses proposed for classifier constructions in other sign languages may or may not hold for NGT. In the research reported in this thesis, I intend to clarify the classifier constructions that are found in NGT and to account for them in a generative linguistic framework. They will then be compared to the accounts that have been given previously for these constructions in other sign languages. Finally, I will compare NGT classifiers to (verbal) classifiers in spoken languages. The aims of this thesis are spelled out more specifically in the next section.

A note on the notation of signs in this thesis is called for. Since there is no generally accepted writing system for signs, most examples will be illustrated with pictures of the signs. These will be accompanied with a translation into English, and in many cases also with a glossed translation. Naturally, the original glosses and translations are given in

⁵ Historically NGT was heavily influenced by Old French Sign Language (Crasborn 2001:28), as is ASL (Lane 1984, and references cited there).

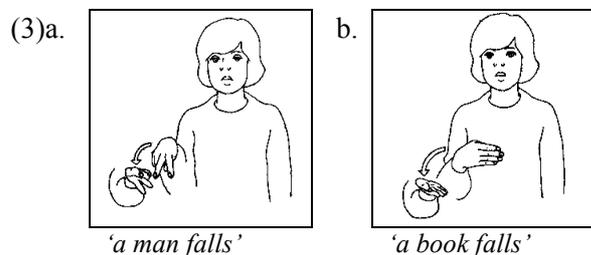
examples cited from the literature.⁶ The glossed translations for the NGT examples differ from these in that they follow the gloss conventions used in the literature on spoken languages. In practice, this means that there are no superscripts and no words printed in boldface, and that the subscripts are merely indexes that show (co-)reference. This is in contrast to gloss conventions in the sign language literature, in which these means are used in order to show as much information as possible about the sign(s) without showing illustrations of the signs (for practical reasons). Explanation of the glossaries and of the symbols used in the sign pictures can be found in Appendix II.

1.2 The objectives of this thesis

Sign language classifiers are usually considered *meaningful hand configurations*. These hand configurations mostly appear on verbs that express the motion or the location of a referent.⁷ Two examples of a verb of motion from NGT are shown in (3).

⁶ I have systematized these slightly, because not all authors use the same conventions.

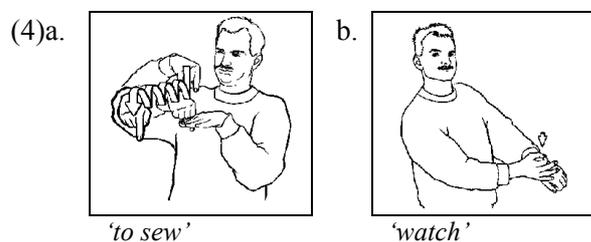
⁷ In this thesis the terms ‘motion’ and ‘movement’ will be frequently used. The term *motion* indicates the motion of a referent, whereas the term *movement* is used to refer to the activity of the hands within a sign. In verbs of motion the *movement* of the hands represents the *motion* of a referent.



NGT
(Schermer *et al.* 1991:
125, Fig. 6.8)⁸

In both signs the verb expresses a *falling* event. The  hand configuration in (3a) indicates a legged entity (for instance: a human being); the  hand configuration in (3b) indicates a flat entity (for instance: a book).

Such meaningful hand configurations do not only occur on verbs of motion and location, but also in other verbs, such as the NGT sign for 'to sew', and in nouns, such as the NGT sign for '(wrist-)watch', as illustrated in (4).



NGT
(Koenen *et al.*
1993:51/73)⁹

In the sign for 'to sew' (4a), the  hand indicates a long and thin referent (the needle of a sewing machine) and the  hand a flat and wide referent (the piece of cloth that is sewn). The  hand configuration in the sign for

⁸ Illustrations reprinted by permission of the publisher; © 1991 by Van Tright Uitgeverij, Twello.

⁹ Illustrations reprinted with the permission of Vi-taal; © 1993 Vi-taal, The Hague.

‘watch’ (4b) indicates a round and flat entity (the circumference of a watch).

The fact that the hand configuration also appears to be meaningful in signs other than verbs of motion and location has been recognized for other sign languages, for instance by Kegl & Schley (1986) for ASL, Brennan (1990) for British Sign Language (BSL) and Johnston & Schembri (1999) for Australian Sign Language (AUSLAN). Thus, in an investigation of classifiers in a sign language such as NGT an analysis of the classifiers that appear on verbs of motion and location is not sufficient; to account for the occurring data, a more extensive analysis is necessary.

This research is mainly concerned with morphosyntactic aspects of NGT, although at certain points it will prove to be necessary to make use of insights from the phonological, semantic and discourse domains. The main aims of this study are fourfold. First, in order to be able to compare NGT classifier constructions to those in other sign languages (and spoken languages), it is crucial to have descriptive work of these constructions. The studies that have been undertaken for classifiers in NGT so far (see references above) are pilot studies, and still leave much unclear. These studies have looked at the meaningful hand configurations that appear on verbs of motion and location, but not at those that appear in other signs. I will therefore provide an extensive inventory of the meaningful hand configurations in NGT. The terminology makes clear that I restrict the topic of research to manual classifiers. *Body classifiers*, a set of classifiers proposed by Supalla (1982,1986); see Figure 10), that consist

of the body (-parts) of a signer, are considered a separate topic that will not be taken up here.

The second goal of this investigation is to give an account of the characteristics and functions of the meaningful hand configurations we observe in NGT (and in other sign languages). I will argue that meaningful hand configurations in NGT have a variety of functions. Many sign linguists consider classifiers to be a mere classificatory device: a way to classify nouns into several subclasses. However, the overview of the functions of classifiers in spoken languages in Table 1 indicates that there is more to classifiers than mere classification: classifiers have a range of *functions*. I will argue that those meaningful hand configurations that appear on NGT verbs of motion and location have an anaphoric function (as indicated by Aikhenvald 2000 for verbal classifiers in spoken languages), namely that of agreement markers. The meaningful hand configurations that in NGT appear elsewhere have a different function: they are sign formation devices that can combine with other morphemes (roots and affixes) to form complex signs, and are not inflectional elements. Thus, meaningful hand configurations in NGT have two different functions. This should also be understood in the following terminological context. The term ‘classifier’ has often led to confusion in the past in sign linguistics, and will continue to do so unless it is made absolutely clear what is meant by the term in a given discussion.¹⁰ Several suggestions for a different term have been made, none of which

¹⁰ This issue has been discussed extensively in a workshop on sign language classifiers, that was held in La Jolla in 2002 (Emmorey 2003)

appears to be unanimously agreed upon. Without the intention of introducing yet another term, I will adopt the term *meaningful hand configuration* as a blanket term in the remainder of this thesis. This term will be used to indicate the hand configurations that refer to a particular characteristic of an entity or referent, independently of the construction in which they appear, that is, on verbs of motion and location, or on signs other than those.¹¹ I will continue using the term *classifier* for the meaningful hand configurations that appear on verbs of motion and location, interchanged with *(classifier) agreement marker* in later chapters. The meaningful hand configurations we find in signs other than these verbs will be called *morphemes* or *stems* where applicable. Of course, when discussing previous accounts of such hand configurations, I will use the term that is used in the corresponding literature.

The third goal is to give a modeled account in a generative linguistic framework for the meaningful hand configurations in NGT and their function, and to compare this account to the accounts given for meaningful hand configurations in other sign languages. The particular framework used will be that of Distributed Morphology (Halle & Marantz 1993; Marantz 1997a,b, 2001). This is a relatively new framework that does not make a lexical distinction between morphology and syntax. The advantage of this framework above others is the fact that it allows an account for the behavior and functions of the meaningful

¹¹ This means that I do not include the hand configurations in number signs or fingerspelled elements in my analysis. Although these also have meaning, they do not indicate characteristics of entities or referents.

hand configurations that occur in verbs of motion and location *and* those appearing in other signs. Furthermore, by using this framework, I can explain why both types of signs are similar at the surface, while their underlying structure differs. In the past, this superficial resemblance has (I will argue) led researchers to the incorrect analysis that these signs are structurally similar.

Although I have access to only comparatively few examples from other sign languages (due to the fact that many publications do not give detailed examples of classifier constructions), it appears from the accounts of classifiers in the sign language literature that sign languages do not differ significantly in their use of classifiers (this is affirmed by Schembri 2001). The denotation of meaningful hand configurations in some languages may be different from that in other languages, but their functions seem to be similar in all sign languages described so far. Therefore, I will assume that my account of meaningful hand configurations in NGT can be applied to other sign languages.

Finally, I will compare meaningful hand configurations in NGT to classifiers in spoken languages. As pointed out in section 1.1, there has been some debate on whether the term *classifier* is appropriate for the sign language phenomena. However, this debate seems to be lopsided with respect to sign language classifiers, since the comparison has often been between classifiers in general (in spoken languages) and the particular *verbal* classifier system of classifiers we find in sign

languages.¹² In section 1.1, referring to a survey by Aikhenvald (2000), I noted that several different classifier systems can be distinguished in spoken languages. Hence a comparison between spoken and sign language classifiers should be between mutual verbal classifier systems. I will provide such comparisons and argue that the debate is affected by misinterpretation of the function of classifiers in languages in general. If this misinterpretation is removed, we will see that sign language classifiers are in fact very similar to verbal classifiers in spoken languages.

My major findings can be summarized as follows. Sign languages have a set of meaningful hand configurations that can be employed in sign formation. Their application has two functions in the grammar. They can be combined with verbs expressing the motion and location of referents on the one hand, and they can be used as elements in the formation of signs other than these verbs, on the other. In the former combination, the hand configuration functions as an affix, marking agreement with the Theme argument of the verb, that is, the argument that is at a particular location or that is in motion (Gruber 1976; Jackendoff 1987). In the formation of signs other than these verbs, such hand configurations have a different function. There is no reason to assume that they are affixes. Rather, since the hand configuration always

¹² Bergman & Wallin (2003) claim that Swedish Sign Language (SSL) has a group of noun classifiers as well. Since, because of insufficient data, I doubt whether the phenomena described in their article actually concern classifiers I will not discuss them.

appears to denote (abstract or concrete) objects, they can be considered roots or stems that combine with other meaningful elements, such as places of articulation and movements, resulting in (simultaneous) compounds.

Although there are many studies into the syntax and phonology of sign languages, studies of the morphology of sign languages, and especially that of NGT, are still relatively scarce. Most of the existing studies focus on a small number of topics, such as compounding, conversion, agreement, and aspectual marking,¹³ but a frequent shortcoming of these contributions lies in the non-theoretical status of the proposed analyses. Clear and clearly theoretical analyses, however, are of the utmost importance for a better understanding of the grammar(s) of sign languages, not only because this reveals us more about their morphology and morphosyntax, but also, as I intend to show, because it is of crucial interest for phonological and syntactic theory as well as well as morphological theory.

A clear understanding of morphological processes facilitates more thorough phonological and syntactic analyses. Van der Kooij (2002) claims that making an inventory of phonological features or phonemes in sign languages is by and large done in the same way as in spoken languages: by comparing minimal pairs of underived words/signs. However, where the minimal pairs are morphologically complex, the

¹³ See for instance Klima & Bellugi (1979), Shepard-Kegl (1985), Liddell & Johnson (1986), Padden & Perlmutter (1987) and Padden (1988) for ASL, Brennan (1990) for BSL, Bos (1990, 1993) for NGT, and Meir (1998, 2001) for ISL.

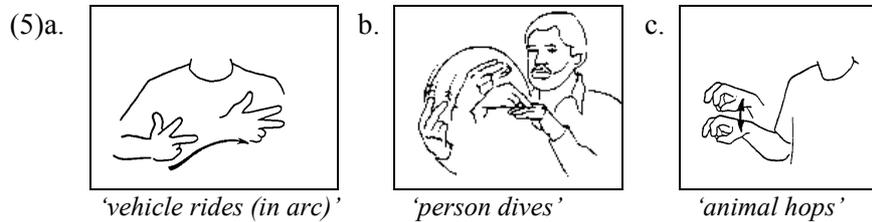
difference in meaning between the signs may be due not to distinctive phonological features, but to elements that carry meaning. Because of this, the results of minimal pair testing may be obscured and an incorrect inventory of the phonological features or phonemes of a language may arise. A good understanding of morphological processes is also important in relation to syntactic theory. For instance, insight into the different functions of meaningful hand configurations will facilitate the understanding of the expression of syntactic relations, particularly agreement.

In the remaining sections of this chapter, I give a brief overview of the literature on sign language classifiers, to provide background for the uninitiated reader (section 1.3). I will also discuss the meaningful hand configurations encountered in signs other than verbs of motion and location in some detail in section 1.4. Furthermore, in section 1.5, I will briefly give an overview of the sign language agreement system which makes use of loci in signing space. This is intended as background information for the discussions of agreement marking in this thesis (particularly in Chapter 6). In section 1.6, I will briefly discuss the influence of the articulatory channel on the form of an utterance, which is relevant for the representations of signs in later chapters. This will include an overview of the phonetic-phonological make-up of signs in general. A brief overview of the methodology used in this research appears in 1.7, and section 1.8 provides an outline of the remaining chapters of this thesis.

1.3 What is a sign language classifier?

For more than two decades, the morphological complexity of classifier predicates in sign languages has intrigued linguists. Although iconicity has been generally recognized in part of the lexicon of sign languages, Frishberg (1975) was the first to mention that some of this iconicity (or ‘motivatedness’) might be due to morphological complexity: the manual articulators in ASL signs sometimes appear to express certain semantic features of noun arguments. She was also the first to describe these elements as classifiers.

The first more detailed overviews of the ASL classifier system were given by Supalla (1980, 1982, 1986) and McDonald (1982). Supalla proposes that manual and non-manual articulators (hand configuration or classifier, and the body of the signer, respectively) can be used to refer to noun referents that are involved in a motion event or that are at a particular location in verbs that express this motion or location. Thus, following Frishberg, he claims that ASL verbs that express a motion or a location of an entity are morphologically complex. The verb consists of a motion root, which is combined with one or more classifiers, expressed by the articulators: either the hands or the upper body of the signer. Supalla claims that the classifiers are variable and bear a systematic relation to the referent that is involved in the event expressed by the verb. The root and the classifier(s) together form the stem of the verb (1982:23). Some examples from ASL are illustrated in (5) below.



ASL (Supalla 1982:31 Fig. 12, 1990:147 Fig 6.25; 1982:49 Fig. 18)¹⁴

In (5a) the movement of the sign expresses the arc motion of a referent. The referent is represented by a particular articulator (in this case a hand configuration) which indicates a member of the class of vehicles. The sign therefore expresses an arc motion of a vehicle. The specific vehicle involved is made clear in the context, preferably before the classifier is used. The sign in (5b) also shows an arc movement, again indicating the arc motion of an entity. The moving articulator indicates a two-legged entity. The sign is interpreted as the arc motion of a person: a person is diving. In the third example, the movement is an up and down straight motion, that can be interpreted as 'hopping' or 'jumping'. In ASL the  classifier indicates small animals, so the sign means '(small) animal hops'. According to Supalla the classifiers in ASL function just as classifiers in spoken languages do: as morphemes marking salient characteristics of an entity (1982:32-33). The characteristics that are marked are particular shapes or abstract semantic categories. As in

¹⁴ The illustrations from Supalla (1982) *Structure and Acquisition of Verbs of Motion and Location in American Sign Language* in this thesis are reprinted by permission of T. Supalla. Those from Supalla (1990) that appear in this thesis are reproduced by permission of the publisher, © 1990 by the University of Chicago Press, Chicago, IL.

spoken languages with a classifier system, he argues, every noun is associated with a set of classifiers that can be used on a predicate. Within a discourse a signer can switch from one classifier to another in order to focus on specific characteristics of the noun. The selection of a classifier is partly determined by the semantic role of the noun in the event (for instance: the Agent or Theme role); for every semantic role, a noun has a different subset of classifiers.

Supalla's descriptions focus especially on the denotation of the various articulators, and he argues for a division of ASL classifiers into four different types and several subtypes. Some later researchers provide arguments for a reduction of classifier types into a subset of Supalla's types, while others extend the set. The proposed types of classifiers range from two to nine. To illustrate classifier constructions, I will show the most extended set of classifiers (from Benedicto & Brentari 2000), (including Supalla's *static Size and Shape Specifier*), since most other proposals use two or more of the types of this set.¹⁵ (For the sake of completeness, Supalla's Body Classifier is mentioned, although most researchers doubt its status as a classifier.) This illustration serves at the same time to facilitate reference when, in subsequent chapters, I refer to work by other researchers.

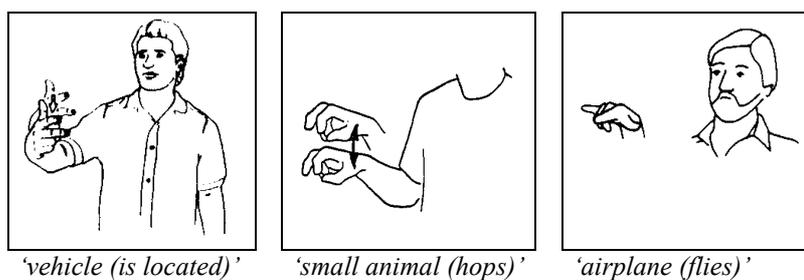
A note must be made on the interpretation of the proposed types: in many reports, information on the form of signs (drawn pictures or printed photographs) is scant or completely absent. I will therefore use

¹⁵ For overviews and comparisons of these types, see Zwitserlood (1996) and Schembri (2001).

illustrations from a variety of sources, but sometimes provide my own interpretation of the type of classifier they illustrate. It is not my intention to strictly link the source to the particular classifier type.

- I. ***Semantic classifiers***: hand configurations that indicate a particular semantic class, for instance the classes of small animals, vehicles and airplanes in ASL:

Figure 1



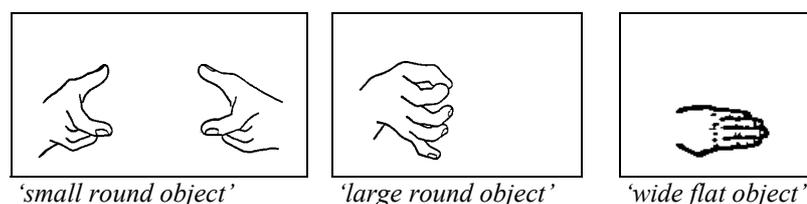
ASL (Valli & Lucas 1995:75,27; Supalla 1982:49,17; Supalla 1986:208,6¹⁶)¹⁷

¹⁶ This figure is slightly adapted in that only one variant of the classifier for airplanes is shown, where the original picture shows five variants.

¹⁷ The illustrations from Supalla (1986) in this thesis are reprinted by permission of the publisher; © 1986 by John Benjamins Publishing Company, Amsterdam.

- II. ***Size and Shape Specifiers (static)***: hand configurations that indicate classes of object with particular shapes (for instance long and thin objects, round objects, flat objects)

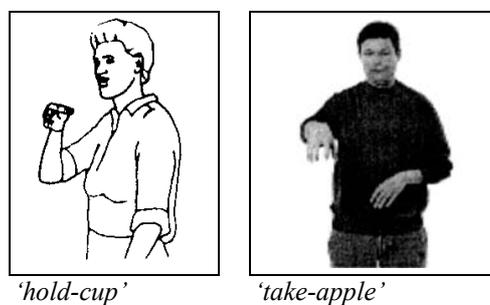
Figure 2



ASL (Supalla 1982:27,7)

- III. ***Instrument classifiers I***: hand configurations that represent hands holding objects or instruments:

Figure 3



ASL
 (Valli & Lucas
 1995:79,27)
 SSL
 (Wallin 1996:;129,7.53)¹⁸

¹⁸ Illustrations from Wallin (1996) *Polysynthetic signs in Swedish Sign Language* in this thesis are reprinted with permission from Wallin, L. (1996); © 1996, L. Wallin.

- IV. *Instrument classifiers II*: hands that represent the instruments themselves:

Figure 4

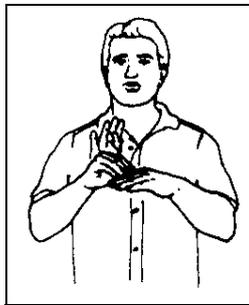


'drill'

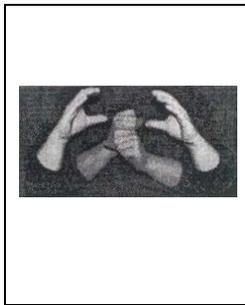
SSL
(Wallin 1996:114,7.26)

- V. *Extent classifiers*: indicating the extent of an object; amounts and volumes:

Figure 5



'deflating tire'



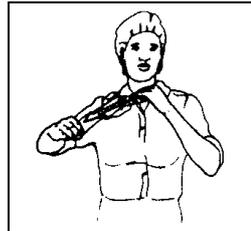
'expand-3D-object'

ASL
(Valli & Lucas
1995:79,27;
Brentari & Benedicto
1999:72, Fig 1)¹⁹

¹⁹ The illustration from Brentari & Benedicto (1990) is reproduced by permission of the authors; © 1999 D. Brentari & E. Benedicto.

VI. **Surface classifiers**: representing the extent or expanse of a surface:

Figure 6

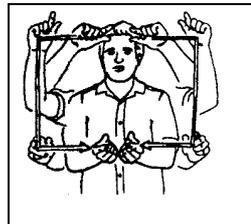


'(a) desert'

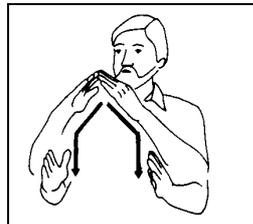
ASL
(Valli & Lucas 1995:79,25)

VII. **Perimeter classifiers**: referring to the external shape of an object:

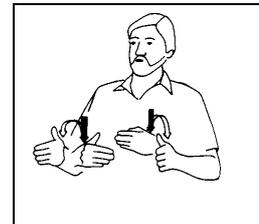
Figure 7



'rectangular object'



'house'

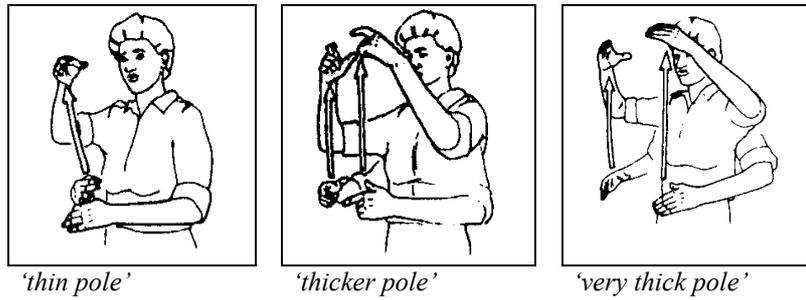


'box' or 'room'

ASL (Valli & Lucas 1995:79,25; Supalla 1986:207,4,5)

VIII. **Depth and Width classifiers:** referring to the depth or width of an object:

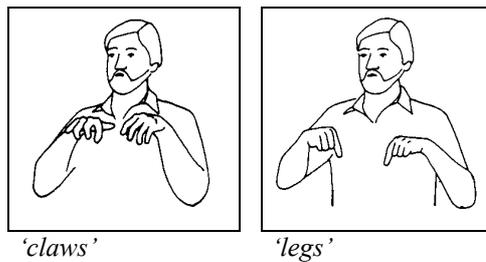
Figure 8



ASL (Valli & Lucas 1995:79,25)

IX. **Body Part classifiers:** these refer to a part of the human body or the body of an animal:

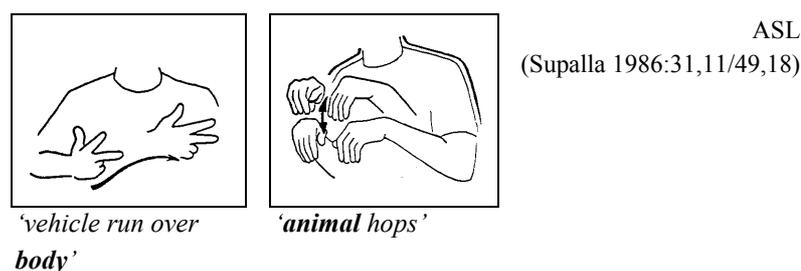
Figure 9



ASL
(Supalla 1986:209-10,9a,8b)

- X. **Body classifiers**: the body itself represents an entity (a person or animal).

Figure 10



Since Supalla's work on ASL, quite a number of sign linguists have described the classifier system in other sign languages.²⁰ Much work has been done on compiling the classifier inventory in particular sign languages and the division of classifiers into several types. For various reasons, such as different viewpoints and lack of clear descriptions or illustrations of the various types in the literature, the boundaries between the classifier types remain sometimes unclear to the reader. In this thesis, I will adopt the analyses of classifier types used by Shepard-Kegl (1985)

²⁰ For ASL, see among others Shepard-Kegl (1985), Schick (1990a,b), Liddell & Johnson (1987), Liddell (2003); for AUSLAN, this has been done by Schembri (2001, 2003), for BSL: Brennan (1990), Sutton-Spence & Woll (1999); DGS: Glück & Pfau (1997, 1998), DSL: Engberg-Pedersen (1993), FSL: Takkinen (1996), HKSL: Tang (2003); ISL: Meir (2001), ISN: Senghas (1996), Kegl et al. (1999); LIS: Corazza (1990); LSC: Fourestier (1999, 2000); NGT: Fortgens *et al.* (1984), De Clerck (1995), Zwitserlood (1996), Nijhof (1996); NZSL: Collins-Ahlgren (1990), SASL: Aarons & Morgan (1998; 2003), TID: Özyurek (2003); SSL: Wallin (1996), Bergman & Wallin (2003), TSL: Smith (1989), Tai *et al.* (2003).

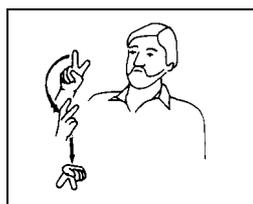
and McDonald (1982), who distinguish only two groups of handshapes in the set of meaningful hand configurations: one group that *directly* refers to an entity, and one group that *indirectly* refers to an entity. The hand configurations in the first group stand for the referent and those in the second group do not stand for a referent, but denote it by indicating its manipulation. I will call these two types *entity classifiers* and *handling classifiers*, respectively, using the terminology of Aronoff *et al.* (). As we will see in Chapter 4 (section 4.4.1) there is morphosyntactic evidence for a necessary distinction between these two (in contrast to other classifier types): entity classifiers occur only on intransitive verbs of motion and location, whereas handling classifiers occur only on transitive ones. As I will show in Chapter 5, I exclude some of the types mentioned here as classifiers (such as those forms in which the hands and the movement outline the shape of an entity). Furthermore, I do not discuss ‘body classifiers’, but focus on classifiers that consist of hand configurations.

1.4 ‘Frozen’ forms

As discussed in section 1.2, it has been observed that sign languages have signs in which the hand configuration appears to have a similar denotation as when used in a predicate expressing a motion or a location of a referent. Following Van der Kooij (2002) and others I will call such signs *motivated signs*. It is often claimed that these signs are ‘frozen’ or lexicalized (for instance Boyes-Braem 1981; Newport 1982; Supalla 1982; Johnston & Schembri 1999; Taub 2001; Aronoff *et al.* 2003). These researchers argue that such signs are formed by productive rules in the language, but can behave unexpectedly in view of these rules. For

instance, the meaning, morphosyntactic characteristics, or productivity may be different from expected. Because of this unexpected behavior, many sign language researchers consider these signs as ‘frozen’ or lexicalized. It is even claimed by some researchers that these signs have become monomorphemic (Supalla 1980, 1982, 1986; Newport 1982). According to Supalla (1986), there is a continuum between productive signs (‘novel forms’) and signs that no longer have internal morphological complexity (‘frozen forms’). Illustrative of the latter is the example in (6).

(6)

*‘to fall down’*

ASL
(Supalla 1986:206, Fig. 2)

The sign in (6) means ‘to fall down’ and the hand configuration is probably used to reflect a legged entity. However, this sign is now used for all entities, such as books, cars and pens, not just legged entities. Thus, the hand configuration no longer functions as a true classifier.

In NGT we find similar signs in which the hand configuration has a recognizable meaning that is similar to that of classifiers on verbs of motion and location. However, as we will see in Chapters 7 and 8, accounts in which motivated signs are analyzed as frozen or lexicalized signs do not have much explanatory power. There are many signs other than verbs of motion, location, and existence in which the hand configuration is meaningful, and among these are also new signs.

Lexicalization analyses explain adequately neither the large numbers of motivated signs in NGT or any other sign language, nor the fact that these forms appear to be (in fact) productive, nor their morphosyntactic characteristics, nor their semantics. I question the assumption that these signs are lexicalized complex signs and especially the assumption that such signs are monomorphemic. Instead, I follow accounts in which motivated signs are considered as complex signs that are productively formed, such as those by Brennan (1990), Kegl & Schley (1986), Meir (2001), and Fernald & Napoli (2000). I argue that NGT (and, probably, other sign languages as well) have a productive sign formation process in which hand configuration plays a major role as a meaningful component.

1.5 Agreement marking in signing space

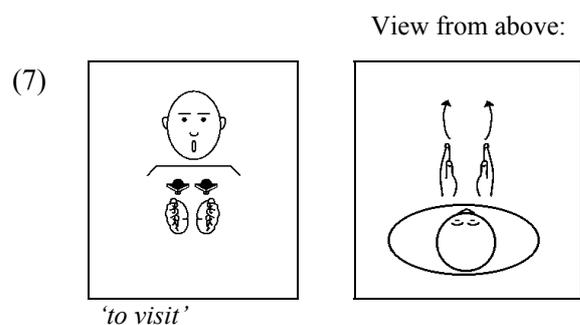
The notion of *agreement* will recur throughout this thesis. All sign languages investigated to date appear to have a system of agreement marking which involves the use of locations in signing space. As a background, I will briefly explain the system in this section.²¹

In sign languages referents can be connected to particular positions in (signing) space, either because these referents are present in the deictic context, or by linguistic mechanisms that connect them with locations in signing space. One such mechanism consists of making the sign for the referent and subsequently pointing to a particular location.²² From that

²¹ For detailed accounts see Padden (1988), Bos (1990, 1993), and Meir (1998).

²² Other mechanisms consist of (i) making the sign for a referent and subsequently using a verb of location at a particular location in signing space, (ii) making the noun sign

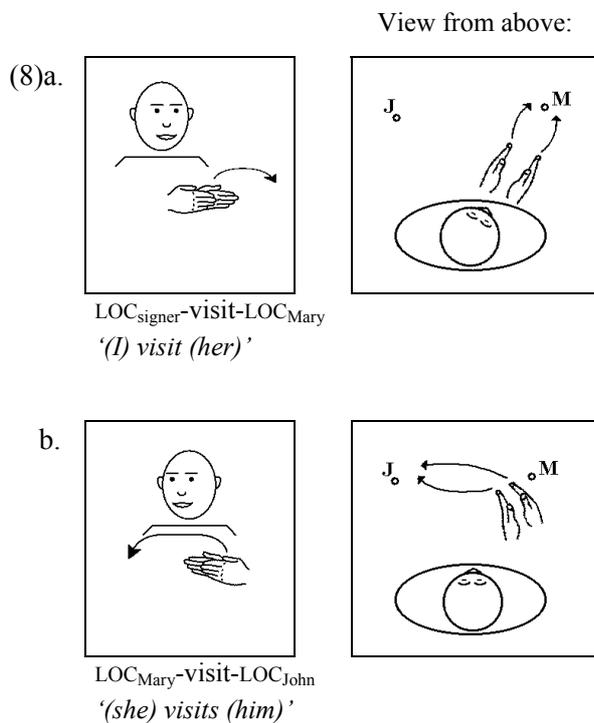
moment on, the referent is connected to that location, until a new discourse, with new referents, is set up. The locations can be used in the agreement system of sign languages: the place(s) of articulation of a subset of verbs can be varied according to the location that is connected to the referent or referents that are involved in the event. For instance, the citation form of the NGT sign for ‘to visit’ has two places of articulation: the first is near the signer, the second some distance away from the signer (see (7)).²³



for a referent and directing one’s eye-gaze to a particular location, and (iii) articulating the noun sign for a referent at a particular location in signing space.

²³ As indicated in section 1.1, I use pictures to illustrate the examples. Since for many examples no pictures are available, or the available pictures were not clear enough, I have made pictures of these signs with help of a programme that is especially designed for drawing sign pictures (Sign PS). Explanation of the symbols used in these pictures can be found in Appendix II, subsection 1.2. Notice that the sign illustrations I have drawn in this thesis should not be seen as a signer that is opposite of the reader, but as a representation of the reader himself signing, or a mirror view of oneself signing.

An inflected form of the verb uses the loci of the referents involved. The begin locus of the predicate is at or near the locus of the visiting referent, its end locus at or near the locus of the visited referent. This is illustrated in (8a,b).



In the context, apart from the signer, John and Mary have been assigned to locations in signing space, indicated by dots (*J* and *M* respectively). If the signer indicates that he is visiting Mary, the predicate will start near the signer's location and will use the location of Mary as the endpoint. Similarly, in signing that Mary visits John the signer uses the location of Mary as the begin location and that of John as end location.

There is a large amount of systematicity involved in this marking system, but it is not fully systematic: not all verbs can be inflected for one or more of their arguments. I will summarize the most important non-systematic aspects of agreement here (for more detailed discussions, see Meir 2002; Rathmann & Mathur 2002, and Van Gijn & Zwitserlood to appear). First, all sign languages appear to have a large group of verbs that do not show agreement at all. In the sign language literature, these are called *plain verbs* (Padden 1988) or *non-agreement verbs* (Bos 1990, 1993). Second, some agreement verbs show agreement with only a subset of their arguments. For instance, they show agreement with the object, but not with the subject. The lack of subject agreement marking is often related to the phonological specifications of verbs: body anchored verbs (that is, verbs that are phonologically specified for a place of articulation near or on the body) do not show subject agreement. Third, agreement does not appear to be obligatory: the verbs that *can* show agreement are *not always* inflected for their arguments. The most important characteristic in the system is, however, that there is (or can be) a systematic marking of (some of) the arguments of a predicate using the locations that are connected to their referents in the expression of the predicate.²⁴

A current issue in the study of the agreement system in sign languages is the feature system. In linguistic theory agreement markers are

²⁴ Some sign languages have one or more auxiliaries that show agreement with the arguments of a transitive predicate. DGS (Rathmann 2000), NGT (Bos 1994; Hoiting & Slobin 2001), and TSL (Smith 1989) are such languages.

considered sets of ϕ -features: features for person, number, gender and/or case. Much of the agreement research in sign languages assumes that the agreement system in sign languages is also based on these ϕ -features (Padden 1988; Glück & Pfau 1999; Neidle *et al.* 2000, among others). The locations in signing space are analysed as sets of person features, and plural number features could be attached to a predicate to include plural referents. However, other investigators question these features. There does not appear to be clear evidence either for the presence of person features, or that of specific number features. Various researchers (for instance Lillo-Martin & Klima 1990; Meir 2002, and Van Gijn & Zwitserlood to appear) propose that locations in signing space must be viewed as *referential loci* (R-loci) that are coindexed with particular referents. Agreement then appears to be a systematic marking of one or more of the referential loci on the predicate, and no person or number features are involved. In contrast to person and number features, locus features do not involve classification, but a locus consists of a location in signing space that is uniquely assigned to the referent at a particular occasion (Meir 2002). I agree with this and assume that the ϕ -features in the agreement system presented here concern features for locus.

1.6 The interface between grammar and phonetics

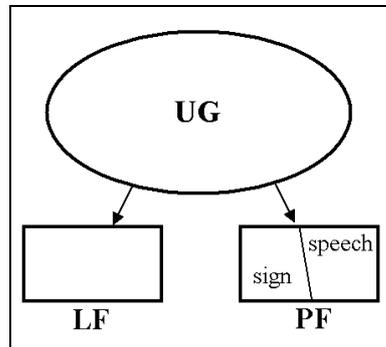
Until recently, sign languages were not considered of much interest for linguistic research, since they did not seem to have the characteristics of fully fledged languages. There are various reasons for this assumption. The main one is probably the idea that for a communication system to be a true language, the relationship between meaning and form must be

arbitrary (going back to De Saussure 1916). In sign languages, the number of iconic forms is rather large in comparison to most known spoken languages. Moreover, there have been many misconceptions about sign languages, such as there being one universal sign language, or that sign languages were invented and/or based on spoken languages. Beginning in the early sixties, linguistic research slowly started to fill in the gaps that the omission of sign languages has left in our understanding of the structure of language. Still, for a long time, linguists have mainly focused on sign language structures that are similar to those in spoken languages, in order to show that sign languages are true languages.

Only recently have the differences between languages of different modalities become of interest. The most important of these differences is the articulatory channel. Roughly speaking, the articulatory channel of sign languages is such that phonemes (handshapes, movements, places of articulation) are mostly articulated sequentially. The same is true for morphemes, since they consist of one or more phonemes. However, this is not necessarily the same in sign languages. The two manual articulators, signing space, and non-manual components make it possible for phonemes, as well as for morphemes, to be articulated simultaneously. This does not imply that all units are uttered simultaneously; as argued by, among others, Liddell (1984), Sandler (1989), and Van der Hulst (1993), signs comprise both simultaneous and sequential material. Signs consist of (features for) hand shape, orientation, place of articulation, movement, and non-manual components (see, among others, Sandler 1989, and, for NGT, Crasborn 2001 and Van der Kooij 2002 for phonological representations of signs).

Linguistic theory (for instance the Minimalist Program, Chomsky 1995) proposes to account for linguistic structure by making only the barest assumptions about the nature of UG. The structure of language is further determined for a large part by the interface conditions that make the linguistic structure available for semantic interpretation (the interface with the level of Logical Form) and for phonetic interpretation (the interface to the phonetic articulation). This conception of UG and its relation to the LF and PF components suggests that there is a specific interface with the manual articulatory component, which states its own interface conditions. Such a state of affairs would correspond to Figure 11.

Figure 11 Model of the semantic and phonetic interfaces from UG



I suggest that the PF interface for sign languages conditions signs to surface with a minimal, but also a maximal number of components. In surface form, signs therefore have at least one handshape with one orientation, one place of articulation and one movement (this includes a change in place of articulation, in handshape or in orientation or a combination of two of these). Maximally a sign surfaces with two

handshapes connected with an orientation and a movement (an non-manual components). The interface appears to bar signs with for instance three different handshapes or signs that have a change in place of articulation, orientation *and* handshape.²⁵

1.7 Methodology

The data that are used in this research come from various sources. I will mention these briefly, and go into more detail about the elicitation of NGT data, the corpus used, transcription, and the analyses in later chapters. The data used in this research all come from native NGT signers, ranging in age from 18 to 55. First, I elicited verbs of motion and location from a subgroup of these consultants by asking them to sign what they observed in a series of line drawings, comics, and video clips. In this elicitation material, various (concrete and abstract) entities were depicted as either static or moving. Second, I investigated isolated signs from various sources. The main sources were the NGT-Dutch and Dutch-NGT dictionaries and some of the teaching materials that were available at the time this research took place. A third source of information and data was discussions with native signers on the structures and possibilities of signs with meaningful hand configurations.

²⁵ Previous accounts (for instance Sandler 1989) have connected the particular patterns we see in the surface form of signs to a phonological template. However, I am not convinced that these patterns are triggered by phonology, because (as far as I am aware) they occur in all sign languages investigated to date. Therefore, I assume that they are conditioned by the articulatory possibilities of the manual channel (including ease of articulation).

The signed texts (source one) were transcribed in detail. These and the isolated signs from the dictionaries (source two) were entered into a database that was especially devised for this research. Extensive discussions of the analyses of the signed texts and isolated signs will be given in the relevant chapters.

1.8 Organization of the book

This thesis is organized as follows. Chapters 2 through 6 are devoted to the subject of meaningful hand configurations on verbs expressing the motion and location of referents. In Chapter 2, I will give a general overview of the literature on classifiers in sign language, focusing especially on the theoretical analyses of classifiers that I will use in or discuss with respect to my analyses. Chapter 3 describes the various experiments I have executed in order to elicit verbs of motion and location in NGT and the transcription system and analytic procedure I have used. Chapter 4 focuses on the set of classifiers in NGT that occur on these verbs and on their meanings. In Chapter 5, I will distinguish between different groups of verbs that have all been claimed to be classifier predicates, but appear to have different characteristics. I will argue that only those predicates that express the path motion, the location and the existence of an entity are to be considered real classifier predicates (the system of which can be compared to verbal classifier systems in spoken languages). I will discuss the morphological and morphosyntactic structure of these predicates in Chapter 6, with special focus on the function of the classifiers.

In Chapters 7 and 8, I focus on meaningful hand configurations that occur in signs other than verbs of motion and location (motivated signs). Chapter 7 contains an overview of the literature on the processes of sign formation in which meaningful hand configurations play a role. It also contains an overview of the corpora I have used to investigate these signs, the method used to analyse them, and, finally, an overview of the meaningful hand configurations that I observed in these signs. I will propose an analysis of these signs as simultaneous compounds in Chapter 8, where I will unify my analysis of the structure of verbs of motion and location with that of motivated signs, in order to explain the different functions of the hand configurations with which they appear.

Finally, Chapter 9 contains a summary, and my conclusions. It also sketches some of the theoretical and practical implications of this research and gives recommendations for future research in the area which this investigation covers.

Chapter 2

Previous analyses of classifier predicates

2.1 Introduction

In order to provide a background to my research of classifiers and the predicates in which they occur in NGT, I address in this chapter one of the first works, and by all accounts the most influential one, on classifier predicates in sign language, namely that by Supalla (1982, 1986) on ASL. Supalla claims that classifier predicates are morphologically complex and suggests a morphological structure in which he accounts for the morphemes (among which classifiers) in these predicates and (partially) for their hierarchical structure. Although analyses of classifier predicates such as Supalla's have been called into question by some researchers (such as Engberg-Pedersen; Cogill-Koez 2000; Liddell 2003), many researchers have accepted at least parts of Supalla's account. I will give a brief overview of some of these subsequent analyses.

My own account will eventually owe a debt to Supalla's seminal work, too, although I will suggest various adaptations which considerably reduce the complexity of classifier predicates in Supalla's analysis.

Furthermore, I will develop a suggestion made in the literature that classifiers in some of these predicates function as agreement markers. The accounts discussed therefore not only provide background to the reader, but also serve as the basis for my own morphosyntactic analysis.

This chapter is organized as follows. In section 2.2, I summarize Supalla's account. Section 2.3 gives an overview of some of the analyses of the roots and classifiers in classifier predicates that have been given subsequently in the literature, and a summary is provided in section 2.4.

2.2 A morphological analysis of classifier predicates

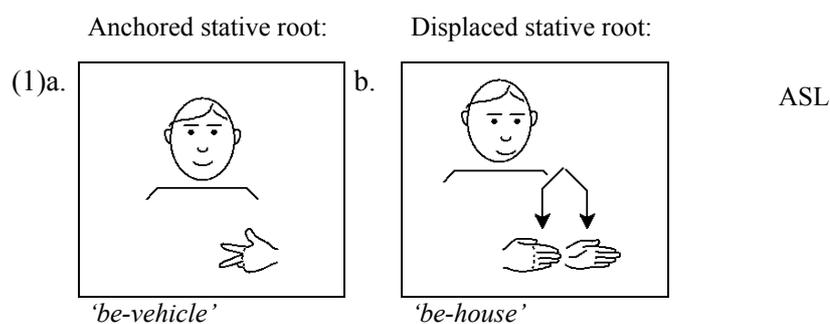
Supalla (1982, 1986) basically distinguishes roots and a variety of affixes in classifier predicates in ASL. I will first address the roots that he suggests (section 2.2.1), followed by a discussion of the affixes in section 2.2.2. One of these affixes, namely the classifier affix, will be discussed in detail in section 2.2.3. Affixes that attach to classifiers are treated in section 2.2.4. This section will be concluded with a discussion and summary in subsection 2.2.5.

2.2.1 Roots

Supalla regards the *movement* of the hands in a classifier predicate as the root, since it denotes an event, and, furthermore, cannot be changed without a change in the meaning of the predicate. Supalla distinguishes three types of basic roots: i) stative roots, ii) contact roots, and iii) active

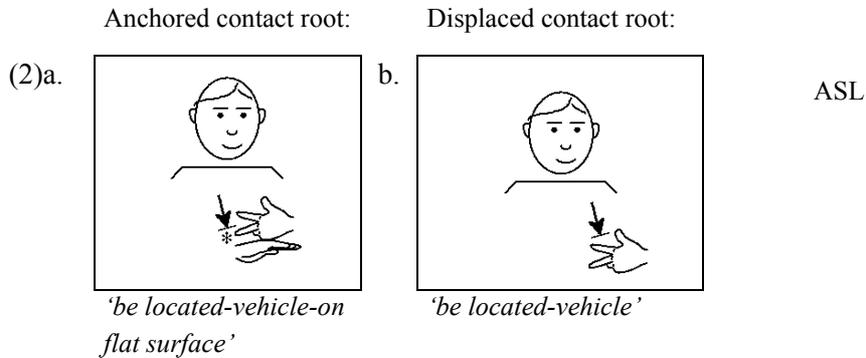
roots. Each of these has two forms: anchored and displaced. These are exemplified and illustrated below.¹

- I) Stative roots indicate a static position in space. The *anchored* form does not show any motion or activity, and indicates that an entity is stationary at a particular position in signing space. The *displaced* form does have a movement, which does *not* indicate the motion of an entity, but the outline (that is, the shape and/or size) of an entity.

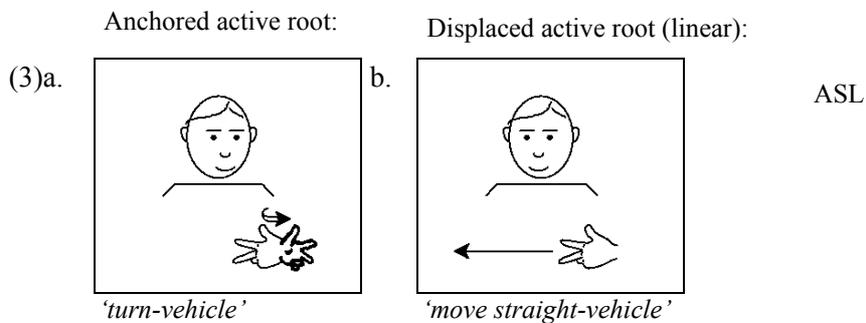


- II) Contact roots have a short, usually downward movement towards a specific position in signing space. The *anchored* form shows contact (with the other hand or with a part of the body), while the *displaced* form shows only a stamping (downwards) motion.

¹ Supalla (1982, 1986) does not himself provide illustrations; the signs in these examples are my reconstructions of the descriptions in his text.

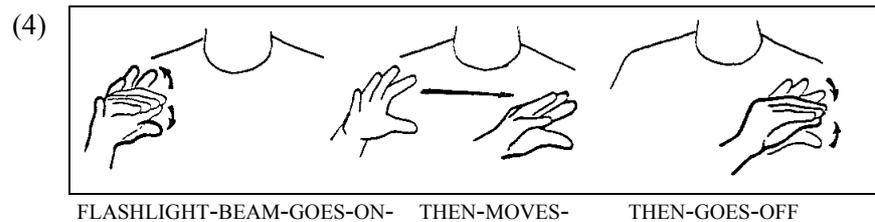


III) Active roots express an activity of an entity. The *anchored* form shows a change in handshape or in the orientation of the hand, thus indicating a change in the form or the orientation of the entity. The *displaced* form shows a change in location and indicates the motion of an entity through space. There are three types of such roots: linear, arc and circular.



According to Supalla it is possible to combine several roots sequentially within a verb. These roots can be - simultaneously - combined with various types of affixes (to be discussed below). An example of a classifier predicate that is sequentially complex is given in (4), where

three active roots are combined. The first and third root are anchored and involve a handshape change, while the second root is displaced.



ASL (Supalla 1982:18, Fig. 5a)

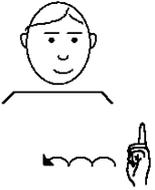
2.2.2 Root affixes

The roots can be combined with numerous affixes. The system is complex, and I do not intend to give a full overview. Instead, I present the main points of Supalla's account. One type of affix are *movement affixes*, that have the same movement features as the roots. They can indicate the manner of the motion, its size, the directionality and (if any) repetitions of the movement. A second type of affix is comprised of *classifiers* that are obligatorily affixed to the verb root. A root can be affixed with a classifier marking the *central object* and, optionally, with an additional classifier marking a *secondary object*.² A central object is a single object that is involved in the event expressed by the verb, and a secondary object is the object with which the central object interacts (in semantic terms, the central object is the *Figure*, the secondary object the *Ground*). The classifiers occurring on these verbs will be described in more detail in section 2.2.3.

² The term *object* is used in the meaning of *entity*, not as a grammatical term.

An example of a classifier predicate root with manner affixes and a classifier affix is given in Figure 1, in which a linear root (represented by a straight arrow) is combined with movement affixes indicating manner (arc), size (small), and repetition, and a classifier affix (indicating a human being).

Figure 1 Simultaneous combination of root and (some) affixes

root		
movement affixes:	manner	
	size	small
	repetition	repetition
classifier affix:	human	
verb stem:		 <p>'person walk by' (ASL)</p>

Yet another type of affix is formed by a variety of *placement affixes*. These specify the reference point for each classifier in relation to a reference frame and in relation to other classifiers. Essentially, placement affixes mark agreement, like classifiers. In contrast to classifiers, they do not agree with the noun that indicates the moving or located entity, but

with the location of a Ground.³ Placement affixes that are attached to stative roots relate the *position* of the classifier to the Ground; placement affixes attached to active roots relate the *path* of the classifier to the Ground. To each placement morpheme an independent locative morpheme is attached that specifies the locative relation of the classifier with respect to the Ground (for example ‘on’, ‘below’, ‘beside’, ‘at-bottom’, ‘inside’). Furthermore, location morphemes may be affixed with orientation morphemes that indicate the orientation of the classifier with respect to the Ground (for instance ‘vertical’, ‘diagonal’). Each locative morpheme is also affixed with a marker for the distance between the classifier and the Ground (‘unmarked’, ‘minimum’, ‘maximum’).

2.2.3 Classifiers

Recall from section 1.3 that the hand configuration in a subset of signs is meaningful and can represent noun referents in Supalla’s (1982, 1986) analysis.⁴ He claims that these hand configurations are similar in meaning and morphological characteristics to classifiers in spoken languages. With regard to their function, Supalla suggests that they function as *noun agreement markers*. Subsequent suggestions of classifiers as agreement markers or proforms are also found in work by Kegl & Wilbur (1976), Edmondson (1990), Bos (1990), Sutton-Spence & Woll (1999), and Tai

³ The Ground can, but need not, be represented by a classifier itself.

⁴ Also recall Supalla’s claim in section 1.3 that not only hand configurations, but also the body can be used as a classifier, representing entities. As indicated there, I will not focus on ‘body classifiers’ in this thesis.

et al. (2003). This suggestion is worked out in some detail by Glück & Pfau (1998). Supalla distinguishes four main types of manual classifiers, each with their own semantics and characteristics. The classifier types are:

- 1) Size and Shape Specifiers (SASSes);
- 2) Semantic classifiers;
- 3) Body Part classifiers;
- 4) Instrumental classifiers.

Some of these are subdivided into two types. All *SASSes* indicate entities by their shape and/or size, and within this type of classifier Supalla (1986) distinguishes *static SASSes* (consisting of a hand configuration only) and *tracing SASSes* (consisting of a hand configuration and movement of the hand(s) that traces the size and shape of the entity). All *SASSes* are morphologically complex. They are composed of smaller units, such as the fingers, the hand and even the lower arm, and morphemes that indicate particular shapes such as roundness or angularity. Supalla argues that each of the fingers can be meaningful, because the  hand indicates one thin and straight entity, and addition of one or more fingers in a spread fashion adds the same number of thin and straight entities; addition of one or more fingers in a non-spread fashion (such as the  and  hands) no longer indicates a thin and straight entity, but a narrow and straight, or wide and straight, entity. The middle, ring

and pinky finger cannot occur by themselves; they are bound morphemes, whereas the  hand is a basic classifier and can occur by itself.⁵

Tracing SASSes have an especially complex form, because they do not just consist of handpart morphemes, but also of a movement of the hand(s). Some examples of static SASSes from ASL are shown in Figure 2. The hand configurations in the right column have the same complexity in finger arrangement as the ones in the left column, but a morpheme indicating ‘roundness’ is added to the latter hand configurations.

Figure 2 Examples of static SASSes in ASL

	THIN & STRAIGHT		FLAT & ROUND (circle)
	NARROW & STRAIGHT		SHALLOW & ROUND ^a (shallow cylindrical)
	WIDE & STRAIGHT		DEEP & ROUND (cylindrical)

(after Supalla 1982:38,15)

^a ‘shallow & round’ is expressed by extension degree of bending of the index and middle finger (and thumb), in contrast to the hand configuration expressing ‘flat & round’, which has only an extended and bent the index finger (and thumb).

⁵ I assume that Supalla implies a hierarchy in the morphological complexity of the classifier predicate, because all classifiers, including ‘basic classifiers’ (such as  and ) are affixes and therefore, bound morphemes. Supalla’s ‘bound classifiers’ probably indicate a certain hierarchy in affixation: the middle finger can only be affixed to the index finger, the ring finger only to the middle finger and the pinky finger only to the ring finger.

In contrast to SASSes, Supalla does not analyse *semantic classifiers* as morphologically complex, admitting that they may have been complex historically and derived from SASSes. Some examples are given in Figure 3.

Figure 3 Examples of Semantic SASSes in ASL

	HUMAN		AIRPLANE
	SMALL ANIMAL		TREE
	VEHICLE		

(after Supalla 1982:41, Fig. 16)

Body Part Classifiers, as the name indicates, represent body parts. These can be represented in several ways. First, static SASSes that indicate body parts are sometimes, but not necessarily, articulated near the real-world position of these body parts (for instance, extended fingers placed near the mouth indicating teeth, or flat horizontal hands representing feet). Second, Body Part Classifiers can be indicated by Tracing SASSes that outline the shape of a body part near the real world position of that particular body part (for instance the tracing of a vertical circle in front of the head, indicating the face). Third, body parts can represent themselves (such as eyes, the nose, the shoulder). Some Body Part Classifiers are

morphologically complex because they consist of SASSes (which are themselves complex), and are, moreover, often combined with a location morpheme on the body.

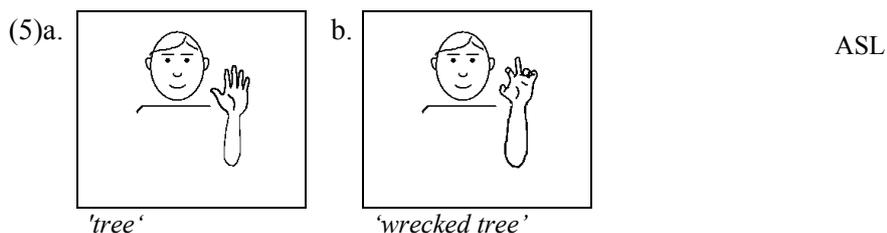
Supalla (1986) divides *Instrument Classifiers* into two groups: i) a group of hand configurations that indicate that the represented entity is held in the hand and manipulated; and ii) a group of hand configurations indicating that a tool is held with which the represented entity is manipulated. Supalla mentions that these are morphologically complex as well, but does not indicate their morphological structure or the morphemes involved.

2.2.4 Classifier affixes

According to Supalla, all classifiers combine with affixes. First, every classifier has at least one *orientation affix* that represents the orientation of the represented entity with respect to the external world, for instance, whether the entity is vertical or horizontal. Furthermore, classifiers that appear on an active root are affixed with orientation markers that indicate the orientation of the entity with respect to the path. A classifier that represents a person can be combined with another orientation affix that indicates that the person is upright and with one orientation affix that indicates that the person is facing forward into the direction in which he is moving. Such an ‘external world orientation affix’ or ‘path orientation affix’ can, in turn, be optionally combined with yet another affix, namely the ‘opposite affix’. Attachment of the ‘opposite affix’ to the ‘external world orientation affix’ indicates that the entity is upside down, and

affixation of the ‘opposite affix’ to the ‘path orientation affix’ indicates that the entity moves backwards.

A second type of affix that can be attached to classifiers is a morphological marker, such as the ‘broken’ or ‘wrecked’ morpheme. A construction in which a classifier is combined with a ‘wrecked’ morpheme is provided in (5). (5a) shows a ‘simple’ semantic classifier, indicating a tree; in (5b), this classifier is combined with a ‘wrecked’ morpheme, indicated by the particular bending (or clawing) of the fingers.⁶ This indicates the deformation of the tree and leaves as a result of fire.



Supalla thus argues that a construction involving a classifier is often morphologically complex; that is, that classifier constructions consist of a number of morphemes, both roots and affixes. Classifiers themselves can be morphologically complex, and can be combined with other affixes, such as orientation affixes and ‘broken’ and ‘wrecked’ affixes.

⁶ The signs in (5) do not appear as such in Supalla’s account, but are reconstructed on the basis of the descriptions in Supalla (1982).

2.2.5 Discussion and summary

Supalla's morphological analysis is attractive: it offers an overview of the components that can occur within a classifier predicate, and a structured account of the grammatical status of these parts. The movements of the hand are roots, other components are affixes, claims also made by other researchers. Some affixes (for instance placement affixes, manner of motion affixes, classifiers) attach to a root, other affixes (orientation affixes, 'broken' and 'wrecked' morphemes) attach to classifiers. Nevertheless, several matters remain unclear and Supalla's account also raises questions. For instance, his claim that SASSes are morphologically complex (that is, every finger can be morphemic), does not make clear what the morphological structure of a complex SASS is. Furthermore, Supalla suggests that classifiers are noun agreement markers, but it is unusual in (spoken) languages to find agreement markers that are affixed with several morphemes. (Of course, it may be possible that sign languages and spoken languages differ in this respect.) Supalla also claims that classifiers in ASL are similar to classifiers in spoken languages. However, the proposed complexity of the ASL classifiers is not attested in classifier systems in spoken languages. Although there are a few classifiers in spoken language classifier systems that can be argued to consist of two elements,⁷ complex classifiers are the exception rather

⁷ For instance, the literature on Kilivila (an Austronesian language spoken in Papua New Guinea) mentions classifiers such as *bililo* (trip) and *lola* (stroll, journey, repeatedly go somewhere), which are formed with the verb *lo* (to go) as a component (Senft 1995; p.c.).

than the rule. It has also been claimed in the literature that Supalla's proposed morphological structure of classifier predicates is unnecessarily complex (see for instance Liddell 2003).

I will address these issues in my account of classifiers in NGT. Furthermore, I will show that there is no need to assume some of the proposed morphemes in the classifier predicate and reduce the proposed morphological complexity of classifier predicates on the basis of NGT data. I will give a clear account of the structure of these predicates, based on but adapting Supalla's proposed basic structure.

2.3 Subsequent analyses of classifier predicates

Supalla's analyses have been used as a basis in many subsequent investigations of classifier predicates, which propose several adaptations and elaborations. One issue concerns the types of classifiers involved in classifier predicates and their semantics (see Zwitserlood 1996 and Schembri 2001 for comparison and discussion). Various alternative proposals have also been made regarding the structural root of classifier predicates. In this section I will give a brief overview of the most important accounts that follow Supalla's analyses.⁸ I will focus on the issues crucial for my analysis, namely the root in classifier predicates and the complexity and function of the classifiers. In section 2.3.1, I will treat the analyses of the root of classifier predicates, and in section 2.3.2,

⁸ I do not include here the accounts in which classifier predicates are considered as extra-linguistic (Cogill-Koez 2000) or non-componential (Liddell 2003); these will be discussed in Chapter 6.

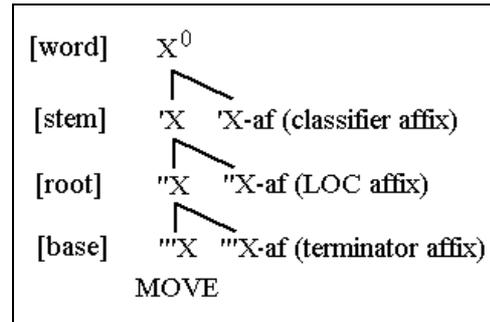
classifiers and their morphological complexity. I will focus on analyses of the function of the classifiers in section 2.3.3.

2.3.1 The issue of the root

This section considers the views in the sign language literature on the most basic element in the classifier predicate. Following Supalla, most researchers regard the movement as the basic element (root) in the classifier predicate, although they differ in the conclusions about the number and nature of these roots. In contrast to Supalla's three-way distinction into stative, contact, and active roots, Shepard-Kegl's (1985) account contains basically one root (or 'base', as she calls it) that indicates a movement (MOVE). MOVE can also be zero movement. In addition to the root, a classifier predicate contains several affixes. Shepard-Kegl first proposes two types of placement affixes, namely *terminators*, that indicate the beginning or end of the movement. Second, *locations* specify the location in signing space of the beginning or end point. Finally, *classifiers* are affixes. New in Shepard-Kegl's analysis is the claim that affixation is cyclic and hierarchical, following X'-theory.

An example of the structure of a simple predicate is in Figure 4 on page 52 (the structure is as yet category-neutral). As usual in X'-structure, nothing is implied (yet) about the position (left or right) of the respective elements with regard to each other; if all is well, this follows from independent principles.

Figure 4 X'-model of a productively formed simple sign
(after Shepard-Kegl 1985:262, Fig. 1)

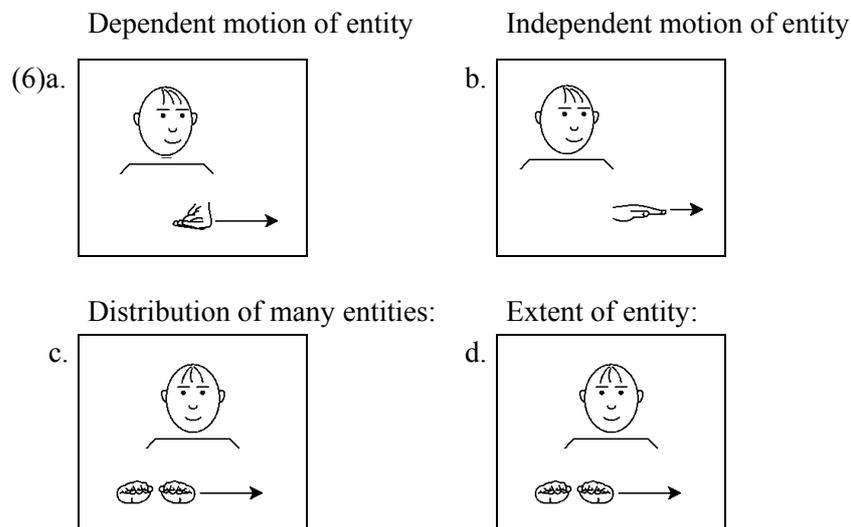


In this view, classifiers are not part of the root, base, or stem of the predicate, but occur in the periphery of the sign structure. Shepard-Kegl thus regards the classifier the head of the sign. Its function is to mark the Theme argument of the predicate (the argument representing the entity in motion).

Other proposals on the root in classifier predicates have been made by Liddell & Johnson (1987) and Schick (1990a), who distinguish three root types, which overlap partially in form and semantics with those proposed by Supalla. Particular roots can often indicate more than one event. For instance, the root called 'MOV' by Schick and the root called 'stative-descriptive' by Liddell & Johnson can indicate the path of a referent, but also the extent (outline) of a referent. Wallin (1996; 2000) supplements Supalla's three roots with a stationary movement root, which expresses a change in orientation of the referent.

In contrast to the previously discussed claims with respect to the characterizations of the root in classifier predicates, McDonald (1982) and Engberg-Pedersen (1993) argue that the movement is *not* the root. McDonald suggests that the movement in a classifier predicate is

polysemous and can express three different things: i) the independent motion of an entity; ii) the dependent motion of an entity; and iii) the extension (outline) of an entity. Engberg-Pedersen adds another possible meaning to the movement, namely the distribution of entities, arguing that it is not always easy to disambiguate between the different meanings of the movement in a classifier predicate. This polysemy of the predicate is illustrated in (6).⁹



DSL (after Engberg-Pedersen 1993:245)

(6a) indicates the dependent motion of a (flat) entity (for instance: a sheet of paper), (6b) the independent motion of a entity (for instance: a car). Whereas (6c) indicates the distribution of many entities (for instance:

⁹ These signs are reconstructed here from verbal descriptions in Engberg-Pedersen (1993:245).

cars) that are standing in a line, (6d) shows the extension (outline) of a flat entity (for instance: a table top). Indeed, the movement is the same in all these signs.

McDonald and Engberg-Pedersen further claim that the hand configuration (as well as the motion) determines the meaning of the verb. This is supported by the fact that the particular handshape used indicates or determines the valence of the verb: classifiers of one type (Engberg-Pedersen calls these *whole entity classifiers*) occur only in intransitive verbs, whereas classifiers of another type (called *handling classifiers*) are used with transitive and/or agentive predicates (this is also noted by, among others, Shepard-Kegl 1985 and Wallin 1996). McDonald and Engberg-Pedersen conclude that the meaning contribution of the hand configuration in classifier predicates is at least as (if not more) important than the movement, and therefore claim that the hand configuration should be considered as the basic unit, not the movement.¹⁰ The status of the movement is as yet unclear. Engberg-Pedersen indicates that it could be classified as a stem, a derivational affix or an inflectional affix, but that none of these is entirely satisfactory.

A third view on the structure of classifier predicates is advocated by Slobin *et al.* (2003). They argue that none of the components of a classifier predicate is meaningful without the other components, that each component can be substituted (for instance the handshapes can be

¹⁰ Engberg-Pedersen (1993:247) calls this basic element the *stem* of the classifier predicate, in accordance to the analysis of classificatory verbs in Koyukon, which, according to her, are similar in structure.

substituted for other handshapes), and that none of these components can stand alone as complete lexical items. Therefore, they claim that these predicates do not have a single root, but consist of several roots. In this, they are similar to bipartite verbs in spoken languages such as the Hoka and Penutian languages of northern California and Oregon, which consist of two necessary parts that cannot form lexical items on their own.

Most researchers thus adopt Supalla's analysis of the movement as the root in classifier predicates, although they suggest (slightly) different roots. In contrast, Engberg-Pedersen and McDonald claim that the hand configuration is the most basic element and Slobin et al. adhere to the view that classifier predicates do not have a single root.

In my analyses of NGT classifier predicates, I will argue that Supalla's assumption of the movement as the root is correct, and that the other meaningful components in these predicates are affixed.

2.3.2 Complexity of classifiers

Although it is generally accepted in the sign language literature that Supalla's SASSes are morphologically complex, most researchers do not (explicitly) analyse other classifier types (such as semantic, instrumental, or body part classifiers) as morphologically complex. Some researchers do explicitly indicate that classifiers are morphologically complex, but the complexity is different from that in Supalla's proposals. For instance, Shepard-Kegl (1985:92-93), who distinguishes two types of classifiers

(SASS/Semantic Classifiers¹¹ and Handling classifiers) claims that both types can be morphologically complex. In her view, complex Handling Classifiers consist of two classifiers: a classifier representing the fingers of a hand and a classifier representing the thumb, the latter opposing the fingers. Furthermore, (all) Handling Classifiers have relation morphemes (indicating contact with the manipulated entity). Complex SASS/Semantic Classifiers are combinations of a SASS/Semantic Classifier (consisting of one or more fingers) and a *copy classifier*.¹² The latter classifier consists of an opposing thumb and ‘copies’ the classifier that is formed by the finger(s). For instance, the  SASS/Semantic Classifier is analysed as consisting of the  classifier for long and thin entities, and the ‘copy classifier’. The  and  SASS/Semantic Classifiers show the same morphological complexity.

Furthermore, Wallin (1990) indicates that Handling classifiers in SSL can be morphologically complex, in that the fingertips can denote ‘intrinsic front’ or ‘a particular orientation in the room’ and the base of the hand denotes ‘intrinsic back’. For instance, the fingertips of the  hand representing a car indicate the front of the car. The hand palm indicates ‘moveability’ of the entity that is represented by the hand. Thus, if the  hand represents a tile, it is oriented towards the surface to which it is indicated to be attached. This orientation means ‘non-moveable’. In contrast, a painting hanging on a wall is represented by the same

¹¹ Shepard-Kegl considers SASSes and semantic classifiers as one classifier type, which she calls *shape/object classifiers*.

¹² Presumably, the ‘copy classifier’ is a SASS/Semantic Classifier, too.

classifier, but the hand palm faces away from that surface to indicate that the represented entity is moveable (Wallin 1990, 1996).¹³

In summary, the morphological complexity of classifiers as suggested by Supalla is not fully adopted by other researchers. Those researchers who analyse classifiers as complex suggest a different kind of complexity. For NGT, I will show that classifiers are not morphologically complex.

2.3.3 The function of classifiers

Recall from section 2.2.3 that Supalla and other researchers suggest that classifiers are agreement markers. However, several other analyses of classifiers have been suggested. The suggested functions are: i) incorporated classifier nouns (Meir 2001); ii) verb stems (McDonald 1982; Engberg-Pedersen 1993, see section 2.3.1); iii) agentive markers (Benedicto & Brentari to appear), and iv) aspectual markers (Brentari & Benedicto 1999). Recently many researchers analyse classifiers as functional elements. There remain several good arguments for the early suggestion of classifiers as agreement markers, which I will use in my analyses of classifiers in NGT. Only Glück & Pfau (1998) work out the agreement analysis in some detail. As a background to my own analysis (in section 6.2.4), I will describe their analysis here.

The basis for the claim made by Glück & Pfau (1998) on the agreement analysis of classifiers is the fact that classifiers share some

¹³ Wallin (1990) suggests that visibility, for instance the visibility of the face of a painting, may be involved as well.

features with the arguments that they classify. Focusing on the syntactic properties of classifiers, they argue that these features are inherent properties of DPs. Their argument concerns pro-drop phenomena with agreement verbs (partially following proposals for ASL by Lillo-Martin (1991)), and runs as follows. As other sign languages, DGS has a set of verbs that show agreement by means of locations in signing space: intransitive verbs have an agreement marker for the subject; transitive verbs can agree with both subject and object. These agreement markers consist of the locations of the referents in signing space (as explained in section 1.5). When the verb in a sentence shows agreement with an argument, this argument can be dropped, as illustrated in (7), where the brackets indicate that the argument can, but need not be, expressed overtly.

- _____ topic
- (7)a. MAN INDEX₁, CHILD THINK, (HE₁) WOMAN INDEX₂ BOOK ₁SHOW₂
'This man_i, the child thinks, (he_i) shows the book to the woman.'
- _____ topic
- b. WOMAN INDEX₂, CHILD THINK, MAN INDEX₁ (HER₂) BOOK ₁SHOW₂
'This woman_i, the child thinks, the man shows (her_i) the book.'
- (Glück & Pfau 1998:69, Ex. 10c/11c)

Glück & Pfau claim that when no overt DPs are present in argument positions, these are filled by empty elements (pro), which are licensed by the agreement marker (cf. Chomsky (1981) and Rizzi (1986)). (At first glance, (7) may seem an example of *topic-drop* rather than *pro-drop*. However, the ungrammaticality of (8) shows that empty arguments

cannot be licensed by topics.) This is not possible with verbs that do not show agreement (usually called *plain verbs*): none of the arguments can be dropped, as can be seen in (8):

- _____ topic
 (8)* BOOK INDEX₁, CHILD THINK, MAN pro_i BUY
 ‘This book_i, the child thinks, the man buys it_i.’

(adapted from Glück & Pfau 1998:69, Ex. 11a)

Glück & Pfau observe that null arguments can occur in DGS sentences with classifiers, too. They claim that the pro-drop possibilities in these constructions are correlated with the presence of a classifier. In intransitive constructions, the classifier is always linked to the subject, and the subject position can (but need not) be empty. The classifier in a transitive clause is linked to the object, and the object position in the clause can be empty. This is illustrated in (9), in which the classifier and the related argument position are indicated in boldscript.

- (9)a. *Intransitive classifier predicate:*

_____ topic
 DOG_a INDEX₁, CHILD THINK, **(IT₁)** STREET₂ **2GO-CL_a**
 ‘This dog_i, the child thinks, (it_i) is crossing the street.’

- b. *Transitive classifier predicate:*

_____ topic
 GLASS_a INDEX₁, CHILD THINK, MAN **(IT₁)** TABLE₂ **2TAKE-CL_a**
 ‘The glass_i, the child thinks, the man takes it_i off the table.’

(Glück & Pfau 1998:70-71, Ex. 14b/12c)

Since there is no person (or location) agreement marker present that could license the empty argument, it must be licensed by the classifier. Therefore, Glück & Pfau argue, classifiers function as agreement markers.¹⁴

The work by Glück & Pfau (and Benedicto & Brentari) represents an attractive body of ideas, but the argumentation backing them up is relatively weak, since cross-linguistic investigations of pro-drop and agreement phenomena has already shown that null arguments are not necessarily licensed by agreement (Huang 1984; Y. Huang 1995). Lillo-Martin (1986, 1991), whose analysis is followed by Glück & Pfau, shows that ASL allows null arguments in the absence of agreement; Van Gijn & Zwitserlood (2003) show the same for NGT.

¹⁴ Benedicto & Brentari (to appear) also indicate that classifiers may function as agreement markers, and that they can license pro, as in (i), where ‘C_j’ is a classifier (representing the manipulation of the object that is in a base-generated topic position). This classifier licenses *pro* in the object position.

(i) THAT BOOK_j, INDEX_{1sg} THINK MARIE pro₃
 that book pron.1sg think M. pron.3sg

CL_j+MOVE

obj_grab_{hdlg}+move_vertical_horizontal

‘That book, I thought Mary took it and layed it down on its side’

(Benedicto & Brentari to appear, ex. 15)

Unfortunately, their account is as yet somewhat unclear, because the claim is that not only do the classifiers function as agreements markers, they also function as elements that trigger argument structure alternations.

Nevertheless, because of the prevalent suggestion in the literature that classifiers may function as agreement markers and because this analysis appears at least partially promising, it will be further pursued in this investigation. I will show that the basic idea is correct and give an extended analysis that fits in with sign language agreement phenomena in general.

2.4 Summary

In this chapter, I have given an overview of the most important theoretical accounts of classifier predicates in sign languages and of the function of the classifier. These predicates are analyzed as complex, consisting of roots and various affixes such as manner, orientation, placement and classifier affixes. Classifiers themselves can be morphologically complex, too. The analyses of the function of the classifier differ, although there is a substantial number of suggestions that they are agreement markers, two of which are formalized to some extent and discussed in this chapter.

In the following chapters I will investigate the classifiers and the predicates with which they occur in NGT. I will provide an inventory of the classifiers that occur in NGT and elaborate the morphological structure of the predicates. On the basis of the results, I will argue that classifiers in NGT are related to arguments and that an agreement analysis accounts best for the NGT facts. The work of Supalla (1982, 1986) and Glück & Pfau (1998, 1999) thus form the basis for my own proposals. The data that underlie the analysis come from several

experiments. These experiments and their results will be discussed in the following chapters.

3.1 Introduction

One of the goals of the research described in this thesis is to inventory the classifiers that appear on verbs of motion and location in NTG and their meaning. Previous investigations (Fortgens *et al.* 1984; De Clerck 1995; Nijhof 1996; Zwitserlood 1996) have provided preliminary inventories. The available data from these efforts are, in some cases, used here. However, elicitation of new data was necessary for a number of reasons. First, examining a larger set of different entities than in the previous investigations, enables a better understanding of the meaning of particular classifiers. Even more information will be obtained by looking at the representation of particular referents. Determining the possible variation in the choice of classifiers will give us more insight into their meaning.

Second, elicitation of new data is desirable because the existing data, two-dimensional recordings taken from a straight angle *vis-a-vis* the signer, is limited. Two-dimensional representations of three-dimensional entities miss information both on the use of space and on the particular

hand configurations, which are often not clearly visible. Recordings from different angles can remedy this defect.

Finally, the use of the same elicitation materials facilitates cross-linguistic and cross-modal comparison of the data. In this research materials were thus used that are and will be also used in studies of other sign language classifier constructions,¹ and of the speech-accompanying gesture systems of hearing people who speak different languages.

Once we have an inventory of the classifiers, we can investigate their role in the grammar of NGT. Recall from section 2.3.3 that classifiers (in different sign languages, that is) have been analysed as having different functions. In this research, I will focus on the proposed function as agreement markers. This means that it is necessary to investigate the structure of the verbs in which the classifiers occur and the structure of the linguistic context in which the verb occurs. In the following section (3.2) I will describe the method used in eliciting data containing verbs of motion and location in NGT. I will discuss the transcription and analysis of the data in section 3.3, and conclude this chapter with some final remarks (3.4).

3.2 Data collection

Data were collected in two ways. First, by eliciting signed texts from four native signers, and second, by discussing the data with two native signers

¹ This concerns current studies of classifiers in ASL, AUSLAN, BSL, Chinese Sign Language (CSL), Danish Sign Language (DSL), DGS, Hong Kong Sign Language (HKSL), Israeli Sign Language (ISL), Japanese Sign Language (NS), Swiss-German Sign Language (SGSL), and Swedish Sign Language (SSL).

(one of whom also participated in the elicitation tasks). The elicited texts were all videotaped and transcribed in detail (see 3.3.1). This does not hold for the discussions, though they were of great help for the analysis of the structures. This section is structured as follows. Information about the consultants who participated in this research is provided in section 3.2.1. This is followed by a section containing information about the elicitation materials that have been used (3.2.2). The elicitation tasks and procedure are described in section 3.2.3 and the recording set-up will be described in section 3.2.4.

3.2.1 Consultants

Five native NGT signers were the main consultants in this investigation. Three were female, two were male. The age range was from 30 - 35. All of them have one or two Deaf parents and all are active in the Deaf community.² Four are prelingually deaf and have attended schools for the deaf; one of them gradually lost hearing until profound deafness set in at the age of 29. This last consultant visited a regular primary school and followed a high school education for the hard of hearing. Four consultants have a quite high level of education. Four signers grew up in the Voorburg region, using the variant of NGT used there, the fifth signer is from the Amsterdam region and uses its NGT variant. Thus, the only variant of NGT tested is that used in the ‘western’ region of the country. This, and the fact that only five native signers participated in this

² As is common in the literature, the capitalized term ‘Deaf’ is used to refer to (members) of the cultural community, in contrast to ‘deaf’, which indicates a certain amount of hearing loss.

research, means that a rather limited sample of NGT data was available in terms of variation. As in most other countries, the number of people who acquire a sign language under normal first language acquisition circumstances is extremely small, due to the small number of prelinguistically deaf children born to deaf parents and the fact that many of these parents promoted the acquisition of (spoken) Dutch for their children. This is the result of the (incorrect) ideas that sign languages are inferior to spoken language and that the use of a sign language blocks the way for deaf people to a ‘normal’ life that have been persistent for years. Because of the limitations inherent to the native signing population, my strategy was to ensure the help of a small number of consultants, with native NGT skills.

3.2.2 Elicitation materials

From grammatical information in dictionaries and teaching materials of NGT, and from consulting signed NGT texts, it appears that sentences in isolation and very short texts are typically produced with a limited use of space. That is, signers tend not to set up locations in space for non-present entities for further reference, as they do in longer texts, and the use of inflected signs is limited. The use of classifiers is limited in such short texts. In order to be able to study classifier constructions, longer texts needed to be elicited. However, it was also necessary to elicit shorter texts, for two reasons. First, NGT allows extensive pro-drop, especially in longer texts.³ That is, after establishing reference, it is possible to leave arguments unexpressed. In such texts it is difficult to

³ This is a common phenomenon for sign languages.

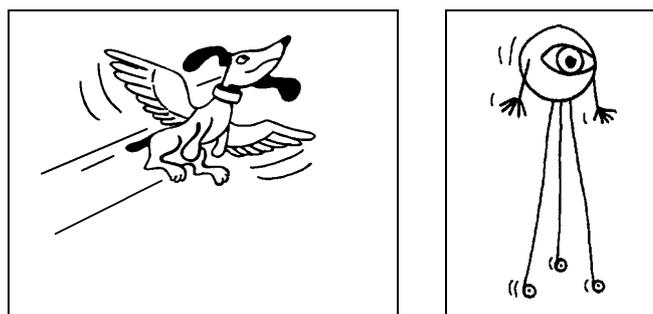
investigate the relation between classifiers and arguments of the classifier predicate, because one or more of the arguments may not be present. Second, perhaps even more than in a fluent, continuous *speech* signal, it is extremely difficult to isolate clauses in a fluent *signed* text, given that we still know so little about clause structure in sign languages. For these reasons, short texts (preferably consisting of one clause) were also elicited.

In order to increase the success of this part of my research the elicitation materials contained many different entities. Based on studies of classifiers in spoken and sign languages, I ensured that these materials contained (pictures of) entities that occur in the prototypical classes we find in classificatory systems in spoken languages, and in classes that are reported to exist in other sign languages. The choice for these particular types of entities does not imply that I expected to find exactly these classes in NGT. Nevertheless, there was a large chance of finding classifiers of these types, while it would always be possible to formulate different or additional classes on the basis of the data.

In many noun classification systems, there are subclassifications for persons. Therefore, I ensured that the elicitation materials contained pictures of males and females, and persons of different ages. Furthermore, pictures containing the signer, the addressee, and the research assistant who was familiar to the participants, were present in the materials in order to investigate whether different classifiers would be used for different discourse participants (signer, addressee) and non-discourse participants (any other entity).

The materials also contained pictures of entities that had abstract or divergent shapes or abnormal characteristics, for instance three-legged persons. These served to find out more about the choice of a classifier, that is, whether the classifier that normally would be used for an entity would also be used if the entity had abnormal characteristics, and if not, which characteristics would then determine the choice of classifier. Related to this, pictures of some non-existent entities figured in the materials, such as aliens with particular characteristics.

Figure 1 Examples of pictures of non-existent entities



Since these entities were completely new to the signers, they might be forced to choose a particular classifier to represent them without being able to resort to conventional representation.

Furthermore, I wanted to find out whether signers would construct new classifiers if none of the conventional ones was judged appropriate. This would shed light on Supalla's claim that classifiers are morphologically complex and that signers can make new classifiers from an inventory of morphemes (section 2.2.3). All entities that figured in the elicitation materials are listed in Table 1.

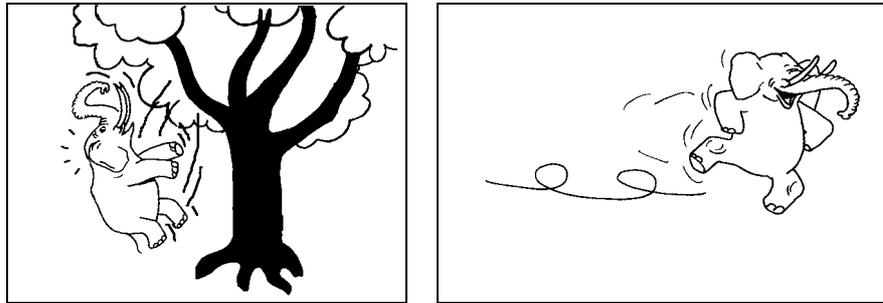
Table 1 Types of entities that occur in the elicitation materials

type of entity	examples
people	male, female senior, adult, child signer, addressee, non-discourse participant flying person
legged entities	persons with 1, 2 or 3 legs animals with 2 or 4 legs aliens with 3 or many legs
animals	large animals (elephant, rhino, cow, kangaroo) small animals (cat, dog, rabbit, frog, snake) tiny animals (ant, bee, bug, butterfly)
vehicles	flying (airplane, helicopter, rocket) floating (ship) wheeled (car, bicycle, motorcycle, train) other (sled, skis, horse)
tools	large (crane, grabbing machine) small (hammer, saw, screwdriver)
long & thin entities	large (missile, lamp post, person) small (pencil, knife, cigarette, ...) tiny (needle, match, nail)
long & narrow entities	plank, bar of chocolate
wide entities	large (table top, wall, bed) small (book, bank note, pancake)
flat round entities	large (hoop, flying saucer) middle (plate, CD-ROM) small (coin, spectacle glass)
cylindrical entities	large (huge pencil, chimney, roll of tapestry) middle (cucumber, bottle, vase) small (pen, chicken leg, flower)

type of entity	examples
round entities	large (large ball, balloon) small (onion, tomato, apple)
solid entities	large (large rock, large box, loaf of bread) small (stone, sponge, egg)
large entities	house, village, worker's cabin
tiny entities	drop of water, contact lens, marble
geometric entities	triangle, circle, cube, bar, square, rectangle, box
non-existing entities	multi-legged alien, three-legged boy
entities acting abnormally	animate (rooster riding a bike, dancing elephant) inanimate (walking hammer)

In addition to providing an inventory of classifiers, a further aim was to investigate the representation of entities (or: *reclassification*). Therefore, it was necessary not only to use many different entities, but also to have several instances of the same entity and in different settings. For instance, it is possible that the choice of a classifier for a particular entity is influenced by other factors, such as its movement or its relative size in relation to other entities in a particular setting. It is imaginable that flying objects are represented by a particular classifier, even though this is not the one that is usually used for these objects (in so far that we can say that there is a 'usual' way of representing entities). Therefore, the entities in the materials moved as they typically do, but also in unexpected ways (for instance, elephants falling out of trees or dancing, as in Figure 2).

Figure 2 Examples of non-common ways of motion of entities



In this research, three different types of elicitation materials were used. I used video clips and comics for the elicitation of longer texts. For the elicitation of short texts (clauses), I used line drawings and comics. None of the materials made use of spoken or written language.

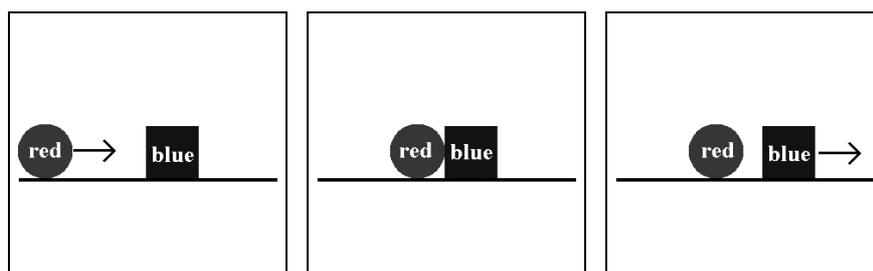
The video clips were of two types: one consisted of five short clips from a children's television programme broadcast in Germany and the Netherlands (*Die Sendung mit der Maus*). The duration of these clips is about 30 seconds. In four of these clips, a mouse moves and interacts with other entities. Some of these are animate, such as a small elephant and a clown. Others are inanimate, namely a hoop, an apple, a banana, a fence, and a trash can. One of the clips features a duck, an elephant, and a hippopotamus.

The second type of video clips were ECOM clips, animations in which colored geometrical entities move and interact.⁴ The clips were devised at the Max Planck Institut für Psycholinguistik at Nijmegen as a pilot for the elicitation of linguistic event expression, to be used for cross-

⁴ ECOM stands for Event COMplexity. There is a total number of 74 clips.

linguistic study of how languages differ in the expression of macro-events and sub-events (Levinson & Enfield 2001). In this research, a selection of 27 clips was used. The duration of the clips ranged from 2 to 9 seconds. The clips involved the movement and interaction of colored circles, balls, bars, triangles, boxes, and ramps. For instance, in Figure 3, a red circle moves into the direction of a (static) blue square and touches it, whereafter the square moves away from the red circle and the circle remains stationary.

Figure 3 Example of ECOM clip (A1)⁵



I devised the line drawings and the comics especially for the elicitation of verbs of motion and location.⁶ These include 75 pictures and nine comics in which entities are situated, move or interact in several ways.

Some of the comics were adapted from existing comics in Walt Disney magazines, which are well-known in the Netherlands. In order to exclude influence from Dutch on the data as much as possible, these were adapted by eliminating text or, where necessary, replacing text by

⁵ Obviously, the words *red* and *blue* in Figure 3 were not present in the clips.

⁶ The materials are too voluminous to be part of this thesis, but the comics and line drawings can be accessed by contacting the author.

pictorial information. In some cases, the motions of the entities were stressed, adapted, or extended. The comics involve two stories about the Bad Wolf chasing the three piglets by the use of a catching machine and a crane. There were also two Donald Duck stories, one of which tells about the construction of rockets by Donald Duck and his nephews and the subsequent misconstruction that leads the rocket of the nephews to fly straight into the galaxy and that of Donald Duck to chase and wound him. Another story involves an animal parade, which Donald Duck hopes to win with a special animal. To that aim, he tries several animals. His final choice, an elephant, chases away all the other animals leaving one of the mice of the nephews as the only animal left to win. Furthermore, there is a story of a fat indian chief, from whom various animals steal food. Another story tells about a three-legged alien who lands on earth, falls in love with a woman who does not like to be kissed by it and beats it up, and there is also a story in which a three-legged boy is involved in a car accident in which one of his legs is ripped off. It is stitched on again in the hospital. One story is a tale of a girl who gets a particular-shaped toothbrush from her grandmother, does not like it and throws it away for her brother to catch and use. The final story is about a young elephant who can fly by flapping his (huge) ears. Instead of taking a bath, he imitates all kinds of flying creatures until he is caught by his mother.

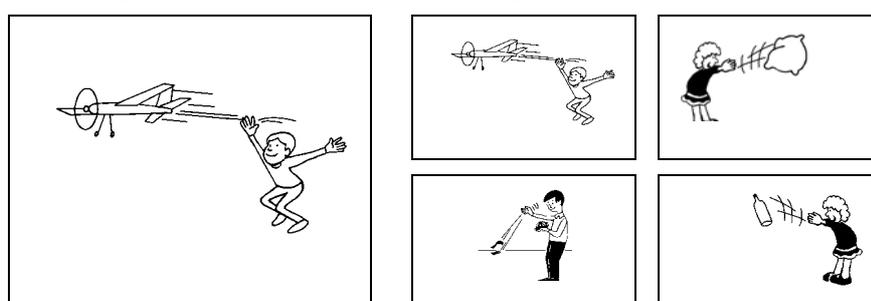
3.2.3 Elicitation tasks and procedure

In all of the elicitation tasks, the participants were shown visual materials, such as comics, line drawings, and video clips and, in each case, asked to describe what was happening. All of these sessions were

recorded on VHS tapes. The recording sessions took place at the gesture lab of the Max Planck Institut für Psycholinguistik at Nijmegen. These sessions took several hours. During all the sessions a Deaf assistant who is a native NGT signer was present. He explained the tasks to the consultants, provided the elicitation materials and communicated between the consultants and the researcher whenever necessary.

As described in section 3.2.2, both shorter and longer texts were elicited. Elicitation of short texts was done using the line drawings and the comics. For the line drawing test, the signer was given a folder that contained the 75 pictures and was asked to describe what happened in each picture as briefly as possible, preferably in one sentence. The addressee also had a folder with 75 pages. Each page held four pictures, one of which was the same as the picture the signer had (see Figure 4).

Figure 4 Example of the signer's picture and picture page of addressee



The addressee was asked to pick out the correct picture from the four on the basis of the description of the signer. If the description was not clear enough, the addressee could ask for clarification and discussion was possible.

In another task each signer was asked to tell stories on the basis of four or five comics. First, the signer was to look through the story and, if something was not clear, to ask the research assistant for clarification. Then, in order to elicit short texts, the signer was asked to sign what happened in every single picture, and to keep the text with every picture as short as possible, preferably to one sentence.

For the elicitation of longer texts, the comics and video clips were used. In the elicitation procedure for the comics, after a signer had completed the task of telling what happened in each individual picture, he was asked to tell the story as a coherent whole (without looking at the comic). The purpose of this procedure was to see whether there would be intra-signer variability in the use of verbs of motion and location and in the use of classifiers as a result of the length of the text. Thereafter, the addressee was asked to tell the same story as a whole, on the basis of the story of the first signer, in his own words. Here (besides gathering data), I could see whether there is inter-signer variability in the use of these verbs and the classifiers, that is, whether the addressee would use the same classifiers as the first signer and possibly take over any new classifier.

In the elicitation procedure for the video clips, the signer was shown each clip twice, after which he was asked to tell what happened in a fluent story. The same holds for the ECOM clips: after being shown a clip twice, the signer was to tell what he had seen. As with the comics, the addressee was asked to retell what happened in each clip after the signer had finished describing it. This served three purposes: i) to provide some interaction, because the ECOM clips are rather boring, ii) to gather data, and iii) to check inter-signer variability.

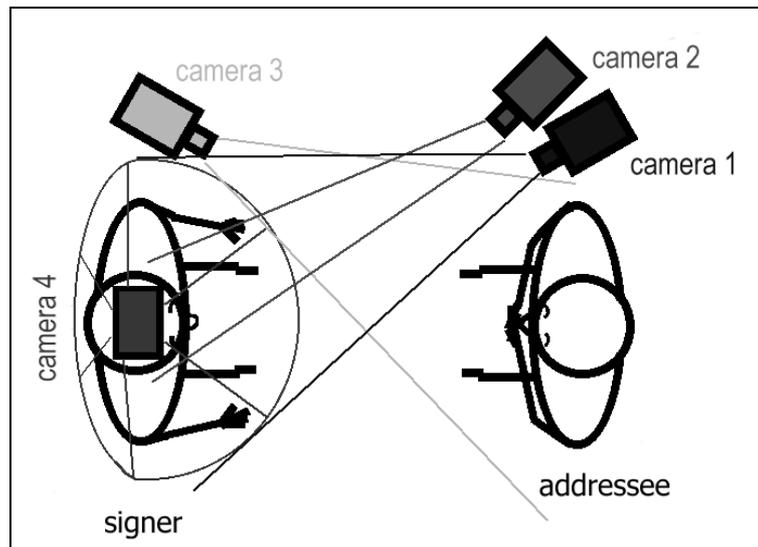
3.2.4 Recording set-up

As stated in section 3.1, a two-dimensional view of a signed text is a poor instrument to judge the exact use of space and the exact hand configuration used. In order to have a multi-angled view of the signer and signing space, the signer was videotaped from different angles.⁷ One of the recordings was of the signer from the waist up to about a foot above his head. In order to get a clear picture of the non-manual markings, a close-up recording of the head and shoulders was made. The signer was also recorded from above, so that the locations in and the movements of the hands through the signing space could be seen clearly. In order to help the signer feel at ease, as far as possible,⁸ and to encourage the data to be as natural as possible, there was some interaction with another Deaf person. In some cases, texts of the signer's addressee were also of importance for the research (see 3.2.3). For this reason the addressee was also videotaped. The set-up is illustrated in Figure 5.

⁷ Recent technology offers other opportunities to look at signs from different angles, viz. capturing of signing. With these techniques it is possible to rotate the image of the signer and look at the signing from different angles. However, the method that was used in this research had several advantages over this technique: i) signing in a special suit that is designed for three-dimensional recording is very uncomfortable and there are only a few laboratories where this can be done. In the situation used, two suits would have been necessary for signer and addressee; ii) the view of the signer from different perspectives simultaneously offers a considerable amount of information.

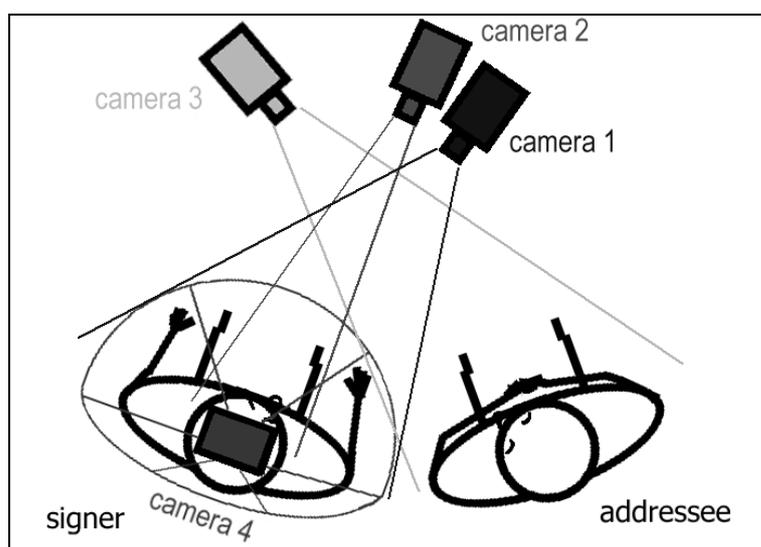
⁸ This was rather difficult for the signer since there were three cameras directed towards him or her. Fortunately, from previous tasks, most of the signers were used to being videotaped.

Figure 5 Set-up during some of the elicitation tasks



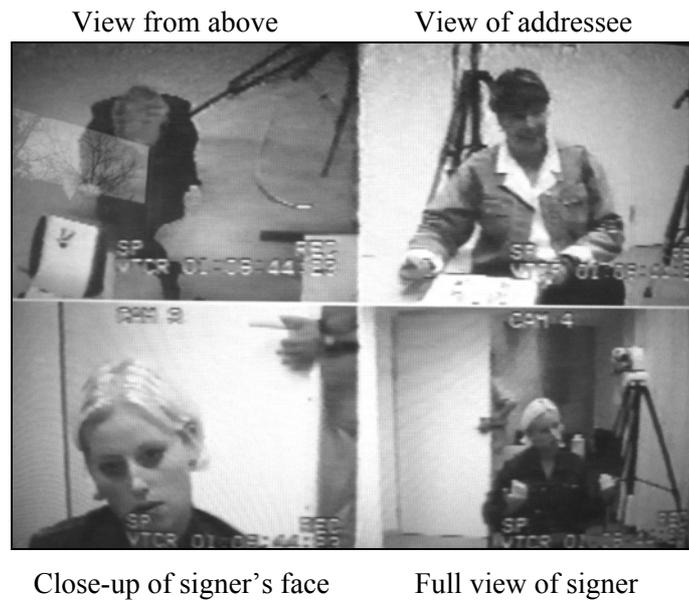
At some points during the sessions the positionings of signer and addressee were switched in order to see whether their positions relative to each other would in any way influence the use of space, especially with regard to pronominal and anaphoric reference. This provided a good view of the loci in signing space that were used for reference with the discourse participants (signer and addressee) and non-discourse participants (other entities), as well as data on how these loci would change with changes in the positions of the participants. Therefore, signer and addressee not only sat opposite each other, but also sometimes next to each other, as illustrated in Figure 6.

Figure 6 Alternative set-up of signer and addressee



The recordings of all four cameras were merged into a split-screen view, on a fifth videotape. This split-screen view was mostly used during the transcription, since it provided a view of the signing from different angles simultaneously. The split screen tape was provided with a counter in hours, minutes, seconds, and frames (25 p/s). Where the pictures were too small or unclear, the separate recording of the signer, the spatial view or the close-up of the face were used. The split-screen view is illustrated in Figure 7.

Figure 7 Split-screen view of the data



3.3 Transcription and analysis

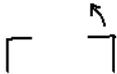
In this section, I will explain the transcription procedure and the analysis of the data.

3.3.1 Transcription method

The elicited data were extensively transcribed with respect to both the manual signs and the non-manual marking, handedness, mouthings, and use of space. Transcription was done by the researcher (who is not a native signer). Before transcription, the data were translated into Dutch by an interpreter who is also a native signer of NGT. This was done as literally as possible, so that the translations would follow the structure of NGT as much as possible, even when it violated the structure of Dutch.

These translations were often consulted during the transcription. After transcription, the data and transcripts were discussed with one of the consultants. The following general aspects were scored (and for each aspect, an example is given):

- the shape of the dominant and non-dominant hand, notated by a shorthand image from HamNoSys transcription⁹

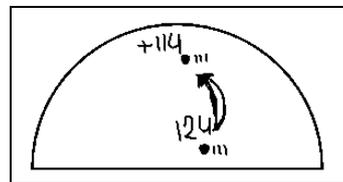
- a shorthand picture of the sign, for instance:
 ‘upright -hand moves forward in arc’
 
- a gloss
 MOVE.WALKING
- eye gaze was scored by notating the reference of the gaze, for instance:
 ‘gaze to right hand’
 gaze RH
- facial expressions were notated by shorthand images, for instance:
 ‘angry, furrowed brow’
 
- actions of head and torso were also scored by using arrows to indicate the direction of their movements, for instance:
 ‘right shoulder moves up’
 

⁹ Hamburg Notation System, developed at the University of Hamburg (Prillwitz *et al.* 1989).

- specifications were given for mouthing patterns, using Dutch words or descriptions in normal fonts (no IPA or SAMPA) ‘kom’ (*come*)
‘pfff’
- a prose translation of the text ‘*The dog ran away.*’

None of the available transcription systems provide a clear and easy procedure for describing the use of space. In this research the use of space was of great importance, and therefore extensively transcribed using a system designed by the researcher. With this system, assignment of a referent to a locus in signing space, pronouns, agreement markings, and the motions and locations in the classifier predicates were scored. As previously discussed, I used shorthand drawings of the signs. In addition to these two-dimensional representations there was a drawing of the signing as seen from above, in order to capture even more information. This is illustrated in Figure 8, where the half circle represents the space in front of the signer (a horizontal plane), the arrow indicates the movement of the sign and the numbers refer to the locations in signing space (to be explained below).

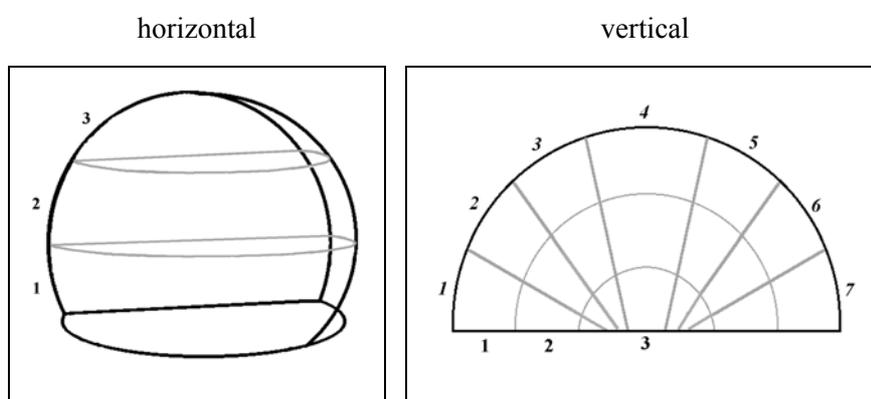
Figure 8 Example of shorthand representations of the use of space



To assist with the coding of reoccurring uses of loci, I used a three-dimensional matrix, in which loci in three horizontal planes could be

scored: one at waist level, one at chest level, and one at head level and higher. Each partition of signing space was given a number based on the horizontal level (1, 2, or 3), on the sectioning from left to right (1 to 7), and on the sectioning from near signer to outer edge of signing space (1 to 3), as illustrated in Figure 9.

Figure 9 Matrix of signing space, used in transcription of loci



During the transcription it became evident that signers did not typically set up so many loci in signing space to make such a detailed system necessary. The consultants tended to be rather sloppy in the use of precise loci. Keeping track of the locations relative to the signer, in terms of right, left, front, up, high, low, near and away, often proved to be sufficient in the transcription. Apparently, a motion from or towards a locus is usually clear enough to distinguish the loci from each other. In cases where I was positive that a particular (sloppily indicated) locus of a referent was intended, I used the coding (a number) of the first instance in which this locus occurred. When the initial locus differed greatly from the locus used in a later instance and no particular reasons for this could

be detected (for instance relocalization of the referent), these were scored as mismatching references.¹⁰

3.3.2 Segmentation

The signed texts were scored along a time line (25 frames p/s). The sign stream was segmented into separate signs and clauses and scored along this line. Separation of signs was done on the basis of combinations of handshape changes and place of articulation. If these did not provide enough information, I also used the movement of the sign. Thus, the beginning of the sign was scored when the handshape was fully formed, and the end of the sign when it started to change into another handshape (or relaxed at the end of a sign sequence).¹¹ When I used the place of articulation, the sign was scored as starting when it stopped moving to the (initial) place of articulation and as ending when it started to move away from the (final) place of articulation. The beginning of the movement was scored from the moment the hand started to move, to change orientation or to change the handshape. The movement was considered to have ended when the movement stopped and no repetitions followed, or when the hand stopped rotating, or changing its shape. Handshape changes were considered the most important in the segmentation of the sign, but sometimes the handshape was held after the movement of the sign had

¹⁰ In some instances in my data, a signer, in referring back to an entity, used a different locus (for instance to his left) than the one he had assigned to it earlier (for instance to his right). Sometimes this could be easily seen, because it was the only referent in the text and no other loci had been assigned to other referents.

¹¹ When the handshape was articulated somewhat sloppily, I scored the moment in which it did not change anymore.

ended and the final place of articulation had been reached. Also, the final place of articulation was sometimes held for some time. Such ‘holds’ were scored as pauses and the various movements of the hand and handshape changes between the end of a sign and the beginning of a new sign were scored as transitions.

As stated in section 3.2.2, in order to investigate the use of classifiers in connection with other elements (arguments) in the clause, it proved to be necessary to elicit short texts containing classifier constructions as well as longer texts. However, even short texts may contain more than one clause and it is often difficult to determine the boundary between two clauses. In an investigation of constituent structure in NGT, Coerts (1992) used particular cues to determine clause boundaries, such as the lowering of the hands, a firm head nod, or even a special sign to indicate the end of a clause. These cues, however, appear to be too crude and mark boundaries of larger units than a clause.¹² Recently, it has been suggested by Nespor & Sandler (1999) and Sandler (1999) that prosody, realized by non-manual markers, can help to determine clause boundaries. For instance, when several non-manual markers change at a certain point in the sign stream, this can indicate the boundary of a prosodic or intonational phrase. Adopting these ideas, I used the following strategy to determine clause boundaries. Assuming that a clause is a description of an event (a state, an activity or an achievement), and that such an event is usually expressed through a predicative element,

¹² In a report on constituent order in NGT (Crasborn & Zwitserlood) it was observed that the structures marked by such cues consisted of a very large amount of material, often containing five or more predicates.

I considered a clause to be a semantically coherent sign sequence that included at most one predicative element. If changes in a set of non-manual markings and/or clear eye blinks coincided with such a presumed boundary, these were considered additional indications of the beginning and end of a clause. Therefore, the following non-manual markings were scored on the time line:

- eyes: eye blinks, widening and narrowing of the eyes
- eyebrows: raising, lowering, and frowning
- nose: wrinkling
- mouth: actions of the lips (pursing, pulling up of the upper lip or sticking out of the lower lip) and the tongue (protrusion, licking)
- cheeks: puffing and sucking in
- direction of face: direction was scored as soon as it turned away from the face of the addressee
- shoulders: raising, lowering, turning
- body: straight or bent, or leaning to the left or right, forward or backward

3.3.3 Analysis

All clauses were entered into a database. Each clause was analysed for clause type, such as *negative*, *wh-question*, *open question*, *topic*, and *affirmative* (based on descriptions of these clause types in Coerts 1992). In relation to one of my research questions, namely whether classifiers on

verbs of motion and location should be analysed as agreement markers, it was necessary to indicate which elements in the clause were the arguments of the predicate (if present).

Whenever possible, I indicated the semantic role(s) of the argument. In some cases DPs could be argued to have two semantic roles and then both roles were indicated. The roles used are Agent, Patient, Recipient, Instrument, Force, Source, Goal, Location, and Theme. I also indicated the grammatical function of the argument if possible. For this, I used the notions Subject, Direct Object, Indirect Object, and Oblique Object.¹³ For each verb I indicated whether it showed agreement, and if so, the form of the agreement marking: directional or locational.^{14, 15} Furthermore, a detailed specification was given for verbs of motion and location with respect to the following:

¹³ Oblique objects mostly were locations (not to be confused with loci representing entities). Although locations are usually considered adverbial phrases, I have scored these as arguments because predicates of motion and location appear to agree with them. I will come back to this issue in Chapter 6.

¹⁴ In this, the agreement types suggested by Bos (1990, 1993) were followed rather than the agreement and spatial verbs proposed by Padden (1988). The latter types are currently under discussion since there appears to be no clear distinction between agreement and spatial verbs. Bos distinguished between verbs that agree with two arguments by incorporating the loci of the arguments in the beginning and end points of the movement (directional verbs), and verbs that agree with one argument by incorporating the locus of that argument into the motion (locational verbs). Thus, Bos's locational agreement type has the advantage of making it possible to score agreement on a verb with only a subset of its arguments.

¹⁵ Initially, I also scored possible non-manual marking of agreement (based on Bahan 1996; Bahan *et al.* 2000), expressed by eye gaze and head tilt. However, it soon appeared that these markings were highly unsystematic with respect to the marking of arguments (see Van Gijn & Zwitserlood to appear).

- movement and direction of the hand(s) was scored as: no movement, straight, arc, circle, zigzag, spiral, and random; up, down, forward, backward, contralateral, and ipsilateral, or combinations of these; and repetition or no repetition
- the hand configurations were scored following the table of handshapes in the HamNoSys transcription system, for instance , , , , .
- orientation changes of the hands were scored for the palmside and fingertip side of the hands
- for every classifier, the referent was noted
- articulation with one or two hands
- similarity between the hand configuration in the sign for the referent and the classifier hand configuration
- comparison with the shape of the referent
- comparison with other possible characteristics of the referent
- whether the referent of the classifier was introduced by a pronoun or a noun, and if so, whether the referent was introduced before or after the use of the classifier
- whether the classifier represented an entity *directly* (that is, whether it ‘stands for the entity’) or *indirectly* (that is, whether the referent was represented as being manipulated by another entity)

3.4 Final remarks

This describes the different types of materials and methods that were used to elicit verbs of motion and location in NGT from four native signers. Furthermore, I have described how the data were transcribed and analyzed. The elicitation tasks were successful in the sense that much data containing these verbs and classifiers was obtained. The data and the analysis are discussed in the following chapters.

Chapter 4

An inventory of NGT classifiers

4.1 Introduction

Previous investigations of classifiers in NGT (Fortgens *et al.* 1984; De Clerck 1995; Nijhof 1996; Zwitterlood 1996) have given a first idea of the range of classifiers that occur on verbs of motion and location in NGT and of their denotations. This chapter follows up and broadens the previous reports, discussing hand configurations and their denotations, and the variation in the choice of a classifier for a particular referent in a given situation. In spite of its wide scope, the proposed inventory is not intended to be exhaustive: it is impossible to elicit verbs of motion and location with all logically possible entities. Therefore, it is possible that NGT has classifiers that failed to show up in my data, or in data elsewhere. Furthermore, I made use of visual elicitation materials and abstract entities (such as ideas, war, darkness) are difficult to capture in drawings, so the data are biased towards the classification of concrete entities.

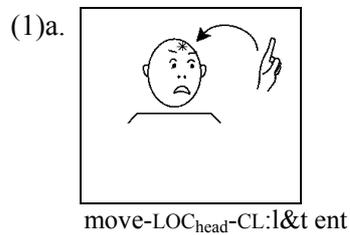
In this chapter, I discuss the classifiers that occurred in my data and in the data available from previous research. In section 4.2, I will present the classes of noun referents as they appear from generalizations over my data. Within the classes I distinguish between two types of representation, specifically whether the classifier *directly* represents the noun referent by standing for that referent, or whether the noun referent is *indirectly* represented by the classifier, following the distinctions made by a number of researchers (McDonald 1982; Shepard-Kegl 1985; Wallin 1996; Aronoff *et al.* 2003). I adopt the terms *entity classifier* for the former type and *handling classifier* for the latter, from Aronoff *et al.* (2003). In section 4.3, I will discuss the morphological complexity of classifiers in NGT and briefly focus on the issue of the orientation of classifiers. The observed variation in the choice of classifiers will be discussed in section 4.4, where I will argue that the reasons for the variation are syntactic, phonetic and semantic/pragmatic. Section 4.5 contains a summary of the main results of this chapter.

4.2 NGT classifier hand configurations

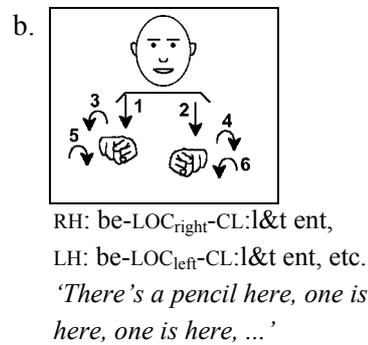
In Chapter 3, I indicated that the elicitation materials contained different types of entities, the selection of which was based on previous investigations into classifiers in a variety of sign languages (including NGT) and on the existing literature on spoken language classifiers. In this section, I provide an overview of the classes for nouns and their referents in NGT. As expected, many noun referents are classified according to their shape, but there are exceptions.

4.2.1 The hand configuration

The  classifier has several denotations. First, it represents noun referents that have a long and thin shape, such as pencils, pens, knives, nails, planks, matches and screwdrivers. Some examples of constructions containing this classifier are shown in (1).¹



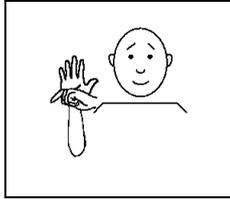
'The plank moves to my head.'



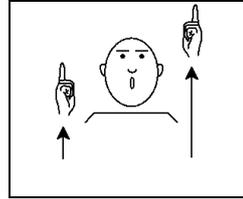
Besides these types of entities, larger objects that are cylindrical or longer than they are wide are represented by this hand configuration. These include shoes, beds, toy cars, trees, towers, poles, tree branches, rockets and (table) legs, as illustrated in (2).

¹ Throughout this thesis, in the glossed transcript of the examples 'entity' is abbreviated as 'ENT'. 'Long and thin entity' is abbreviated as 'L&T ENT'. In (1b), the numbers refer to the order of the movements of the hands.

(2)a.

LH: be-LOC_{left}-CL:treeRH: be-LOC_{left+high}-CL:l&t ent*'There's a broken branch in the tree.'*

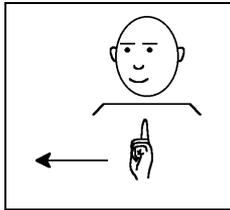
b.

RH: LOC_{right+high}-move.up-CL:l&t entLH: LOC_{left}-move.up-CL:l&t ent*'The two rockets take off (one goes faster than the other).'*

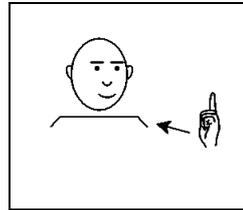
The  hand configuration also represents animate referents: human beings (including the signer and addressee), animals, aliens and inanimate entities given imaginary animacy (for example by elicitation materials).

Illustrations are in (3).

(3)a.

move-LOC_{left}-CL:animate ent*'The indian goes to the tree.'*

b.

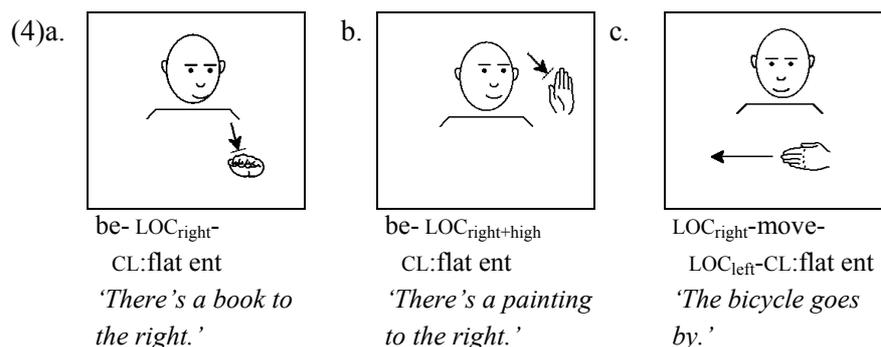
LOC_{right}-move-LOC_{signer}-CL:animate ent*'The dog comes to me.'*

Besides the  hand, the  hand often occurred, with the same meaning. I will discuss this alternative hand configuration in more detail in section 4.4.

4.2.2 The hand configuration

The  classifier represents a wide range of noun referents. It is used for those referents with a shape perceived of as flat and wide: books, sheets

of paper, mirrors and paintings, walls, feet and hands, tongues, pedestals, videotapes and pancakes. Some examples are given in (4).



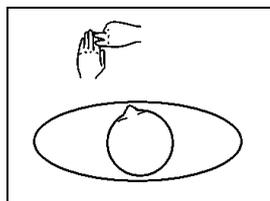
The  hand is also sometimes used for entities that at first glance do not entirely have a flat and wide shape, such as tables, chairs, cups, circles and squares, toy planes, piles of trash cans, elephant trunks. On the other hand, tables do have a flat surface, and so do most chairs. This may be considered the most salient characteristic of tables and chairs. The  classifier appears to represent these entities by focusing on a part of their shape. However, cups and circles can hardly be considered as flat and wide and it is surprising to see these entities represented by various hand configurations. I will discuss this issue in detail in section 4.4.2.

The  classifier is further used to represent vehicles of different sorts: cars, bicycles (a very common means of transport in the Netherlands), trains, boats, trams, helicopters, flying saucers and sleds. However, it is not used for all means of transportation. For instance, it is not used to represent pairs of skis, or airplanes. For this reason I hesitate to assume that the  classifier represents a separate class of vehicles, but rather assume that these vehicles are perceived of as flat and wide entities.

The  hand is also sometimes used to represent both a vehicle and a person using that vehicle. For instance, a person riding a bicycle is represented by the single  classifier, without separate representation of the person. Signers sometimes do not even mention the vehicle before using the classifier, although mentioning the referent first in the discourse is more typical.

Another common use of this classifier is the representation of a (flat) surface: a table, the top of a book case, the floor, a wall or any other surface, such as the back of an elephant. Usually, in these cases the hand functions as a Ground for the location or motion of other entities, in the sense of Talmy (1985, 2003). For instance, the example in (5) below shows the  hand representing a table, that is a Ground for the location of a cat, which is represented by another hand configuration (the  hand, which will be discussed in section 4.2.3).

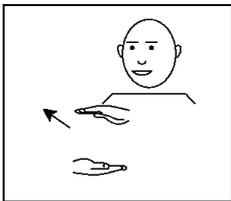
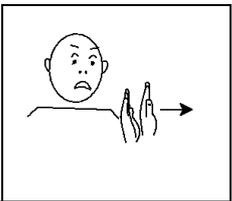
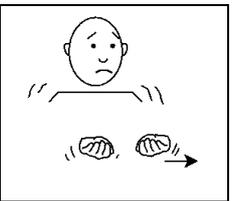
(5)a.

LH: be-LOC_{centre}-CL:flat entRH: be-LOC_{centre}-cl:legged ent*'The cat sat at the corner of the table.'*

The  classifier hand is sometimes used to represent hands. In many cases, signers use it to represent more than merely a hand: ² it also

² In the elicitation materials, not only humans but also animals figured, and many of these carried and manipulated entities as well. Because in the stories the animals

represents referents that are being manipulated by the hand: referents that are held or moved by animate entities, mostly human beings. Usually these referents are large or bulky entities, such as boxes, people, large rocks or piles of laundry, as illustrated in (6).

(6)a.		b.		c.	
	X-LOC _{close} -move- LOC _{left+up} -CL:bulky ent '(Someone) puts a pile of towels (into a cupboard) to the left.'		X-move-LOC _{right} - CL:bulky ent '(Someone) pushes a huge stone to the right.'		X-move-LOC _{right} - CL:bulky ent '(Someone) carries the boy to the right.'

The  and  hand configurations also occurred often representing the above mentioned referents. These handshapes will be discussed in section 4.4.

4.2.3 The and hand configurations

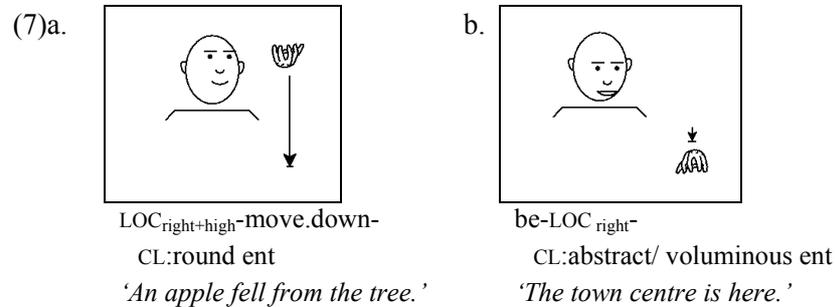
Since the  hand configuration, in many sign languages, is reported to represent human beings, and many people appeared in my elicitation materials, I expected this hand configuration to appear frequently in my data. This was indeed the case. In most instances, the hand configuration represented people and animals by focusing on their legs. In the data it was used to represent both the signer and the addressee as well as non-

behaved by and large as human beings, I will not distinguish here between human hands and animal hands.

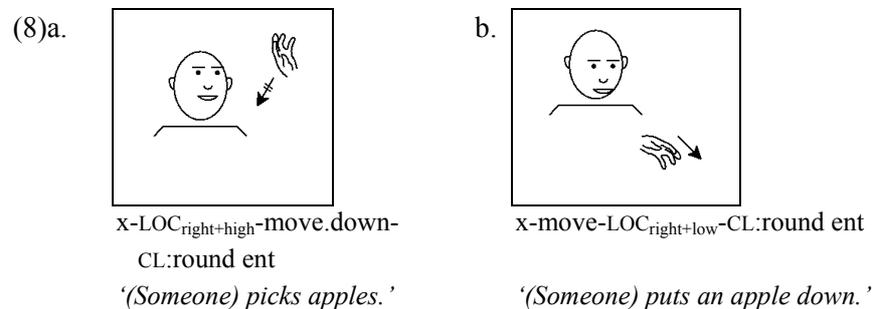
discourse participants: all kinds of people, animals acting like people (such as Donald Duck and his nephews, the Bad Wolf, his son and the piglets, elephants, cats and dogs) and even aliens. The  hand appeared (almost equally often) with the same denotation. In the literature on classifiers (especially ASL), a distinction is often made between the two. The  hand is reported to represent humans, whereas the  hand represents animals and sitting or crouching people (Supalla 1982). However, NGT does not make this distinction. Both hand configurations represent the same entities, and humans are represented by the  hand as well as the  hand. Therefore, I see no reason to assume that these hand configurations represent different classes in NGT. I will discuss the reasons for the variation in the choice between these hand configurations in section 4.4.

4.2.4 The hand configuration

Most spherical entities in the elicitation materials were represented by a  hand configuration in the data. These include stones, balls and fruits, such as tomatoes and apples. The hand configuration was also used for voluminous entities, such as houses and villages, and, in some cases, more abstract entities. For instance, it can be used to indicate (several) hospital wards or sections in a school. Illustrations are in (7).



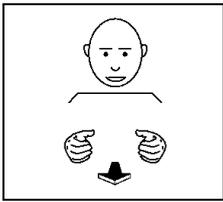
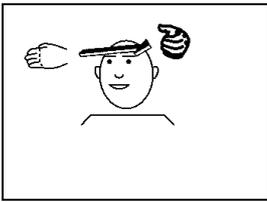
Besides *directly* representing spherical entities, this hand configuration was also used to indicate the *manipulation* of spherical entities, for instance apples that were picked or put into a fruit bowl, balls that were thrown, tomatoes that were eaten. Examples of these uses of the  hand are shown in (7).



4.2.5 The hand configuration

The  classifier refers to referents of cylindrical and curved shapes and to containers. Among these are mugs, drinking glasses, bottles and, for some signers, trees. Some signers preferred use of the  hand configuration to represent spherical referents (round fruits, balls) over the  hand configuration of subsection 4.2.4. Referents with large round

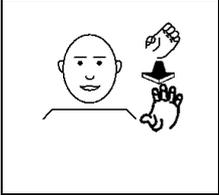
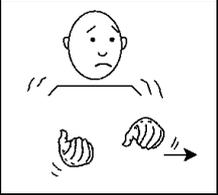
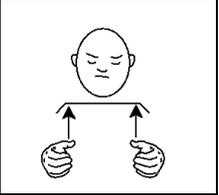
shapes (a wash tub or a large round machine) were represented by a two-handed combination of  hands.³ Illustrations of the use of this classifier are in (9).

- (9)a. 
- LOC_x-move.out-CL:round ent
'The machine moved forward.'
- b. 
- LOC_{left+high}-move.out-CL:cyl. ent
'The glass flew by.'

In addition to the representation of three-dimensional round and cylindrical entities, the hand configuration appeared to represent two-dimensional entities, too, namely geometrical shapes: circles, squares and curve-shaped entities. It is interesting to note that these entities need not necessarily be round.

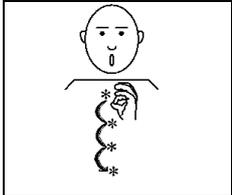
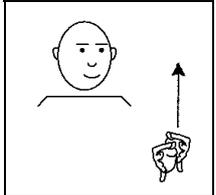
The  hand configuration, just like the  hand configuration, can be used to indicate (round and cylindrical) entities *directly*, but also entities that are being *manipulated*. Many manipulated entities in the elicitation materials were cylindrical rather than round. These were mainly glasses, and bottles, but also larger entities (represented by two hands), such as a leg, Donald Duck, a trash can, a chicken or a person. Examples are given in (10).

³ The machine was a moveable device, used for catching piglets.

- (10)a.  x-move.out-CL:cyl.ent
 '(Someone) throws a bottle (forwards).'
- b.  x-hold-CL:cyl. ent
 '(Someone) carries the boy's leg to the right.'
- c.  x-LOC_{down}-move.up-CL:cyl. ent
 '(Someone) lifts the old lady.'

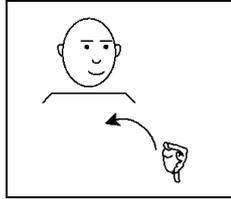
4.2.6 The hand configuration

The  classifier represents entities that are small, round and thin, such as buttons, eyes, and coins. Examples are in (11):

- (11)a.  be-LOC_{body}-CL:thin round ent, etc.
 'There are four buttons on the blouse.'
- b.  LH: be-LOC_{right}-CL:round ent
 RH: be-LOC_{right}-CL:round ent, etc.
 'There is a pile of coins here (to the right).'

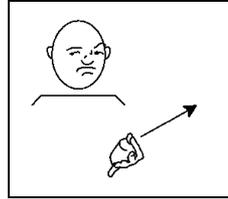
The same classifier also represents the *manipulation* of referents. These manipulated referents are not round or cylindrical in shape, but rather small and/or thin. Examples are sheets of paper, pens, (the handles of) a tea cup, and a pin, as in (12).

(12)a.



x-LOC_{right}-move.up-CL:thin ent
 '(Someone) picks up a teacup
 (by the handle).'

b.



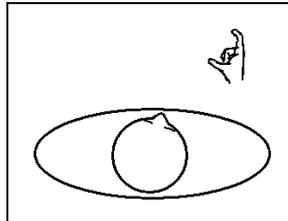
x-move.right-CL:thin ent
 '(Someone) moves a pin up (to
 someone else).'

In some cases, I have observed that signers used a hand configuration that is very similar to the  hand, namely the  hand. I will come back to this in section 4.4.

4.2.7 The and hand configurations

NGT signers also use the  hand configuration to indicate small or round and thin entities. Among these were eye-glasses, eyes, CD-ROM discs, floppy discs and coins. Occasionally, the hand configuration appeared to be adapted somewhat (by stretching and tensing of the thumb and index finger into the  hand configuration) to indicate larger round entities. Both hand configurations are illustrated in (13).

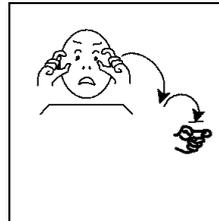
(13)a.



be-LOC_{right}-CL:large round ent

'A CD-ROM disc is to the
 right.'

b.



LH: be-LOC_{left eye}-CL:round ent

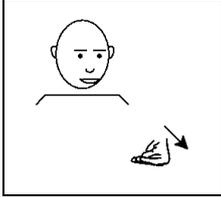
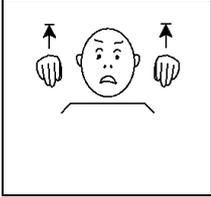
RH: LOC_{right eye}-move.down-CL:round ent

'A spectacle glass fell down.'

These hand configurations may belong to a group of handshapes that also includes the  hand, since the latter also indicates small round objects. The elicitation materials did not focus on differences in the exact sizes of round objects, which is why it is not possible to make a fundamental distinction between the  hand, the  hand and the  hand. For ASL this has been systematically tested. Emmorey & Herzig (2003) show that for the representation of stimuli consisting of ten flat round entities (medallions), the size of which ranged from very small to very large, signers use only three different classifiers. They conclude that this is a categorial distinction. In my data, I have seen that although signers were not very precise in indicating the size of a flat, round entity in fluent signing, no signer used the  hand to indicate very small round entities. In the light of these data and the evidence from ASL for categorial (morphemic) differences in the classifiers, I assume that NGT, too, has a categorically distinct set of three hand configurations for the representation of round and thin entities of various sizes. These are the ,  and (one or two handed)  hand configurations.

4.2.8 The hand configuration

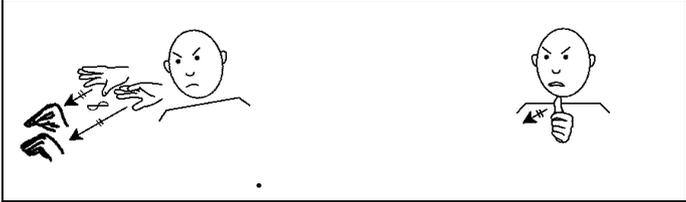
The  classifier usually represents the manipulation of entities. In the elicited data, these were typically flat entities, such as books, sheets of paper, cloth, CD-ROM discs, saucers and plates, but also a toy plane. Examples are shown in (14).

- (14)a. 
 x-move-LOC_{right+down}-CL:flat ent
 'The man puts the book down.'
- b. 
 LH:x-LOC_{shoulder}-move.up-CL:thin ent
 RH:x-LOC_{shoulder}-move.up-CL:thin ent
 'The hands of the machine lift the
 Bad Wolf by his clothes.'

The same hand configuration occurred sporadically in the data as a *direct* representation of a referent. In these cases, it represented the claws of a piglet-catching machine (this is illustrated in the next section).

4.2.9 The hand configuration

Next to the (closed)  hand configuration, an open version occurred as well, namely the  hand. Both the open and closed hand configurations were used to *directly* represent the claws of a piglet-catching machine, *without* actually manipulating another referent. This happened in a story in which the signer relates that the machine is trying to grab the piglets without success. Example (15) illustrates this: the signer's hand moves to the location of the piglets while closing, but we know from the comic and the story told by the signer that the machine never catches them, so the hands only represent the movement of the hands of the machine; they do not represent the piglets.

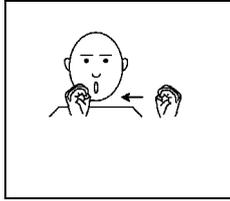
- (15) 
- 2H: move.down-IT-CL:beak-like ent miss miss miss
'The grabbing devices went down and closed several times.' *'Each time they missed!'*

The fact that this classifier can have a handshape change is interesting. It appears from my data that entity classifiers usually do not have a handshape change, as we will see in section 4.3.3.

4.2.10 The hand configuration

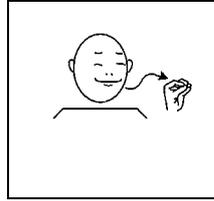
The  hand configuration represents round, square and cylindrical entities. The entities represented were circles and squares. It may also have been this hand configuration that was used to represent the mouth of an alien intending to kiss someone, where the mouth was detached from the alien's face and moved through space towards the person he wanted to kiss. The exact hand configuration is not clear, however; since the fingers were not totally bent into a round shape, the  hand configuration may have been intended. See (16) for illustrations.

(16)a.

LH: be-LOC_{centre}-CL:round entRH: LOC_{right}-move-LOC_{centre}-CL:round ent

'(The blue square) is here, (the red ball) moves towards it.'

b.

move.random-LOC_{right}-

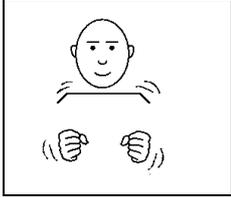
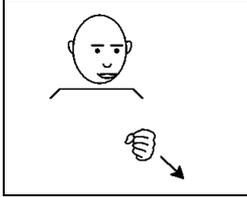
CL:round ent

'(The mouth) moves towards the right.'

The hand configuration was also used to indicate manipulated cylindrical entities, such as bananas and thin poles.

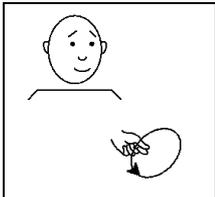
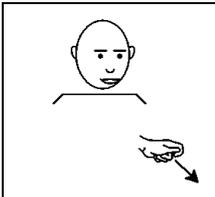
4.2.11 The hand configuration

Another hand configuration that occurred in the data is the  hand. In the ASL literature, it is reported to represent solid entities (Supalla 1982, 1986), such as stones and heads. This appears not to be the case in NGT. Nowhere in the data did this hand configuration represent an entity *directly*: all instances formed an indirect, that is, *manipulated* representation of entities. The manipulated entities that were represented were mostly long and thin entities, cylindrical entities or entities with a rather large cylindrical extension: a handle bar. Among these are a frying pan, a fishing net, a mug (held by its handle), a bicycle (held by the handle bars), a stick, a (large) toothbrush and a (large) pen, the ears of an elephant (held forcefully), and a chair. In general, this hand configuration was used to indicate a forceful manipulation of entities. The use of the  hand configuration is illustrated in (17).

- (17)a. 
- 2H: x-hold-CL:cyl. ent
'(Someone) carries a chair.'
- b. 
- x-move-LOC_{right+down}-CL:cyl. ent
'(Someone) puts down a mug
(holding it by the handle).'

4.2.12 The hand configuration

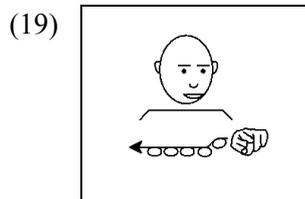
The manipulation of cylindrical or long, thin entities is also represented by the  hand. There appears to be a difference of interpretation between the  and the  hand configurations: while the former represents entities that need manipulation with some force, the latter appears to represent entities that need more careful handling. Thus, we see that instruments are likely represented with the  hand configuration. Entities that are represented with this hand configuration include knives, spoons, hammers and screwdrivers, frying pans, bandages, and bank notes. Some examples are given in (18).

- (18)a. 
- x-move.circle-LOC_{right}-
CL:thin ent
'(Someone) bandages
Donald Duck's tail.'
- b. 
- x-move-LOC_{right+down}-CL:cyl. ent
'(Someone) puts a hammer down.'

In my data the  hand, similar to the  hand, is never used to represent entities directly, only to represent the manipulated motion of an entity.

4.2.13 The hand configuration

Another classifier is the  hand configuration, that represents very small, even tiny referents, such as dots and flies. Apparently, this classifier consists only of a finger tip. In (24) the finger tip represents a tiny circle.



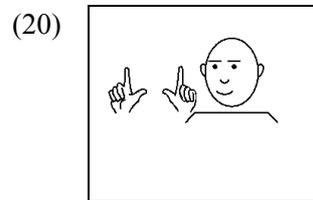
LOC_{right}-move.left.circling-CL:tiny ent

'The small circle rolls down from the right and then straight to the left.'

According to Supalla (1986), ASL has a similar classifier. Furthermore, this classifier represents referents that do not have a specific shape, or a shape that is difficult to represent by a hand configuration, such as triangles and stars. I will come back to this classifier in section 4.3.1.

4.2.14 The hand configuration

In two instances in the data the combination of two hands with extended index finger and thumbs occurred as a classifier, indicating the location of a flat angular entity (a painting). Although infrequent, this combination is apparently used as a classifier construction. Its use is illustrated in (20).



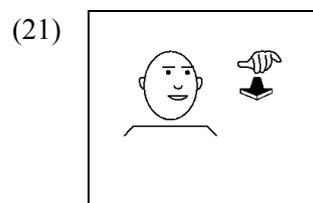
2H: be-LOC_{left+up}-CL:flat angular ent

'There is a painting on the wall, to the left.'

In the data, this classifier was only used to represent referents *directly*.

4.2.15 The hand configuration

The (very infrequent)  hand configuration was used to represent referents *directly*. The representation was restricted to that of airplanes, as in (21).⁴



LOC_{right+high}-move.out-CL:airplane

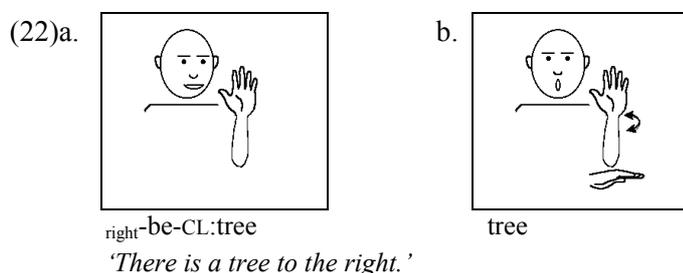
'The airplane flies away.'

4.2.16 A classifier for trees

As in ASL and some other sign languages, NGT appears to have a configuration that indicates trees. It is an uncommon configuration for several reasons. First, in contrast to any of the other classifiers discussed so far, it does not consist of a mere hand configuration (or perhaps even

⁴ Only when prodded in a discussion did one of the consultants use it to represent a telephone receiver.

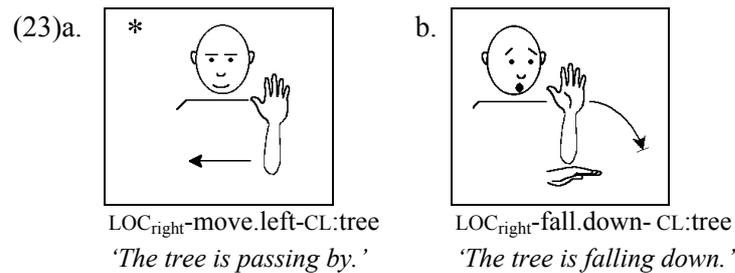
only a configuration of the fingers), but includes the lower arm. The fingers represent multiple branches and the lower arm the stem of a tree. Second, the configuration has a very specific denotation: it only represents trees. Third, the configuration is clearly related to one of the variants of the NGT sign for ‘tree’ (compare (22)a,b).



Finally, this construction cannot be used on a verb expressing a path motion. The impossibility of combining a tree referent with a path motion is not necessarily a result of the fact that trees usually do not move: when confronted with the idea of trees moving along a path consultants produce a verb of motion, using either a  or a  hand configuration, depending on whether possibly ‘legs’ are involved. The lack of motion with the configuration representing a tree is probably due to the fact that it is physically difficult to move the lower arm along a trajectory.⁵ On the other hand, it is possible to express that a tree is falling down by

⁵ According to Benedicto and Brentari (to appear) movement of a combination of a hand configuration (a fist) and the lower arm is possible in ASL classifier predicates, indicating a person passing by. They call this configuration a Body Part Classifier (BPCL).

changing the orientation of the arm and hand. The (im)possible motions of a tree are illustrated in (23).



Since the configuration can appear on verbs of location and the latter type of motion, I consider it a classifier, too, in spite of its specific reference and its deviant structure (following Supalla 1982).

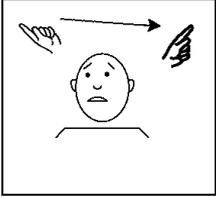
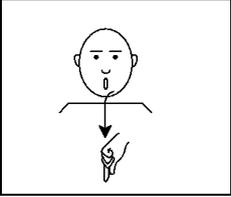
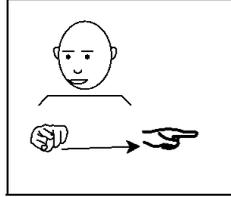
4.3 Discussion

In this section I will focus on observations that need further discussion before I can present the set of NGT classifiers found in my data. In section 4.3.1, I will discuss the presence of default classifiers. Section 4.3.2 focuses on the representation of plural referents. The issue of morphological complexity of classifiers will be discussed in section 4.3.3, and the orientation of classifiers in section 4.3.4.

4.3.1 General or default classifiers

In section 4.2.13, I introduced a classifier for tiny entities or entities whose shape are difficult to represent by a hand configuration. It seems to be the case that this classifier can represent *all* entities that can also be represented by another entity classifier. Thus, this classifier is not only a

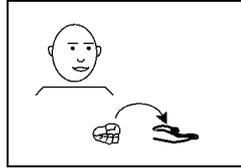
classifier for tiny entities, but also a *general entity classifier*. Its use is illustrated in (10), where it represents a bird, an egg, and a fox, respectively.

- (24)a. 
 LOC_{left+high}⁻
 move.right-CL:x.ent
 'The bird flies over.'
- b. 
 LOC_{mouth.move.down}
 CL:x.ent
 'The egg goes down
 (the snake's body).'
- c. 
 LOC_{left-move.right}
 CL:x.ent
 'The fox runs away
 to the right.'

In addition to a general classifier that *directly* represents referents, NGT has also general classifiers that represent the *manipulation* of referents. These are the  and  classifiers. In section 4.2.8 we have seen that the  classifier represents the manipulation of flat entities, and in section 4.2.12, that the  classifier represents the manipulation of thin or cylindrical entities. They can also be used to represent concrete entities that cannot normally be held in the hand, such as houses and cars (see the example in (25), in which [a relaxed form of] the  hand is used to represent a house).⁶

⁶ Unless it concerns toy houses and cars (examples of these occur in my data) or the entities are being manipulated by a giant, in which case these entities *can* be held in the hand(s).

(25)



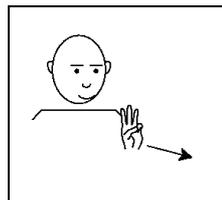
x-LOC_{left}-move-LOC_{right}-CL:entity of unspecified shape
 '(Someone) gave (someone to the right) (a house).'

The choice of the  or  classifiers seems to be signer dependent, although this requires further study.

4.3.2 The representation of plural referents

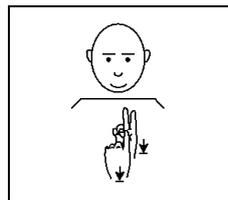
The classifiers discussed in the previous sections represent one referent. Plural referents can be indicated by employing a second hand, but it is possible to represent multiple referents within one hand configuration. This latter possibility appears to be restricted to the representation of animate referents. Extra fingers can be added to the  classifier, resulting in the ,  and  hand configurations, to indicate the precise number of referents (with a maximum of four). Some examples are in (26).

(26)a.



LOC_{center}-move.right-
 CL:3 animate ent
 'The three of them go off.'

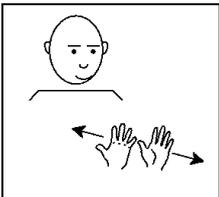
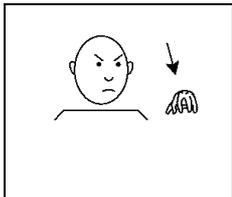
b.



RH: LOC_{close}-be-CL:2 animate ent
 LH: LOC_{far}-be-CL:1 animate ent
 'Two persons are here, one person is opposite.'

The  hand configuration is not attested in my data, although it is reported by consultants to occur in NGT.

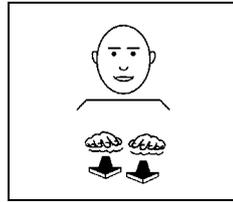
The  hand was more frequent, but the plurality involved in this hand configuration appears not to be restricted to animate referents. In contrast to the ,  and  hand configurations, the  hand does not represent an exact number of referents, but rather *multiple* referents. This hand configuration is for instance used to indicate people in a particular ordered fashion, for instance standing in a line (see (27a)) or sitting in a stadium. It is also used to indicate multiple extensions of an entity, such as the claw of a derrick (27b).

- (27)a. 
 2H: be-CL:many animate ent
 '(Many persons) are in a line.'
- b. 
 LOC_{right+high}-move.down-
 CL:many l&t ent
 '(The claw) moved down.'

Note that some of these 'plural' forms are the same as existing non-plural forms, hence, such hand configurations are polysemous. For instance, the  hand configuration represents legged entities (4.2.3), but also two animate entities, and the  hand represents round referents (4.2.4) as well as referents with multiple thin extensions.

Plurality was also observed in the representation of tiny entities or entities of unspecified shape, namely with the  hand configuration. Clearly, this is a plural form of the  classifier. An example is in (28), in which the signer indicates that many people are in motion.

(28)



2H: move.out-CL:many x.ent

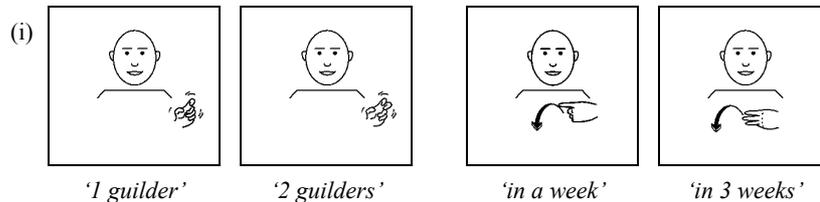
'(Many people) are moving forward.'

With Supalla (1982, 1986), I suggest that the , ,  and  hand configurations and the  hand configurations derive from the  and  classifiers. I suggest that the process involved is that of numeral incorporation. In this process fingers can be added to a basic hand with extended index finger, to indicate the number entities involved.⁷

4.3.3 The morphological complexity of classifiers in NGT

In section 2.2.3, I indicated that, according to Supalla (1982, 1986), some classifiers in ASL are morphologically complex, that these classifier can

⁷ This process occurs in lexemes as well, although it does not seem to be very productive. The lexemes that undergo number incorporation must have a hand configuration in which there is only an extended index finger. The process is restricted to maximally the number 10 in NGT, but usually no more than five entities are indicated. Examples are the NGT signs in (i), in which the fingers indicate the number of 'guilders' (the pre-Euro Dutch currency) and weeks, respectively:



be affixed with several morphemes, and that new (complex) classifiers can be produced. Applying this hypothesis to NGT we would expect the set of NGT classifiers to be large and open. The set of classifiers in NGT presented so far in this chapter appears to be restricted, however. In this light, it is interesting to see to what extent the NGT classifiers are morphologically complex and to what extent new classifiers can be created from morphemes consisting of separate fingers and morphemes such as ‘broken’ and ‘wrecked’ morphemes, that can be attached to all classifier hand configurations to indicate some disformation of the entity.

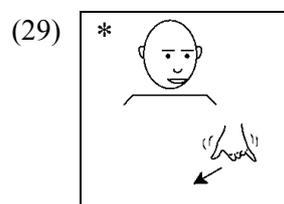
I will start with a discussion of the complexity of entity classifiers. In order to investigate this, the elicitation materials used in the elicitation tasks contained entities with particular characteristics which I thought they could not be easily classified with the common set of classifiers in NGT. Some of these were based on descriptions of novel creations in Supalla’s accounts. I expected that the signers would, or even had to, construct new classifiers to represent these entities. From the results and discussions with native signers, however, it appears that the set of classifiers in NGT is not easily creatively extended.

Below I will discuss several hand configurations that I expected to see, but did not occur in my data. Signers used different devices to indicate these referents, such as a hand configuration from the set described above, or a sign in which the outlines of the shape of the referent are traced (instead of representing the shape of the entity by means of a particular hand configuration) or both.

First, although Supalla (1986) considers the  hand configuration as monomorphemic (perhaps derived from a historically complex form), I

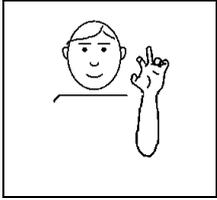
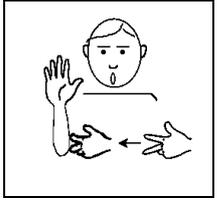
considered that this hand configuration in NGT might (still) be complex. I have shown in section 4.3.2 that the  hand configuration, representing a long thin entity, such as a human being, can undergo numeral incorporation, so that the  hand configuration can represent two upright entities. If this process is productive, the  hand configuration that represents human beings by their legs can be argued to be morphologically complex, representing the two legs that human beings usually have. Therefore, I expected that it would be possible for a signer to use a  or  hand configuration to represent an entity with *three* legs and, similarly, a  hand configuration to represent an entity with multiple legs. However, this was not confirmed by the data. Although a signer would explicitly indicate that a referent had three legs, the hand configuration used to represent that referent would be  or .

Second, Supalla (1982) mentions a particular classifier in ASL (a static SASS), namely the  hand configuration, that can be used to represent (the legs of) a fat person. I tried to elicit this hand configuration by a picture of a very fat woman, but did not get the expected result. After explanation signers would understand my intention with this classifier construction, but did not accept it. Thus in NGT the sign in (29) is not an acceptable form to represent a (fat) legged entity.



* RH: LOC_{right}-move.out-CL:fat legged ent
'(A fat person) is moving forward.'

Third, and again following Supalla, I had expected that NGT might have morphemes such as Supalla's 'broken' and 'wrecked' morphemes. Examples of classifier hand configurations combined with the 'wrecked' morpheme are the classifier used to represent a tree, in which the fingers are bent to indicate that the tree in question is dried out, and a  hand configuration with bent index and middle finger, to indicate a wrecked car (see (30) for illustrations).

- (30)a.  b.  ASL
- LOC_{right}-be-CL:tree-
deformed
'There is a deformed
tree to the right.'
- LH: LOC_{left}-be-CL:tree
RH: move-LOC_{left}-CL:vehicle-wrecked
'The car hits a tree (and got wrecked).'

I used several pictures of entities that were usually straight, but in the picture were bent, broken or wrecked. As for long and thin entities, there were pictures of people playing hopscotch, where I expected a  or perhaps a  hand configuration as a representation of their leg(s). Also, there were pictures of bowing and bent-over people, for which I expected to see a  hand. Overall the consultants preferred to use a common  or  classifier to represent the person, sometimes combined with role taking: they tended to hunch forward with their upper body to indicate bowing. A bowing person was never represented by bending the index finger of the  hand to a  hand, but by bending it at the base joint to a

 hand configuration: the finger, thus, was still straight. Persons whose legs were not both straight or both bent were represented by a combination of two hand configurations:  and .

Besides people, there were also pictures of non-animate entities that were bent (inherently or not, such as bananas, the hooks of clothes hangers; and bent nails), but signers were reluctant to use the  hand: they preferred to make the sign for the entity, followed by a sign that traced the curved shape of the entity.⁸ In ASL, however, signers have no problems using a  hand to indicate hunched people.⁹

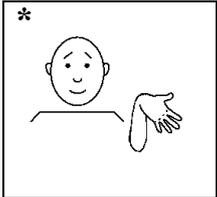
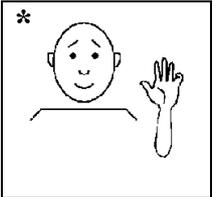
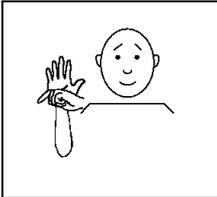
Another entity with which I tried to elicit a ‘broken’ morpheme was a beaten-up three-legged alien, which could perhaps be represented by a  or  hand configuration. However, none of these hand configurations appeared. The fact that the alien was beaten-up was represented by role taking. A  or a  hand configuration was used to indicate the referent, and the path motion expressed by the predicate was combined with a specific manner of motion: the hand did not follow a straight course but made a staggering movement, in which the orientation of the hand altered slightly.

Furthermore, the elicitation materials included pictures of broken trees and trees with broken branches. For these I hoped to elicit signs such as

⁸ The only instances where this hand configuration could be used for a hooked or curved object was when the object in question was hanging on a rail. However, this sign may also be used for hanging all kinds of things, so the hand configuration is not necessarily a classifier.

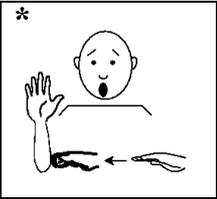
⁹ ASL may simply have a  classifier, without it necessarily being derived from a  classifier.

ones in (31a,b). (The broken branch in (31b) is represented by a bent pinky finger.)

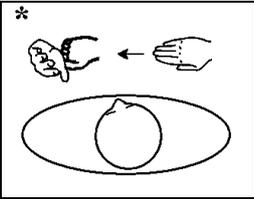
(31)a.	*		b.	*		c.	
	*	LOC _{right} -be- CL:tree-broken		*	LOC _{right} -be-CL:tree- broken.branch		LH: loc _{left} -be-CL:tree RH: LOC _{left+up} -be- CL:l&t entity
		<i>'There's a broken tree to the right.'</i>			<i>'There's a tree with a broken branch to the right.'</i>		<i>'There's a tree with a broken branch to the left.'</i>

However, these hand configuration did not occur. The signers would make the sign for tree or branch, followed by the sign for 'broken'. Alternatively, a tree with broken branch could be represented by a two-handed construction in which one hand represented the tree and the other the broken branch, as in (31c) above.

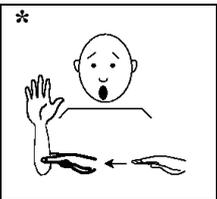
Discussions of situations with damaged cars or cars that had split up in a collision with a tree or a pole, did not result in the signs in (32) and (34); when the consultants were shown these signs they indicated that they understood the construction (and were amused by it), but they did not consider them acceptable.

(32)a.  *

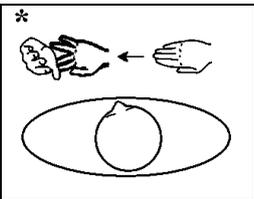
* LH: LOC_{left}-be-CL:tree
 RH: LOC_{right}-move-LOC_{left}-CL:flat ent(-broken)
 'The car hits a tree (and gets wrecked).'

b.  *

View from above :

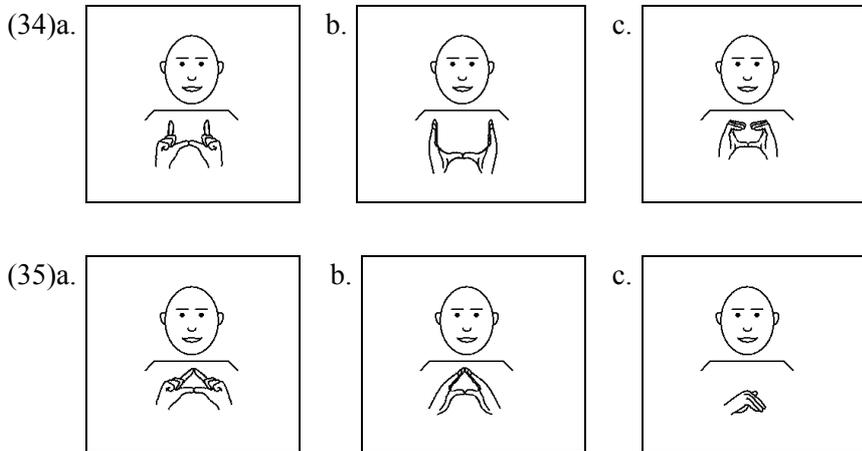
(33)a.  *

* LH: LOC_{left}-be-CL:tree
 RH: LOC_{right}-move-LOC_{left}-CL:flat ent(-split)
 'The car hits a tree (and splits into two halves).'

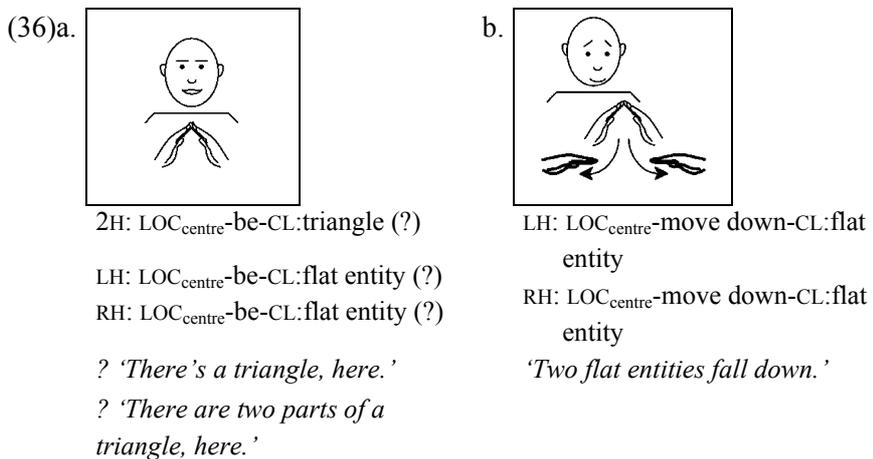
b.  *

View from above :

The literature on sign language classifiers makes clear that the representation of shape is very important (see section 2.2.3). Therefore, and based on the proposed morphological complexity of classifiers, I expected that signers would invent new classifiers to represent entities of particular geometrical shapes. In some of the elicitation materials (the ECOM clips) such entities occurred: circles, squares, boxes, bars and triangles. For instance, it would be possible to form a square from the fingers and thumb, or the fingers and the base of the hand (see (34)). The same holds for representation of a triangle, as can be seen in (35).



Triangles were represented by constructions of two  hands (see (36a)). However, since the triangle was decomposed into two smaller triangles in the clips, which was related by signers with the two  hands moving apart and down (36b), it cannot be determined whether the whole triangle itself was represented, or the two parts into which it broke up.



The signer preferred to indicate the shape of these entities by using a sign in which its shape was outlined.¹⁰ However, a moving square was not represented by such a sign but rather by a , a  or a  hand.¹¹

It therefore appears that signers do not create new classifiers from sub-hand parts and other morphemes. However, it should here be noted that it is possible for some signers to use some of the expected but seemingly non-occurring hand configurations. A discussion with two native signers who did not take part in the elicitation tasks, suggested that they would have no problem using the  hand configuration to represent a three-legged entity. I am reluctant to rely on their intuitions, however, because neither of these signers can be considered ‘average language users’: both of them are very aware of the language, one being a poet and the other an interpreter. Furthermore, I had talked to them earlier about the elicitation tasks and my expectations, and had explained that these expectations were not fulfilled. Therefore, their intuitions may reach farther than those of average NGT users, and the structures they accepted may have crossed the boundary between language and pun or poetry.

So far, I have not discussed *Handling Classifiers*. As stated in section 2.2.3, Supalla claims that these are also morphologically complex, but does not discuss their complexity. Shepard-Kegl (1985) makes a similar claim. This claim is based on theoretical considerations, and is not supported by independent evidence. I did not find any indication for such a claim in my data (although I did not systematically attempt to elicit

¹⁰ But recall that a similar two-handed configuration as the one in (34a) incidentally occurred when representing a large rectangular entity: a painting (in section 4.2.14).

¹¹ I will go into this observation in further detail in the next chapter.

complex Handling Classifiers). Therefore, I assume that these classifiers are not morphologically complex.

From the results described above, I conclude that the use of such complex hand configurations as classifiers is highly restricted. The sets of classifiers in NGT appear to form relatively small, closed classes of underived hand configurations.

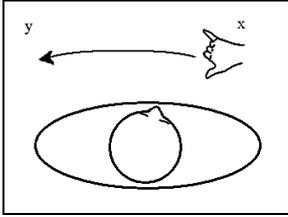
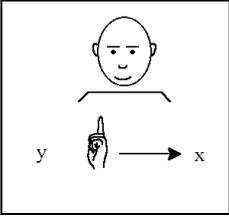
4.3.4 The orientation in a classifier predicate

So far, I have not addressed the *orientation* of classifiers. I will do so in this section, with particular focus on entity classifiers. Every classifier hand configuration has a particular orientation. Some referents may be represented by the same classifier, but have a different ‘default’ orientation. For instance, in NGT a car and a bicycle are both represented by a  hand configuration, but the orientation of the hand differs in both representations. Some researchers (Kantor 1985; Schembri 2003; Supalla *et al.* in press) suggest that such classifier hand configurations in different orientations may actually be different classifiers: in their accounts of ASL and AUSLAN the  hand configuration with fingertips oriented upward is analysed as a classifier representing upright human beings and long and thin or cylindrical entities, whereas the same hand configuration in a horizontal orientation represents horizontal long and thin or cylindrical entities. This implies that the sets of classifiers proposed for these languages are actually larger, because they contain classifiers in different orientations. Still, there should be mechanisms that specify orientations different from the ‘default’ ones, since referents can occur in several orientations. Rather than assuming that there are different classifiers for

referents in different default orientations, I assume that the sides of referents are mapped onto parts of the articulator in a manner predictable from the articulation possibilities and ease of articulation, involving as little bending of joints as possible. In this, I follow by and large the analogue building processes that have been proposed for ASL by Taub (2001). This would result in a mapping of the bottom of a car onto the palm side of the  classifier, while the bottom of a bicycle would be mapped onto the radial side of the hand. The front of the referents will be mapped onto the parts of the hands that can most flexibly change orientation, given the hand orientation that is connected with the bottom. In case of the car and bicycle, this would be the finger tips. Possible other sides of the referent would be mapped accordingly, and used in the linguistic (morphological) system that represents the orientation of a referent.

The orientation of a referent is expressed by morphemes in the predicate. I call these morphemes *contact points*. I assume that every referent is by default connected to a Ground. Usually, the Ground is formed by the (abstract) base plane, but it can also be another surface, for instance a table or a wall. The Ground forms the *main contact point*. The main contact point for a referent that is represented in its usual orientation has, as a default, its bottom. The term ‘contact point’ does not necessarily imply a physical contact of the hand or the entities. A flying airplane is also connected to a main contact point, even though it does not touch the Ground. If the referent is in an unusual orientation, the main contact point must be specified for that orientation.

A referent can also be specified for a *secondary contact point*, which is connected to the direction or referent to which it is facing or to the direction of its motion. Usually, a secondary contact point is the locus of another referent in signing space. The secondary contact point for a referent in its usual orientation has a default contact point, namely its front. If a referent is moving backwards, the secondary contact point is specified for the part of the referent that ‘faces’ the direction in which it moves. The examples in (37) illustrate this.

- (37)a.  b.  NGT
- LOC_x-move-LOC_y-
CL:airplane
'(The airplane) is flying
from x to y.'
- LOC_y-move.backwards-LOC_x-
CL:animate ent
'(Somebody) is going to the right,
backwards.'

Example (37a) shows the VELM expressing the motion of an airplane, flying from x to y, in a normal configuration. Thus, the bottom of the airplane (and thus, of the classifier representing it) is connected to the base plane and its front (and that of its corresponding classifier) to its end locus. Its full specifications appear in (38):

- (38) a. Main contact point [base plane ↔bottom]
b. Secondary contact point [location_y ↔front]

The construction in (37b) represents an animate referent moving backwards from y to x. The back of the referent is therefore facing its destination. This is represented in (39).

- (39) a. Main contact point [base plane ↔bottom]
b. Secondary contact point [location_x ↔back]

I will come back to the representation of orientation in classifier predicates in more detail in section 6.3.4.

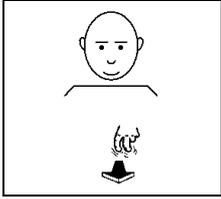
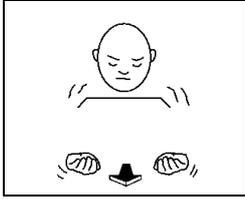
4.4 Variation in the choice of a classifier

The description of the range of classifier hand configurations in section 4.2 suggests that there is a certain amount of variation in the choice of a classifier. In this section I will discuss the phonological, syntactic and semantic/pragmatic reasons for this variation and argue that the variation comes partly from the grammatical structure of the clause and partly from ease of articulation. Furthermore, the choice of a particular classifier over another can provide extra detail in a particular situation, or can represent events from a particular viewpoint.

First, in section 4.4.1, I will address the grammatical reasons for the variation and distinguish the *direct* representation of an entity (by means of an entity classifier) from the *indirect* representation of an entity (by means of a handling classifier). This distinction is also described by other researchers, in particular Shepard-Kegl (1985), Wallin (1996, 2000) and Benedicto & Brentari (to appear). I will then discuss the variation that occurs within the type of entity classifiers in section 4.4.2, and within that of handling classifiers in section 4.4.3.

4.4.1 Entity and handling classifiers

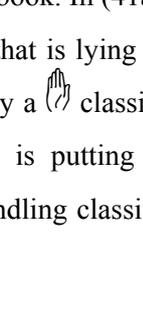
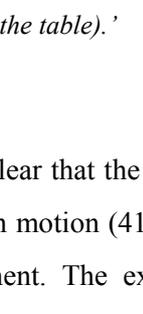
In previous sections, we have seen that an entity can be represented by various hand configurations. For instance, a person can be represented by no fewer than seven classifiers: , , , , ,  and . A specific example of an entity that is represented by different classifiers in the data helps illustrate this variation. In one of the comics, Donald Duck is attacked by a rocket. In the signed text, the representation of Donald moving around is mainly accomplished by use of the  hand configuration, as in (40a). However, after he is attacked, he is unable to walk, and one of his nephews carries him into the house. This is represented by the  hand configuration in (40b).

- (40)a. 
 LOC_{centre}-move.out-CL:legged ent
 'Donald Duck walks (forwards).'
- b.  NGT
 x-hold-CL:large cyl. ent
 'The nephew carries Donald Duck (forwards).'

Importantly, in both cases Donald Duck is undergoing an event of motion. In the first instance, this motion is independent, and Donald Duck is represented *directly* by means of an entity classifier (focusing on the legs). In the second instance, the motion is dependent: Donald Duck is undergoing a manipulated motion, being carried by his nephew. The  hand configurations thus represent Donald Duck *indirectly*. Next to

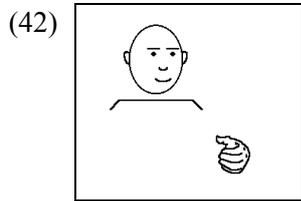
representing the entity in motion (Donald Duck), the manipulating entity (the nephew) is represented.

The same point can also be illustrated with another entity: the location and the manipulation of a book. In (41a), we see that an entity classifier is used to represent a book that is lying on a surface (for instance a table). The book is represented by a  classifier. This classifier cannot be used to indicate that someone is putting a book on a surface. In such a manipulated motion, a handling classifier is required, in this case the  classifier, as in (41b).

- (41)a. 
 LOC_{down}-be-CL:flat ent
 'There is a book (on the table).'
- b. 
 x-move-LOC_{distal}-CL:thick flat ent
 '(Someone) puts a book down (on the table).'

These examples make it clear that the classifier represents a referent that is at a location (41a) or in motion (41b). In terms of argument structure, this is the Theme argument. The examples also make clear that the representation of the referent differs radically. This difference is connected to the argument structure of the verb. Entity classifiers (direct representations of entities) occur on *intransitive* verbs of motion and location of a referent. Handling classifiers, on the other hand, represent manipulation of the referent in question and occur only on *transitive* verbs. Thus, the choice between an entity classifier and a handling classifier is determined by the argument structure of the verb.

In many cases, a clear-cut difference between entity and handling classifiers emerges, but the distinction between the two types is not clear in all cases. Some classifiers are polysemous and have both an entity classifier reading and a handling classifier reading. One example is the  hand, representing cylindrical or round referents, as in (42).



1. x-LOC_{right}-hold-CL:cyl. ent
2. be- LOC_{right}-CL:cyl. ent
1. '(Someone) is holding a glass.'
2. 'There is a glass to the right.'

The handshape in this case could stand either for the cylindrical entity, or indicate that the cylindrical entity is held. In some cases the intended reading can be inferred from the movement in the predicate, representing the motion of the noun referent, combined with world knowledge. In many cases the linguistic context is needed to disambiguate between the possible readings. If the classifier occurs in a transitive context it functions as a handling classifier, whereas in an intransitive clause it functions as an entity classifier.¹² This issue is important for my analysis of the grammatical function of classifiers, and I will return to it in Chapter 6.

¹² Note, however, that there will always be situations in which it is impossible to distinguish the entity classifier reading and the handling classifier reading, because it is not obligatory to express the arguments of the predicates overtly.

There thus appears to be a systematic difference in the choice of classifier used to represent an entity. Entity classifiers represent entities directly; handling classifiers represent the way in which an entity is held or manipulated. This difference is directly related to the argument structure of the verb: entity classifiers appear on intransitive verbs whereas handling classifiers appear on transitive verbs. This grammatical difference is one of the sources of variation in the representation of an entity.

4.4.2 Variation in the choice of an entity classifier

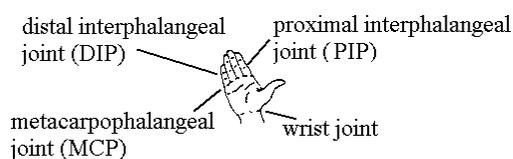
Two other types of variation in entity classifiers occur in the data: allophonic variation and ‘free’ variation. In allophonic variation, the hand configuration used is one that is easy to articulate in a particular situation. Free variation is determined by semantics/pragmatics, providing information on the point of view of the signer. I will discuss the allophonic variation first, referring to claims on variation in hand configurations made by Crasborn (2001) and Van der Kooij (2002).

Besides the  hand, in the data the  hand was often used to represent flat and wide entities. Crasborn (2001) argues that these two hand configurations are phonetic variants. In particular places of articulation, it is difficult to use a fully extended flat hand. In these places, the bent variant is used. This holds for the data collected in this research, as well. For example, in NGT, cars are often represented by the  hand. The palm side of the hand (or rather, of the fingers) is oriented downward, towards the base plane that can be considered the ground. Using the  hand would in some cases require that the wrist or even the

elbow or shoulder joints be bent, for instance when signing that one car was following another car. Ease of articulation leads signers to bend the MCP joints instead.¹³

Another variation observed in the data involves the  hand and the  hand, both used to indicate flat entities. The difference in thumb position does not appear to affect the meaning of the sign, so this difference seems to be phonetic, as well. (Partial) spreading of the thumb may be easier to articulate, but can in some cases hamper signed constructions, as noted by Van der Kooij (2002). In signs where the radial (or thumb) side of the hand contacts a body part of the weak hand or arm, the thumb is in the way. It is then positioned close to the rest of the hand or against the hand palm. This phonetic variation occurs with both the  hand configuration and the  hand, which does not seem to differ in meaning from the  hand. Similar to the bending of the MCP joint in the  hand, bending of the MCP joint of the index finger (resulting in the  and  hands) is possible, too; the hand configuration does not have a different denotation.¹⁴

¹³ The joints of the hand are:



¹⁴ For this reason Crasborn (2001) claims that in NGT the manual articulators are not so much whole hands, but that fingers, hands and arms are phonetic implementations of abstract phonological features, that can be influenced by the position of the articulator and by different registers (ranging from whispering to shouting). At least the former appears to hold true in the classifier system of NGT as well.

The  and  appear to be variants of each other, too. This variation may be related to ease of articulation, as the variation between the  and the  hand appears to be. Representing (standing) legged entities with a  hand configuration requires straight fingers and a bent wrist or MCP joint, imposing a strain on the articulator. In the  hand configuration the (MCP and the) DIP and PIP joints are bent, and the wrist joint need not be bent. This suggestion is supported by the fact that the  hand configuration is not used in the representation of *lying* legged entities, where the orientation produces less strain on the joints. Instead, the  hand configuration is used.

Another variant of the  hand is formed by one or two  hands representing the motion or positioning of legs. This configuration is quite predictable, used when the fingers have to represent a particular movement (for instance marching, limping or skipping) or a particular positioning of the legs (for instance crossed legs) that cannot easily be articulated with one hand because of the articulatory restrictions of the fingers. Again, I consider ease of articulation a reason for this variation.

Finally, in some cases where a  hand is used, the spreading of the fingers does not actually indicate a different type of referent; rather, the finger spreading appears to be a relaxed form of the  hand, which also seems to be true for much of the variation between the  and the  hand. The data in my investigation and discussion with my consultants do not make it clear whether the  hand represents a wider surface than the  hand, or whether, in manipulation structures, the  hand might indicate larger or heavier entities than the  hand. Since the spreading of the fingers of the  hand is often rather lax, I assume (for the time

being) that the  hand and the  hand can be phonetic variants, just as the  and  hands are variants.

In view of the articulatory possibilities, it is interesting to note that entity classifiers in NGT appear to represent far fewer shapes and configurations of referents than they could, in principle. It appears that the use of an entity classifier is restricted to the representation of an entity as a whole (even if it, literally, represents only a part of that entity), and, that the classifier, apart from the orientation of the entity, does not necessarily represent its actual shape or configuration in a particular situation, particularly when these deviate from normal expectations.

A third type of variation in choice of a classifier hand configuration occurs. This is ‘free’ variation.¹⁵ The existence of free variation is stressed in the sign language literature, and has led some researchers to doubt the status of sign language classifiers as classifiers. I will not discuss this grammatical issue here, but return to it in Chapter 6. Here, I will discuss the free variation in the choice of an entity classifier.

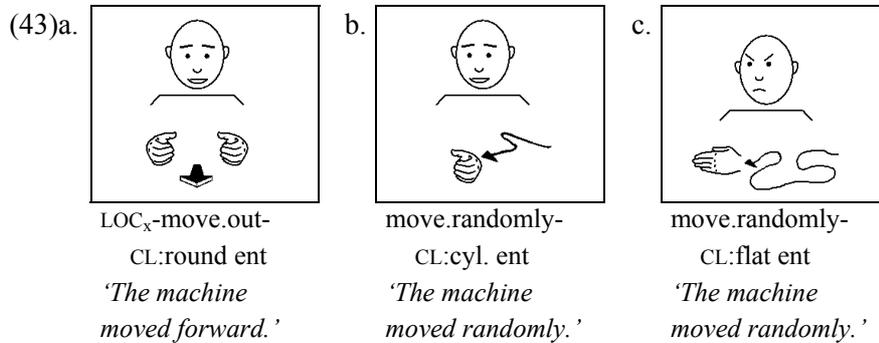
The most obvious variation is found in the representation of humans and animals (whether or not acting as humans). Most of these entities can be expressed either by an (upright)  hand or the  hand. The  hand is used more frequently, and it appears to highlight the legs in the motion of a referent (for which reason I call it a classifier for legged entities). For the most part, this involves the self-propelled motion of walking, but can also represent other motions, which we would interpret as falling, jumping and dancing. The  hand (oriented upward) is

¹⁵ Since the variation is semantically/pragmatically determined, it is not completely free. Nevertheless, I will use this convenient term for this type of variation.

primarily used to indicate the localization of an entity in signing space and a motion of an entity towards the signer, often when the signer has taken the role of one of the characters in the story. This hand configuration is also used when an entity's self-propelled motion is fast, or the emphasis is not specifically on the way in which the legs move.

Some variation occurs in the representation of round entities, too. If an entity is not only round but also flat, such as a CD-ROM disc, the signer has a choice in the shape aspect(s) he wants to express. The signer can use a  classifier to stress the flatness, or a  hand to stress the roundness (and flatness). An instance where a round entity was represented by different hand configurations was in the expression of the motion of the piglet catching machine, which has a rather complicated shape. Its body is relatively flat, but also round, and it has a pedestal with wheels. It turned out that signers focused on different aspects of the shape of the machine. In some cases, the round shape was expressed, by the use of one or two  hand configurations. In other cases, the  hand was used. In expressing the complex motion of the machine when it was chasing the piglets, either a one-handed or two-handed version of the  hand configuration was used, or the  hand. These variants are illustrated in (43).¹⁶

¹⁶ Strangely, the orientation of the  hand does not reflect the orientation of the flat part of the machine. Other than a possible effect of ease of articulation, I have no explanation for this.



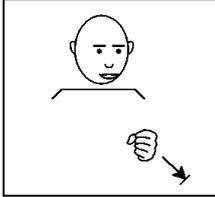
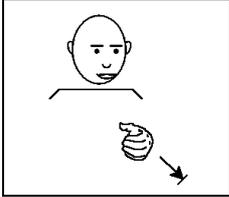
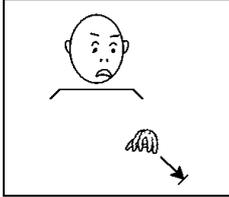
Furthermore, as I have shown in section 4.3.1, many entities were represented by a default classifier: . This classifier appears to be used when the signer does not want to emphasize any characteristic of the referent, but rather its location or path.

There is, indeed, a range of variation in the use of an entity classifier for a particular referent. This variation is, however, relatively restricted considering that it is in large part predictable from grammar and ease of articulation. The remaining free variation reflects the (lack of) emphasis on a particular characteristic that a signer wants to stress.

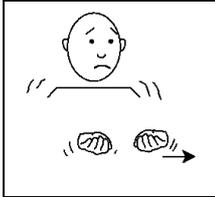
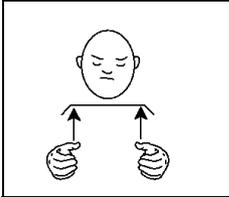
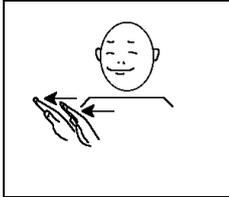
4.4.3 Variation in the choice of a handling classifier

Within the set of handling classifiers, there also appears to be variation in the choice of representation of a specific entity. The hand configuration usually reflects the way in which an entity is normally handled, usually by holding its smallest part (see also Wallin 2000). For instance, a flower is usually held by its stem, which is represented in the normal classifier hand configuration. A frying pan, a fishing net and a mug are usually held by the handle. However, a signer can choose to indicate that the entity was *not* held in the usual way. Thus, he can represent a mug in a motion

verb by indicating that it was not held by the handle but that the whole mug was held in the hand, or that it was held by the brim, for instance because the contents were hot (see (44)).

- (44)a. 
 x-move-LOC_{right+low}-
 CL:thin cyl. ent
 '(Someone) puts
 the mug down.'
- b. 
 x-move-LOC_{right+low}-
 CL:large cyl. ent
 '(Someone) puts the
 mug down.'
- c. 
 x-move-LOC_{right+low}-
 CL:round ent
 '(Someone) puts the
 (hot) mug down.'

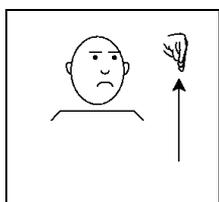
We have also seen several examples of humans being handled: carried and lifted, but they can also be pushed. These manipulations are illustrated in (45).

- (45)a. 
 x-move-LOC_{right}-
 CL:bulky ent
 '(Someone) carries
 the boy away.'
- b. 
 x-LOC_{down}-move.up-
 CL:cyl. ent
 '(Someone) lifts the
 old lady.'
- c. 
 x-move-LOC_{left}-
 CL:large ent
 '(Someone) pushes
 the girl.'

The characteristics of the manipulating entity can also affect the choice of a particular hand configuration. In normal contexts, manipulation takes place by humans, but if a giant were to be the manipulator, the size of the

manipulated entity in relation to the manipulator would be different from the size in relation to a human manipulator. This turns up in the particular hand configuration, since an entity that humans consider large may be small in the view of the giant. In my elicitation materials, manipulating entities other than human beings occurred, such as grabbing arms of machines. In a particular context the Bad Wolf was lifted by the claw of a crane. The shape of the claw was represented as well as the shape of the part of the Bad Wolf in the signed texts. In another context, the same Bad Wolf was lifted by the claw of the piglet catching machine. In these cases, the manipulated referent was represented as rather small in comparison to manipulation by a human being, as can be seen from a comparison of (45) and (46).

(46)



x-LOC_{right}-move.up-CL:thin flat ent

'It (the grabber of the crane) lifts the Bad Wolf (by his clothes).'

It seems that the different ways of manipulation can all be represented by a classifier. There is also some variation with respect to the shape of an entity in the degrees of aperture of the hand. However, these degrees are in fact barely identifiable. For that reason, I do not distinguish hand configurations that have different apertures ranging from fully open to fully closed as different classifiers. Instead, I only consider open and

closed hand configurations such as the  and  hands and the  and  hands as distinct classifiers.

In summary, variation in the choice of a handling classifier is dependent on the size of the manipulator relative to the manipulated referent and on whether the signer emphasizes a particular, possibly unusual way in which the referent is being handled.

4.5 Summary

This chapter showed which hand configurations occur as classifiers in verbs of motion and location in NGT and what their meaning is. I have also focused on the morphological complexity of classifiers and concluded that NGT classifiers are not morphologically complex and that novel forms are not easily constructed from finger morphemes or other morphemes. Instead, the set of classifiers in NGT appears to be small and closed. Furthermore, I have focused on the orientation of the entity and made some suggestions to account for its representation within a classifier predicate. I have also discussed the variation that occurs in the choice of a classifier. It appears that the variation has three causes: (i) the argument structure of the verb: entity classifiers are used on intransitive verbs, handling classifiers on transitive verbs; (ii) allophonic variation, that is, some hand configurations are not distinct classifiers, but the particular shape of the hand in a predicate is a result of restrictions on articulatory possibilities; (iii) free variation, that is, a signer chooses a particular classifier over another in order to focus on a specific characteristic of the referent. I conclude with an overview of the NGT classifiers that occur in my data.

Table 1 Overview of NGT classifiers and their denotations

Hand Conf.	Type	denotation
	EC	flat and wide entities: books, sheets of paper, walls, table tops, cars, bicycles, trains, helicopters, flying saucers, CD-ROM discs, circles, squares
	HC	large entities: boxes, pizzas, humans, large plates
	EC	flat rectangular entities: paintings, mirrors
	HC	--
	EC	long and narrow entities: poles, pens, knives, toothbrushes, branches, trees animate entities: humans, animals
	HC	--
	EC	(animate) legged entities: humans, animals, aliens
	HC	--
	EC	3D round entities: balls, apples, tomatoes, stones entities with many long & thin extensions grabbers entities of undetermined shape/abstract entities: village center,
	HC	3D round entities: balls, apples, tomatoes, stones large entities handled with delicacy: people/animals, roofs, walls
	EC	(3D) entities: squares, circles
	HC	--

Hand Conf.	Type	denotation
	EC	3D round/cylindrical entities: glasses, mugs, apples, balls, poles, circles, trees
	HC	3D round/cylindrical entities: glasses, mugs, apples, balls, poles, circles, trees small/flat entities (compared to shape of manipulator): clothes, feet, books
	EC	small 2D round entities: coins, buttons, eyes
	HC	small/thin entities: pins, pens, handkerchiefs, buttons, cups (by handle)
	EC	2D round entities: biscuits, glasses
	HC	--
	EC	large 2D round entities: CD-roms, plates
	HC	--
	EC	flat opposite entities: claws, beaks, mouths
	HC	thick flat entities: paper, books, floppy discs, people (by their clothes)
	EC	flat opposite entities: claws, beaks, mouths
	HC	flat entities: piles of paper, towels, books
	EC	--
	HC	thin cylindrical entities (held with some force): handles, poles, string

Hand Conf.	Type	denotation
	EC	--
	HC	thin cylindrical entities (held with delicacy): silverware, banknotes, string
	EC	tiny entities: flies, bees, ants, contact lenses, drops of water, entities of unspecified shape or shape that is difficult to represent by any other classifier all entities
	HC	--
	EC	airplanes
	HC	--
	EC	trees
	HC	--

Chapter 5

Different types of classifier predicates

5.1 Introduction

When meaningful hand configurations in sign languages started to be investigated, they were compared to classifiers in spoken languages, resulting in the conclusion that they were highly similar to them (Frishberg 1975; McDonald 1982; Supalla 1982; and others). Initially, meaningful hand configurations in sign languages were compared to the classificatory verb stems in spoken languages like Navajo. However, several researchers (Engberg-Pedersen 1993; Zwitserlood 1996; Schembri 2001) have argued convincingly that this comparison is based on a misinterpretation of the Navajo verb stems. The Navajo verbs that have been used in the literature to illustrate their similarity to the sign language classifier predicates consist of two morphemes, analysed as a verb and a classifying morpheme, respectively. However, it has become clear that this analysis is not correct. The Navajo verbs in question consist of a (perfect) aspect marker and a verb stem in which the verb and classificatory element are conflated. Although this verb stem may be

analysed historically as consisting of separate morphemes denoting a verb root and a classifier (Young & Morgan 1987; Cook & Rice 1989), this is not a possible synchronic analysis. In sign language predicates, the element that is considered the classificatory device is clearly analyzable as a separate morpheme, and is separate from the verbal element. For this reason, classificatory verbs in Navajo and constructions with meaningful hand configurations in sign languages cannot be fully compared.

In the last twenty years additional research and comparison has been done on classifiers in both spoken and sign languages. More recent discussions on their status have arisen on the basis of new data, and alternative analyses of meaningful hand configurations and the structures in which they occur. Some researchers (Engberg-Pedersen 1993; Emmorey 2001; Schembri 2001; Slobin *et al.* 2003) doubt whether these hand configurations are really classifiers and whether the structures in which they appear are really classifier predicates. (This doubt has led to a number of different terms for the same phenomena).

In this chapter I will compare the characteristics of classifier predicates in NGT with those of genuine verbal classifier systems in spoken languages, using recent literature on classificatory devices in spoken languages (Aikhenvald 2000; Grinevald 2000). I will show that the prototypical morphosyntactic and semantic characteristics of verbal classifiers in spoken languages are comparable to the morphosyntactic and semantic characteristics of some of the NGT classifiers, but not all. Therefore, not all of these sign language predicates should be considered examples of the same phenomenon.

I will generalize over the morphosyntactic characteristics of three subtypes of classifier predicates in sign languages. The generalizations are based on my NGT data. In section 5.2, I will discuss the verbs expressing the path motion, the change of orientation, the location and the existence of a referent; in section 5.3, the predicates in which size and shape of referents are outlined (Size and Shape Specifiers or SASSes), and in section 5.4, I will focus on the predicates that express the manner of motion of referents. In section 5.5, I will compare these to the prototypical morphosyntactic characteristics of verbal classifiers in spoken languages. The summary and conclusion can be found in section 5.6.

5.2 Verbs of motion, location and existence (VELMs)

In this section, I will focus on the subtype of classifier predicates consisting of verbs that express the path motion of a referent through space and/or the orientation change of a referent, verbs that locate a referent in space, and verbs that express the existence of a referent in space (I will call these VELMs),¹ and I will generalize over the characteristics I have found in the NGT data.²

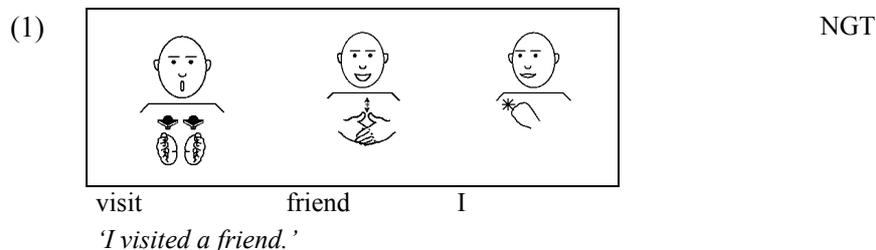
¹ VELM is short for ‘verb of motion, location and existence’. The unexpected ordering of the initials is chosen because of the easy pronunciation (easier than VMLE).

² In contrast to the literature (Supalla 1982, 1986, and others), I distinguish terminology for verbs that express the localization of a referent and verbs that express the existence of a referent, because these diverge somewhat. Verbs that express motion or that indicate the existence of a referent express an event or a stative situation. Verbs expressing the localization of a referent, in contrast, are often *not* used to describe a stative situation (or an event), but to assign referents to particular loci in signing

In the sign language literature, it is often claimed that before a classifier is used, its referent must have been introduced in the discourse. If this were not done, the reference of the classifier would be unclear. This holds true for the classifiers that appear on VELMs in NGT, as well. A signer telling a story usually begins with a setting, introducing the entities that will occur in it before relating the events of the story (a common pattern in narratives in all languages). After potential referents are introduced, classifiers can be used to represent them. When a new referent is necessary during the narration of the main events, it is introduced before the signer uses a classifier to represent it. There are some exceptions. A classifier is sometimes used without the previous introduction of the referent, when the reference of the classifier can still be obtained. The linguistic or deictic context may make the reference of a classifier obvious, or the signer may make the referent explicit after using a classifier predicate.³ Signers tend not to use classifier predicates in isolated sentences out of context. For instance, when asked where he has been, a signer can respond sufficiently as in (1):

space, so that the loci can be used for further reference to the referents (this can be done with a default entity classifier  as well as with a more specific entity classifier. In the former case the verb of localization is a pointing sign, in the literature often glossed as INDEX). In that respect, these verbs seem to function like *operators* that assign overt indices to connect referents with particular loci rather than as verbs. However, since they behave like verbs of motion and existence in other respects, I will not treat them differently in this thesis.

³ In my data, some particularly interesting cases occur. Since some of the tasks required situations to be expressed repeatedly, either by the signer or by the addressee, a signer sometimes did not bother to introduce the referents when starting to retell a story: they were clear from the previous story, not from the immediate context.



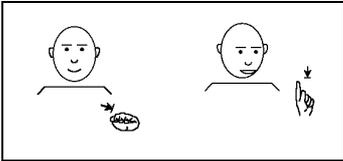
Although the verb expresses a motion, no classifier predicate is involved in the structure in (1). The friend has not been localized, nor has an inflected predicate been used, only a verb stating that someone visited someone.⁴ Although the signer could have introduced the friend, assigned him a locus in signing space and used a verb of motion with a classifier (for instance a  hand) to indicate the trajectory of the referent, in such isolated sentences he tends not to set up referents in signing space and not to express the exact path that was traversed.

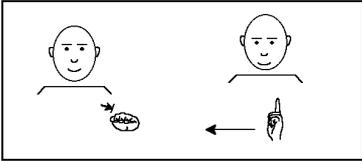
Within a VELM a particular hand configuration can be used to represent the referent involved in the event expressed by the verb. Such a hand configuration cannot occur in isolation: it is always used simultaneous with the verb. The hand configuration is thus a bound morpheme.⁵ Classifiers represent a referent that is in motion, that is being located or that exists at some location in signing space. This means that classifiers are linked to the Theme argument of the verb (Gruber 1976;

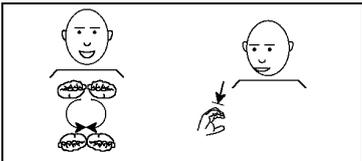
⁴ This verb can be inflected for Source and Goal, but this is not obligatory.

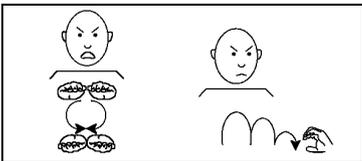
⁵ Actually, the verb is also a bound morpheme, as has been pointed out in the literature (among others Engberg-Pedersen 1993; Meir 2001; Slobin *et al.* 2003). I will discuss the grammatical status of the elements within the classifier complex in more detail in Chapter 6.

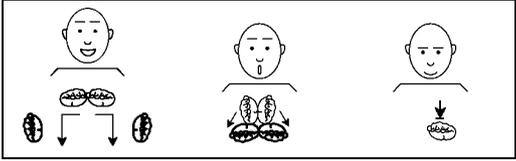
Jackendoff 1987, 1990), that is: the argument whose motion or location is specified. Examples that illustrate this observation are given in (2)-(4). In each example, the hand in the predicate represents a referent that is being localized somewhere in signing space or that follows a trajectory through space (a child in (2), a ball in (3), and a book in (4)).

- (2)a. 
 child be-LOC_{right}-CL:animate ent
'There's a child, here to the right.'

- b. 
 child LOC_{right}-move-LOC_{left}- CL:animate ent
'The child went (from here to there).'

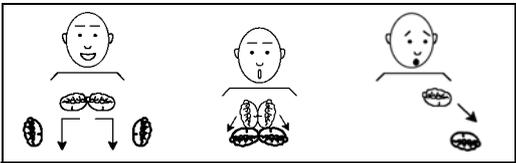
- (3)a. 
 ball be-LOC_{right}-CL:round ent
'There's a ball, here to the right.'

- b. 
 ball LOC_{left}-move.arc-IT-LOC_{right}-CL:round ent
'The ball bounced away to the right.'

(4)a. 

table, book be-LOC_{center}-CL:flat ent

'There's a table, and there's a book on it.'

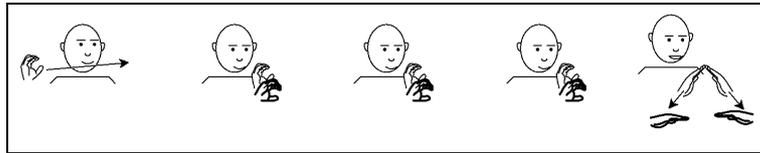
b. 

table, book LOC_{center}-move.down-CL:flat ent

'There's a table, and a book fell off it.'

In these examples, the verb's arguments are overtly expressed. Overt marking of the arguments is, however, not obligatory: they can also be left implicit. Within a discourse, it is often the case that no overt reference to the referents that are involved is made: pro-drop appears to be possible for all arguments, and sign sequences that consist of various predicates often occur in a discourse. This is illustrated in (5), which contains a sequence of five intransitive VELMs without any overt marking of the arguments involved.

- (5) *Linguistic context: 'There's a green triangle to the right, and a ball, oh, it's a packman!, to the right. It has a plank in its mouth.'*



X-LOC_{left}-move.right-CL:flat ent X-LOC_{right}-move.down-CL:flat ent X-LOC_{right}-move.down-CL:flat ent X-LOC_{right}-move.down-CL:flat ent RH: LOC_{center}-move.down-CL:flat ent
 LH: LOC_{center}-move.down-CL:flat ent

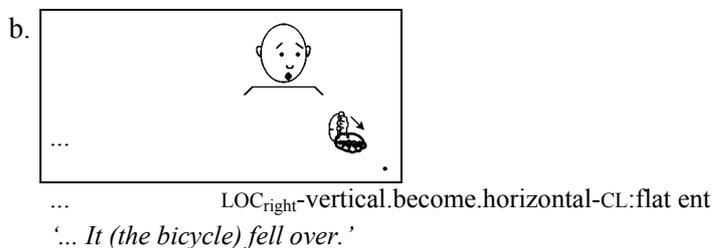
'(The packman) moved the plank to the right, hit the triangle with it three times and the triangle fell apart in two pieces.'

Classifiers are used to keep track of the referents during a discourse. These generalizations hold not only for verbs that express the motion of an entity through space or its localization in signing space, but also for verbs that express the existence of an entity, as in (6a), where the dots indicate that the signer can express several signs with one hand while holding the classifier predicate configuration on the other. The generalizations also pertain to verbs expressing a change in the orientation of an entity (6b).

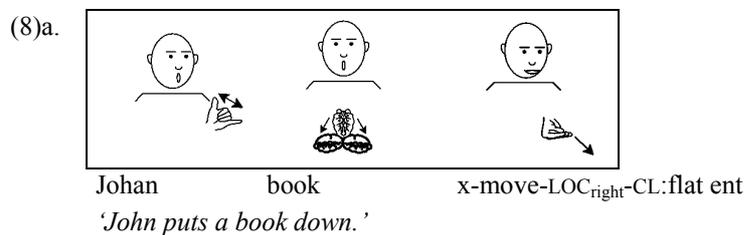
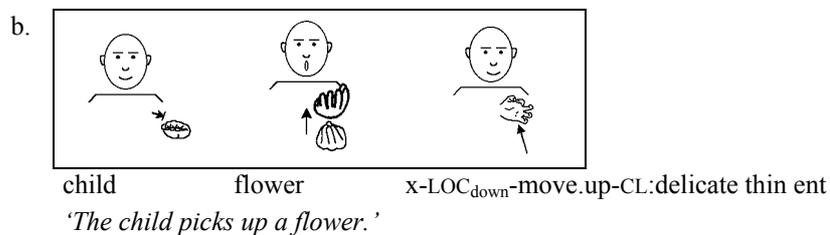
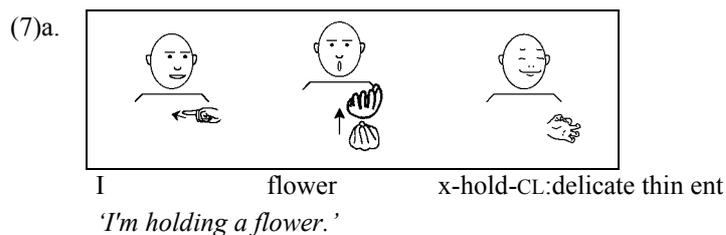
- (6a.)

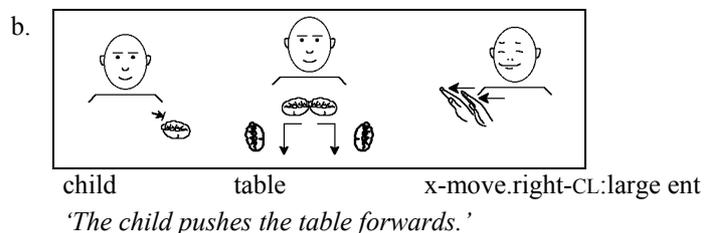
 bicycle be-LOC_{right}-CL:flat ent exist-LOC_{right}-CL:flat ent ...

'There's a bicycle, here to the right. (It is here and)'



We have seen in section 4.4.1 that classifiers also occur on transitive VELMs. Some examples are given in (7) and (8); here, the arguments of the verb are expressed overtly .





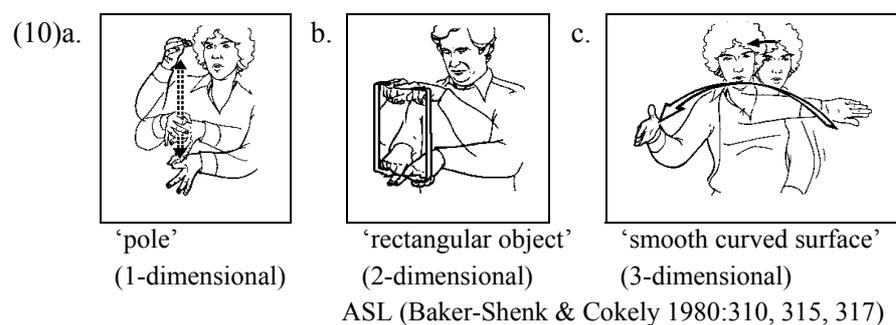
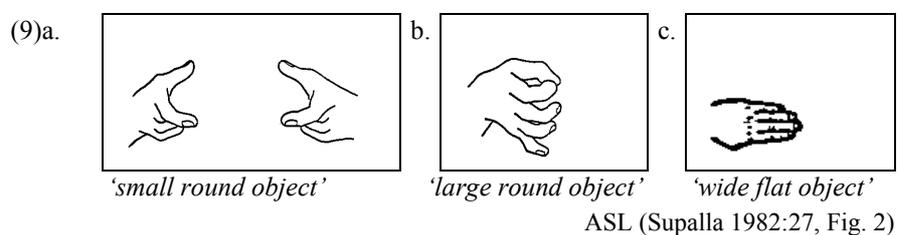
In both transitive and intransitive sentences classifier hand configurations represent the Theme argument of the VELM. It may seem somewhat premature to use syntactic terminology for this argument, since there is no overt systematic marking on nouns that shows us what their syntactic role is. Nevertheless, since the preferred constituent order in NGT sentences is SOV/SVO (Coerts 1994; Van Gijn in prep.), I assume that the argument of a transitive VELM that is not in sentence-initial position functions as the object. With respect to intransitive verbs word order cannot be of any help in determining the syntactic role of the argument, since there is only one argument, which can be a subject but also an object. According to Benedicto & Brentari (to appear), one subgroup of classifier predicates (in ASL) is unaccusative, whereas another group of these predicates is unergative. Preliminary results of an investigation on classifier predicates in NGT show that VELMs are probably unaccusative (Zwitzerlood in prep.). This means that the argument in a sentence with an intransitive VELM is a deep object, but a surface subject. For this reason. I assume that, in syntactic terms, meaningful hand configurations are connected to the subject of intransitive VELMs and to the object of transitive VELMs.

Thus, there appears to be a systematic marking of the moving referent, that is, the Theme argument (subject or object), on the verb by means of a

classifier: VELMs appear to be obligatorily marked with a classifier. As we have seen in Chapter 4 the set of hand configurations involved is rather small: the inventory of classifiers (so far) holds fifteen entity classifiers and eight handling classifiers.

5.3 Tracing Size and Shape Specifiers

Sign language researchers have proposed different types of classifiers, ranging from two to eight types (see Chapter 1, section 1.3). Supalla (1982; 1986) calls one of these types is called a Size and Shape Specifier or SASS. Recall from section 2.2.3 that he divides this type into two subtypes: static SASSes and tracing SASSes. Examples of these are given in (9) and (10), respectively.



These types have been accepted in much subsequent research, although they are often labeled differently.⁶ Static SASSes are similar to entity classifiers in that the hand configurations represents noun referents, occur on intransitive VELMs and refer to the Theme argument of VELMs. Tracing SASSes, in contrast, have very different characteristics.

An important characteristic of all ASL SASSes, as described by Supalla (1982, 1986), is their representation of the size and/or shape of the referent. In static SASSes, the shape is represented solely by the hand configuration. In tracing SASSes, the hand follows a trajectory through space that traces the shape of the referent, while the hand configuration contributes in meaning with respect to that shape. The hand configuration provides information about the dimensionality of the entity that is referred to (see also Wallin 1990). For entities that are saliently one- or two-dimensional, such as thin poles or paintings, a hand configuration is usually used that has only an extended index finger or an extended index finger and thumb. A tracing SASS indicating a thin object, such as a thin pole as in (10a), employs a hand configuration with only extended and bent index finger and thumb: . To outline a thick pole, the  hand configuration, in which all fingers are extended and bent, is used, and the  hand configuration would be considered less felicitous. Similarly, if, in the sign in (10b), the  hand were used instead of the  hand, the sign

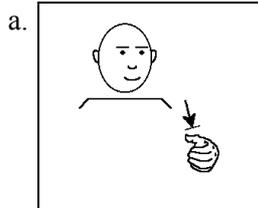
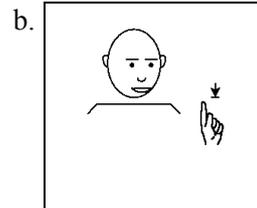
⁶ In the literature, *static SASSes* are also called *object classifiers*, *class classifiers*, *whole entity classifiers*, *semantic classifiers*, and *descriptive Instrumental classifiers*. *Tracing SASSes* are also known as *extent classifiers*, *surface classifiers* and/or *perimeter classifiers*. To facilitate comparison of the characteristics of these elements, I will use the terms static and tracing SASS in this section. However, in the remainder of this thesis I will use different terms.

would indicate a three-dimensional cube entity, such as a box, instead of a two-dimensional square entity.

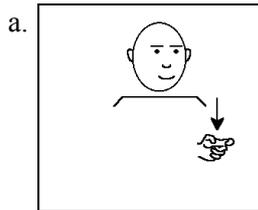
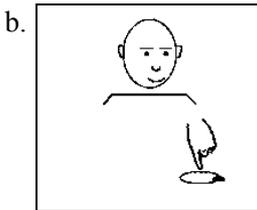
Another characteristic of tracing SASSes is that they can be made at a particular position in signing space, after which the referent is associated with that locus. This locus can be used for further reference in the following discourse. The characteristics described above for ASL hold for similar signs in NGT as well. My data reveal some additional characteristics of tracing SASSes in NGT. It appears that while static and tracing SASSes are considered classifiers of one general type, they differ on four accounts.

First, despite superficial similarities, static SASSes and tracing SASSes function differently in NGT grammar. NGT signers can locate a referent in signing space with a static SASS or a tracing SASS. When a static SASS (or entity classifier) is used, it is placed at a locus in signing space, as we have seen in previous chapters. This is accomplished by means of a small movement of the hand towards that locus. The movement can be downward, if the referent is on top of something else (including the ground) as in (11), or towards a vertical plane, if the referent is, for example, hanging on a wall. When a tracing SASS is used, an outlining movement takes place at a locus in signing space. Localization with an entity classifiers is illustrated in (11), and localization with a tracing SASS in (12).

(11) Localization with entity classifiers:

be-LOC_{right}-CL:cyl ent*'There is a cylindrical entity to the right.'*be-LOC_{right}-CL:l&t ent*'There is a long and thin entity to the right.'*

(12) Localization with tracing SASSes:

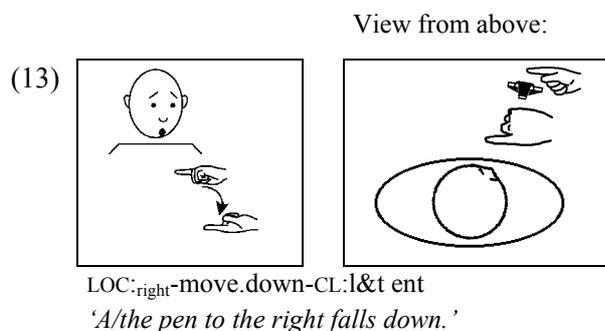
be-LOC_{right}-cyl ent*'There is a cylindrical entity to the right.'*be-LOC_{right}-round ent*'There is a flat round entity to the right.'*

The first difference between these structures is that the hand configuration itself represents the referent in an entity classifier (by its shape), whereas a tracing SASS needs a movement of the hand to express the (shape of) the referent in addition to a hand configuration. For instance, the sign in (11a) consists of a  hand configuration expressing the cylindrical shape of a referent, combined with a small downward movement that indicates the localization of the referent. Similarly, the sign in (12a) indicates a cylindrical referent, and by making the sign at a particular location, the signer localizes that referent. Although in both (11a) and (12a), the referent is cylindrical, in (12a) this shape is indicated

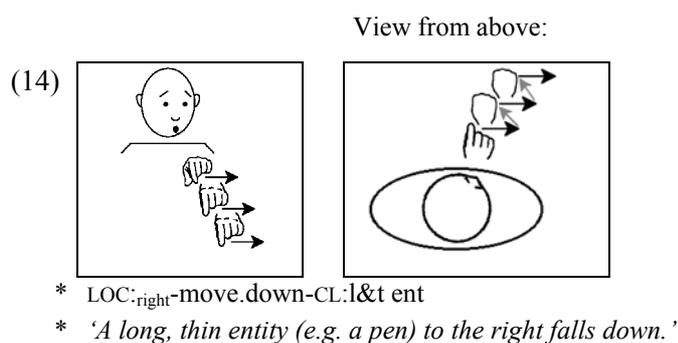
by a combination of the hand configuration and a movement of the hand that traces the outline of a cylindrical entity. Without the movement, the sign in (12a) would not indicate a cylindrical entity, but a flat (small) round entity. Movement is equally crucial in the example in (12b), in which the signer expresses the localization of a referent that has a flat, round shape: this shape is indicated mainly by the outlining movement. Without that movement, the sign would not indicate a round entity, but a long and thin one.

The movement in tracing SASSes, therefore, does not indicate a path motion, but the shape (and/or size) of a referent. The hand configuration in these predicates contributes to the meaning of the whole sign in indicating its dimensionality, but it has a different function from the hand configurations that appear in VELMs, which refer to an argument of the VELM, namely the Theme argument. In tracing SASSes, the hand configuration is not connected to verbal arguments.

A second difference between the SASS types relates to the verb types with which they may appear. In my data, in addition to verbs of location, static SASSes (or: entity classifiers) are also used with verbs of existence and verbs of motion, indicating an orientation change of a referent, or a path motion of a referent, as illustrated in (13).



However, nowhere in the data is a tracing SASS used on a verb of motion. Since non-occurrence does not prove non-existence, I discussed the possibilities of using a tracing SASS to indicate the motion of a referent with my consultants. They all agreed that this was impossible. The only feasible way to combine a tracing SASS and a verb expressing a path motion is to repeat the SASS along the traversed path. It is physically possible to realize such a construction, as can be seen in (14).



This combination, however, has a different interpretation than that of a referent traversing a path. It means that there are several similarly shaped (long and thin) referents positioned at several loci in signing space (for

instance, several pens). Thus, this construction expresses a sequence of verbs of location, not a verb of motion.⁷

A third difference between static SASSes and tracing SASSes is their use. Although both can give information on the shape of the referent, the use of these constructions differs. As shown in Chapter 4, the set of meaningful hand configurations is rather small. As a consequence, the number of shapes that can be represented is very limited. Furthermore, when a signer uses a static SASS, he often represents the shape of the referent globally or focuses on a part of its shape that can be represented easily or that he considers important. In contrast, tracing SASSes can be much more specific about the shape of the referent. For example, a signer confronted with a line drawing of a star-shaped mirror that is hanging on the wall, and asked to describe what he sees in the drawing, can use a verb of location to indicate the location of the entity. It is perfectly possible to trace the outline of the mirror, using the tips of the extended index fingers to indicate that the entity is flat and thin, as in (15).

(15)

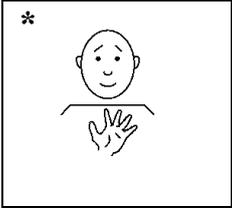
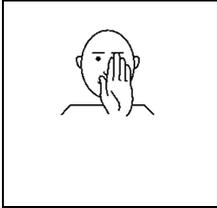


be-LOC_{center}-flat star-shaped ent

'There's a flat star-shaped entity (vertical) here at the center.'

⁷ This difference has also already been described for ASL by Baker-Shenk & Cokely (1980).

However, representing the star-shape of the entity is not possible by means of a hand configuration alone, even though the hand has five fingers (as the star has five extensions) and these could in principle be extended and spread to indicate the extensions of the star. The picture would not be really accurate, but such a representation would still be a viable option. However, in NGT the  hand cannot be used to represent the star, although a flat hand can be used to represent the flatness of the mirror. This is illustrated in (16a,b).

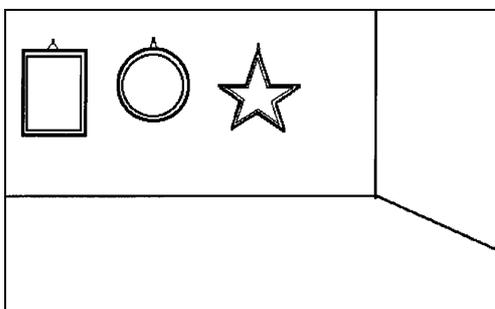
- (16)a. * 
 * be-LOC_{center}-CL:star-shaped ent
 * 'Flat star-shaped entity (vertical)'
- b. 
 be-LOC_{center}-CL:flat ent
 'Flat entity (vertical)'

Tracing SASSes are therefore much more specific about shape than static SASSes. The conclusion of this is that tracing SASSes, in contrast to *classifying* noun referents, *specify* them. Tracing SASSes can indicate an infinite number of specific shapes of referents, while static SASSes classify referents by assigning them to one (or more) particular group(s) of referents that share the same characteristic(s). In contrast to static SASSes or entity classifiers, tracing SASSes form an open class with an infinite number of elements.

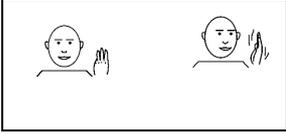
A fourth difference between tracing SASSes and static SASSes in NGT is their distribution. Static SASSes (or entity classifiers) are used on verbs of motion, to express the motion of a referent entity, and on verbs

of location or existence, to indicate the localization or existence of a referent in signing space. After a referent is introduced in a discourse, it can be referred to. There are three ways to do this. First, when the signer considers the spatial arrangement or the motion of the referent important, he will use a verb of motion or location, combined with an appropriate classifier. Second, when he considers the particular shape of the referent and its location important, he can combine a verb of location and a tracing SASS. Third, when he considers only the particular shape of the referent important, he will indicate the shape and (optionally) indicate the locations by means of pointing signs.⁸ These three possibilities are illustrated with an example in which signers describe the picture in Figure 1 using static SASSes (17a) or tracing SASSes (17b,c).

Figure 1 Situation with three differently shaped mirrors

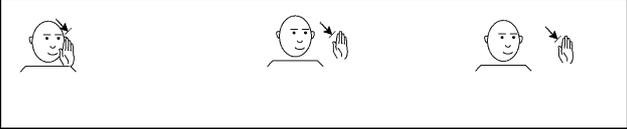


⁸ As already stated in footnote 2, these pointing signs are verbs of location themselves, combined with the default classifier .

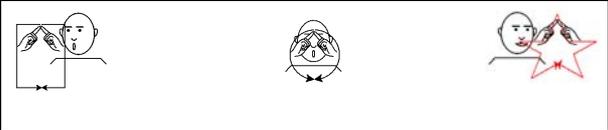
- (17) 
 three mirror
 'There were three mirrors.'

Localization of referents with use of an entity classifier:

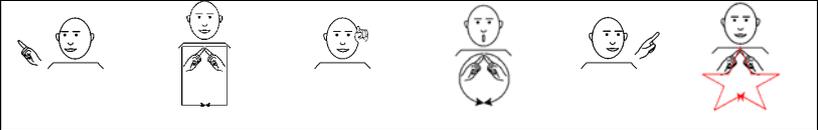
a.

- 
 be-LOC_x-CL:flat ent be-LOC_y-CL:flat ent be-LOC_z-CL:flat ent
 ... one here, one there and one there.'

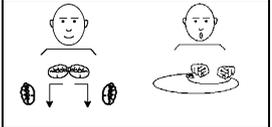
b. *Localization of referents and indication of their shape by tracing SASSes:*

- 
 be-LOC_x-flat be-LOC_y-flat round be-LOC_z-flat star-shaped ent
 rectangular ent
 ... a flat rectangular one here, a flat round one there and a flat star-shaped one there.'

c. *Indication of the shape of referents by tracing SASSes and localization of these referents by pointing signs:*

- 
 there.LOC_x flat there.LOC_y flat round there.LOC_z flat star-shaped
 rectangular shaped
 'Here is a flat and round one, there is flat and triangular one and over there is flat and star-shaped one.'

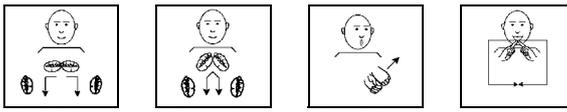
Static SASSes occur on verbs that signal a path motion, a location or the existence of an entity. We see that tracing SASSes can, but need not be, combined with a verb of location. Again, the primary function of a tracing SASS appears to be the *specification* of the shape of a referent. Tracing SASSes function as modifiers; they give information on the specific size and/or shape of a referent, sometimes combined with a verb of location as in (17b), but not always, as in (18).

(18) 
 table kidney.shape
 'The table is kidney-shaped.'

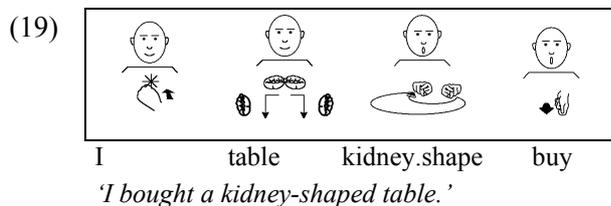
Glück (2001) similarly observes that the function of tracing SASSes (in DGS) differs from that of static SASSes and may be adjectival in nature. Indeed, some constructions (such as the one in (19)) should perhaps be analyzed as adjectival constructions.^{9,10}

⁹ The structure of (19) is not completely clear. It may consist of two clauses, one of which is a relative clause. The meaning would then be: 'I bought a table that is kidney-shaped.' It is not clear to me whether there is a difference between verbs and adjectives in NGT, and whether such a difference is of importance.

¹⁰ In NGT many nouns exist that are similar to tracing SASSes, for instance:



'table' 'house' 'stick' 'window'



The differences discussed can be summarized as follows. In contrast to static SASSes, tracing SASSes cannot be used in the expression of the motion of a referent through space or the orientation change of a referent. However, they can be used to locate a referent of a particular shape in signing space. The movement is never used to indicate the path motion of a referent and when a tracing SASS is used to locate a referent it is combined as a whole with a verb of location. In contrast to entity classifiers, tracing SASSes are never used to track reference in a discourse, and they specify, rather than classify, entities. They can modify nouns by specifying their shape. While static SASSes (or entity classifiers) consist of a hand configuration only, tracing SASSes require an outlining movement. This means that tracing SASSes surface as free morphemes. Static SASSes, in contrast, never occur in isolation but are always combined with a VELM. Thus, the latter are bound morphemes.

Some of these nouns may have derived from modifying (adjectival) signs. However, they may also have entered the language as nouns. Some nouns (and modifying signs) have the same form, but the nouns usually have a clear word pattern, where the mouthing consists of the Dutch word for the concept. This mouth pattern, combined with the sign, is sufficient to express the meaning and to distinguish the nouns with similar forms from each other.

Both static and tracing SASSes have probably been the reasons for considering them classifiers in the sign language literature because in both (i) the handshape contributes to the meaning of the sign, (ii) there is an indication of the shape of a referent, and (iii) referents can be located in signing space. However, the differences between the two types are such that tracing SASSes and static SASSes should be analysed as two distinct types of linguistic elements. I will not focus on tracing SASSes in the remainder of this thesis, but will return briefly to their structure in section 8.2.4.

In order to be able to discuss the differences between SASSes in connection with previous accounts, it was important to use the term SASS. However, this term is rather confusing, even if it is specified as *static SASS* or *tracing SASS*. To avoid confusion, I will not use the term SASS in the remainder of this thesis. From now on, I will refer to Supalla's tracing SASSes as *contour signs*.¹¹ Static SASSes have been distinguished in the literature from other classifiers that directly represent entities (especially semantic classifiers) because they i) have an internal morphological structure (Supalla 1982, 1986; and many others), and ii) allow particular combinations with other classifiers that semantic classifiers do not allow.¹² However, there does not appear to be a distinction between static SASSes and semantic classifiers in NGT. This

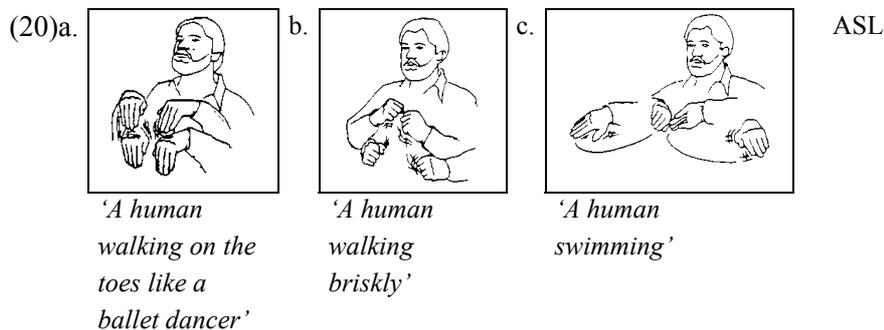
¹¹ I am grateful to Sotaro Kita of the Max Planck Institut für Psycholinguistik at Nijmegen for this suggestion.

¹² For instance, Supalla (1982;1986) and Liddell & Johnson (1987) report the impossibility to locate a classifier on a semantic classifier, whereas this is very well possible on a static SASS.

was already described in Zwitserlood (1996), and I have not found any evidence for a distinction since. As described in section 4.3.3, the NGT entity classifiers do not appear to be morphologically complex. Furthermore, I have not found any restrictions on the use of particular classifiers with respect to each other (at least in NGT). Therefore, I will consider all hand configurations that directly represent noun referents and appear on VELMs as *entity classifiers*.

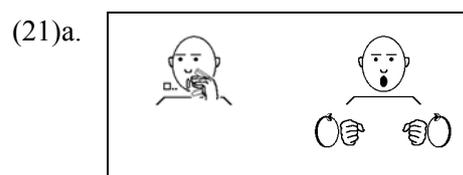
5.4 Verbs of manner of motion

I will now turn to a discussion of the third type of construction that is usually considered in the sign language literature to be part of the system of classifier predicates, namely verbs that express the manner of motion of a referent. In most of these verbs one or two hand configurations occur that represent body parts (Supalla's Body Part Classifier). Such verbs indicate how a referent moves by referring to the movements of hands and arms, feet and legs, as in the verb in (20a), where the articulators function as 'human feet classifiers', and in (20b,c), where they function as 'human arms classifiers'.

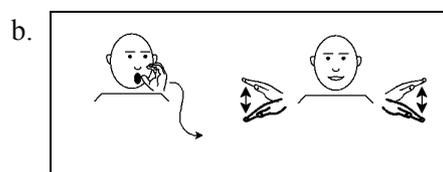


(Supalla 1990 :138-139, Fig. 6.11-6.13)

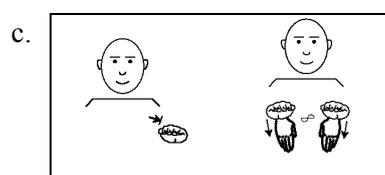
NGT has a similar group of verbs, as illustrated in the clauses (21).



Donald Duck run
'Donald Duck runs.'

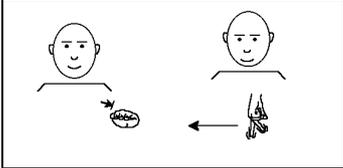


elephant fly
'The elephant flies.'

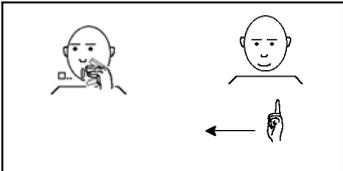


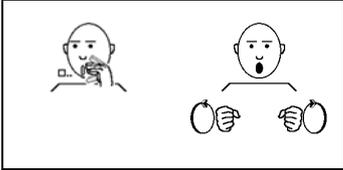
child walk
'The child walks.'

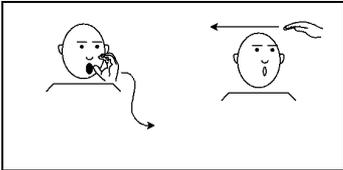
In the clauses in (21) the arguments of the verbs are expressed overtly (although this is not always necessary). We can see that these predicates are intransitive, too, just like predicates that express the path motion (or orientation change) of referents. Moreover, in these manner verbs the hands indicate (parts of) the moving referent, as in the path motion verbs (22).

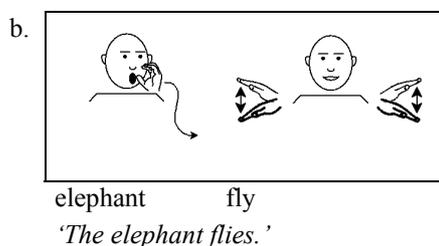
- (22) 
- child move.left-CL:legged ent
'The child went (walked) to the left.'

Nevertheless, predicates expressing the manner of motion of a referent differ in several ways from predicates expressing the path motion of an entity. I will explain this by means of the examples in (23) and (24).

- (23)a. 
- Donald Duck move.left-CL:animate ent
'Donald Duck goes from the right to the left.'

- b. 
- Donald Duck run
'Donald Duck runs.'

- (24)a. 
- elephant move.left-CL:flat ent
'The elephant goes from the right to the left.'



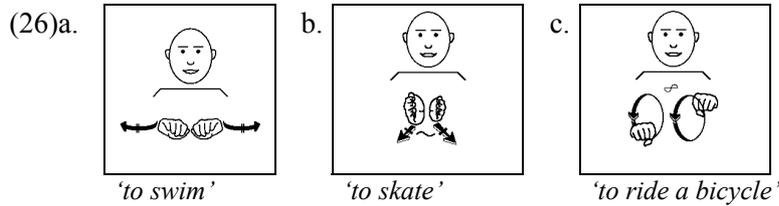
The sentences in these examples all indicate the motion of referents, namely running and flying motions. One difference is that the motion predicates in the (b) examples cannot express a path motion from a particular locus and/or to a particular locus in signing space (although an indication can be given by slightly moving the hand or hands in a particular direction; see also Supalla 1986, 1990:144-145).^{13, 14} A second difference is that, even though the hand configurations in these verbs are undoubtedly meaningful, representing body parts, and the predicates express the motion of a referent, the hand configurations do not appear to represent arguments of the verb. This becomes clear when we consider (23) and (24). The movement in the verbs in (23a) and (24a) expresses the exact path motion of the entity. The Theme argument of the verb is represented by the hand configurations on the verb: Donald Duck in (23a), represented by the  hand, and an elephant (Dumbo, a character in Walt Disney comics who can fly by flapping his ears) in (24a), represented by the  hand configuration. This is not the case in the (b)

¹³ In my data (in contrast to Supalla's observations) it appears that the upper body of the signer may slightly move into the direction of the hand(s) as well.

¹⁴ Hawk & Emmorey (2002) argue that, in ASL, the hands and body in these verbs *can* show a path motion. Since the data on which this argument is based are not available to me, I will not pursue this here.

examples. In (23b) the hand configurations () represent solid objects, namely fists. Interpreting the movement of the hands as path motions would require interpreting a rotating motion of two fists. Similarly, in (24b) the () hand configurations represent flat referents (for instance wings), and the movement would denote up and down motion of these referents. However, this is not what is expressed by the predicates. In these examples, the movement of the hands does not express the path motion of the arguments (Donald Duck and the elephant, respectively) through space. A signer using the expression in (23b) does not intend to express a rotating motion of two referents involved in the expression of Donald Duck running: there is only one referent that moves (namely Donald Duck), not two (fists). Furthermore, the signer does not intend to express a rotating path motion. The hand configurations are also not appropriate for representing Donald Duck as an independently moving referent. The same holds for the example in (24b). The signer does not intend to express up and down motions of two flat-shaped referents, but a motion of one referent: the elephant.

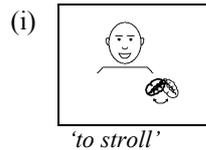
Note that the verbs in (23b) and (24b) *could* be interpreted as two rotating solid referents and two flat-shaped referents going up and down, respectively. For instance, the hand configurations in the predicate in (25) express the up and down movement of large ears.



However, as in contour signs, these hand configurations do not seem to classify referents. Moreover, they appear to have a radically different function in manner verbs than in verbs expressing a path motion. I will discuss this function in detail in section 8.2.4.

5.5 Comparison to verbal classifiers in spoken languages

As discussed in Chapter 1, several different types of classifier systems have been proposed for natural (spoken) languages. The systems are distinguished according to the element hosting the classifier and have their own morphosyntactic and semantic characteristics. Languages can combine various classifier systems. Some languages, notably Amazonian languages, combine classifier systems and a gender system. Recall from section 1.1 that Aikhenvald (2000) mentions the following classifier types:



- 1) numeral classifiers (which occur with quantifiers, determiners and numerals within a DP)
- 2) noun classifiers (that cooccur with the noun they classify within the DP)
- 3) verbal classifiers (that appear on verbs and categorize one of its arguments)
- 4) possessed classifiers (that occur in a possessive construction to characterize the possessed noun)
- 5) relational classifiers (that also occur in possessive constructions, but indicate the relation between the possessed noun and the possessor)
- 6) locative classifiers (which occur on locative adpositions)
- 7) deictic classifiers (that are associated with deictics and articles within a DP).

The sign language ‘classifiers’ discussed in the above sections are all related to predicates; they do not occur systematically with numerals, determiners or quantificational expressions, nor with possessors, genitives, or locatives.¹⁶ Therefore, if we want to compare meaningful hand configurations with classifier systems in spoken languages, this comparison is made best to verbal classifiers.

¹⁶ Meaningful hand configurations in sign languages superficially occur sometimes in the environment of quantificational expressions, have sometimes been analysed as markers of plurality and therefore could perhaps be interpreted as somehow similar to numeral classifiers. However, as argued by Nijhof & Zwitserlood (1999), this use of meaningful hand configurations is no different from that on VELMs: the constructions in which they appear express the loci of individual entities in space; they do not behave as numeral classifiers.

Aikhenvald (2000) distinguishes three forms of classification with verbs:

- 1) *classificatory noun incorporation*: verbs combine with nouns that have a generic meaning, resulting into a complex verb. Besides as incorporated element, the nouns can also occur in isolation. An illustrative example from Mohawk is (27): the generic noun *[i]ts* (fish) occurs in isolation in (27a), whereas it is incorporated into the verb in (27b) (*[i]tsy*).

(27)a. Rabahbót yah tha'-te-yo-[a]tʰhutsóni ne úhka
 bullhead not CONTR-DUP-ZSS-want/STAT NE someone
 a-ye-hnínu-ʔ ne kʰ-[i]ts-uʔ.
 OPT-FSS-buy-PUNC NE NSS-**fish**-NSF
 'The bullhead doesn't want anyone to buy fish.'

b. Sha'téku ni-kuti rabahbót wa-hʰ-[i]tsy-a-hnínu-ʔ
 eight PART-ZPSbullhead FACT-MSS-**fish**-Ø-buy-PUNC
 ki rake-'níha.
 this my-father
 'My father bought eight bullheads (fish).'

Mohawk (Baker 1996:310/321, ex. 58, 79b))

- 2) Verbal classifiers that are affixed to the verb. In contrast to incorporated classificatory nouns, these cannot occur in isolation. In the following examples from Palikur,¹⁷ the verb *sukuh* (to wash) is

¹⁷ Palikur is a northern Arawak language spoken in Brazil and French Guiana.

combined with several different classifiers, depending on the referent that is being washed.

(28)a. ig ner awayg sukuh-**ape**-ne
 he that.MASC man wash-CL.**concave**-CONT.MASC
 barew-yo tumawri
 pretty-DUR-FEM gourd.FEM
 'That man is washing a pretty gourd bowl.'

b. eg no tino sukuh-**pta**-no
 she that.FEM woman wash-CL.**irreg**-CONT.FEM
 barew-ye epti
 pretty-DUR.MASC chair.MASC
 'That woman is washing a pretty chair.'

c. eg sukuh-**mine** ennetet, in barew-**min**
 she wash-CL.**cylindrical** pencil be clean-CL.**cylindrical**
 'She washed the pencil; it is clean.'

(Derbyshire & Payne 1990:263, ex. 31b,c,f)

3) Suppletive classificatory verbs or classificatory verb stems. These verbs combine the expression of an event (often a motion event) or a state and a referent that is involved in that event. Examples from Navajo illustrate this.¹⁸

¹⁸ Exactly these examples have been used to illustrate the similarity between classifier predicates in spoken and sign languages in the beginning of the investigation of sign

- (29)a. béésò sì-ʔá
 money PERF-lie of round entity
 ‘A coin is lying (there).’
- b. béésò sì-nìl
 money PERF-lie of collection
 ‘Some money (small change) is lying (there).’
- c. béésò sì-ltsòòz
 money PERF-lie of flat flexible entity
 ‘A note (bill) is lying (there).’

(Allan 1977:287)

Instead of excluding classificatory verbs from classifier systems, Aikhenvald argues that the three forms can be seen as points on a grammaticalization continuum:¹⁹ verbal classifiers often derive historically from incorporated classificatory nouns (and sometimes from serial verb constructions), and classificatory verbs derive from verbal classifiers. Although the morphological structure of classificatory verbs is different from incorporated classifiers and affixed verbal classifiers, she argues that the three systems share many characteristics. In section 5.1, we have seen that a comparison of the sign language classifiers to classificatory verbs is problematic. In order to make the comparison with meaningful hand configurations (which are clearly separate morphemes)

language classifiers. However, the comparison will not hold as was indicated in section 5.1

¹⁹ This is a different continuum than the one proposed by Grinevald (2000).

as clear as possible, I will exclude characteristics of classificatory verbs as much as possible.

Verbal classifiers have the following morphosyntactic and semantic characteristics (Aikhenvald 2000; Grinevald 2000):

- 1) Verbal classifiers are bound morphemes (occurring with verb stems).
- 2) They are always linked to an argument of the predicate.
- 3) This is usually the subject in an intransitive clause and the object in a transitive clause. The argument can also be realized with a full DP (besides the classifier on the verb), but it is not necessary to express the argument overtly.
- 4) Verbal classifiers are used to maintain reference to the noun within a discourse.
- 5) The use of a verbal classifier is not obligatory.
- 6) The use of verbal classifiers is often limited to certain semantic groups of verbs. (Unfortunately, it is not made clear in the literature whether this concerns different kinds of semantic verbs or similar types, and whether there is a reason for the occurrence of classifiers with these particular types of verbs.)
- 7) Verbal classifiers categorize the referent of the argument in terms of animacy, shape, consistency, size, structure and/or position.
- 8) The choice of a verbal classifier is variable, that is, some nouns may be associated with more than one classifier. The variation functions to focus on a particular characteristic of the referent argument.
- 9) Not all nouns are related to a verbal classifier.
- 10) Verbal classifiers derive historically from lexical items (nouns or verbs).

These characteristics are prototypical and it is therefore expected that a system may not share every characteristic with the prototype. From the discussion in sections 5.3 and 5.4, however, it should be clear that contour signs and manner verbs share almost none of these characteristics. With respect to contour signs, we have seen that, although the hand configuration(s) are meaningful and the whole sign itself indicates shape and/or size of an entity, neither relates to a verb argument. The contour sign forms a free morpheme that is not necessarily bound to a host, although it can be combined with a verb of location. The hand configuration(s) in the sign is always combined with the movement and, being meaningful in itself, thus forms a bound morpheme. However, neither the hand configuration(s) nor the contour sign have a referent-tracking function. The hand configurations in manner verbs also share few characteristics with the prototypical verbal classifier. Although they can be analysed as bound morphemes, too, they occur within a verb, and they give some indication about the shape of an entity, they are not connected to a verbal argument and are not used to maintain reference with a noun throughout a discourse. In regard to obligatoriness, things are not quite clear. On the one hand, the use of a meaningful hand configuration is not obligatory in manner of motion verbs, since there are also manner of motion verbs that do not have a meaningful hand configuration. On the other hand, in those verbs in which a meaningful hand configuration *can* appear, it *must* be present.

The characteristics of the hand configurations occurring in VELMs, on the other hand, appear to be strikingly similar to the prototypical

verbal classifier characteristics (compared to the ‘classifiers’ in manner verbs and contour signs). We have seen in section 5.2 that they are bound morphemes, always occurring with a verb, and that they systematically relate to the subject argument of intransitive VELMs and the direct object argument of transitive VELMs. They are used as referent-tracking devices, especially in discourse, and some variation in the choice of a hand configuration is possible to highlight a particular characteristic of a referent. These hand configurations classify referents with respect to characteristics such as animacy and shape, and only occur in a subset of verbs, namely VELMs. The characteristics of these hand configurations diverge from those of prototypical verbal classifiers in that they appear obligatorily on these VELMs. For characteristic 9), I can make only a partial comparison, since my data contain only a subset of noun referents. However, for all of these, one or more hand configurations could be used. It is implausible that the classifiers originate from lexical items. First, in contrast to (a set of) verbal classifiers in spoken languages, none of the NGT classifiers seems to be form related to a particular lexical sign. Secondly, evolution from lexical item to grammatical device is bound to take some amount of time, but (as illustrated in Senghas 1996 and Kegl *et al.* 1999), classifiers occur shortly after the emergence of a new sign language.

Table 1 (page 178) summarizes the comparisons made above between prototypical characteristics of verbal classifiers (in spoken languages), characteristics of meaningful hand configurations on VELMs and on

verbs expressing the manner of motion, and characteristics of contour signs.²⁰

Table 1 Comparison of characteristics of verbal classifiers in spoken languages and three types of ‘classifiers’ in NGT^a

Verbal classifier systems	meaningful hand configurations on:		contour signs
	VELMs	manner verbs	
1. bound morphemes	yes	yes	no
2. linked to arguments of the verb	yes	no	no
3. S/A or direct object	yes	no	no
4. referent-tracking function	yes	no	no
5. optional	no	no	n/a
6. limited to a subset of verbs	yes	no ²¹	yes
7. assignment semantic	yes	yes	n/a
8. variation	yes	no	n/a
9. classification of a subset of nouns	?	no	yes
10. lexical origin	no	no	no

^a *Deviances are shaded.*

²⁰ A more detailed comparison between the characteristics of NGT classifiers and those of verbal classifiers in four unrelated spoken languages can be found in Zwitserlood (2000).

²¹ This may seem somewhat surprising. In Chapter 8 I will show that the meaningful hand configurations we find in manner verbs and contour signs occur in all kinds of verbs, and, moreover, in nouns.

I conclude that contour signs and meaningful hand configurations in verbs indicating the manner of motion differ from the prototypical verbal classifiers and do not appear to function as verbal classifiers at all. This is in contrast to meaningful hand configurations on VELMs, which display most of the characteristics of prototypical verbal classifiers. I will return to the diverging characteristics of the latter in the next chapter, where I will also compare the characteristics of meaningful hand configurations with the prototypical characteristics of noun class systems. Although the hand configurations in contour signs and manner of motion verbs differ in many respects from verbal classifiers, they obviously contribute to the meaning of the sign. I will come back to this issue in the second part of this thesis.

5.6 Summary

We have seen in this chapter that the group of predicates that have been traditionally considered as classifier predicates in the sign language literature actually consists of three different predicate types: i) predicates indicating the path motion, location or existence of an entity; ii) predicates specifying the size and/or shape of an entity; and iii) predicates indicating the manner of motion of an entity. Not only the meaning, but also the structure of these verbs differ. The verbs have probably all been considered classifier predicates in the literature because the hand configuration is meaningful and the predicate expresses shape (contour signs) or signals motion (manner of motion verbs). I have argued that these groups of predicates should be distinguished from each other on the basis of phonological, morphological and syntactic differences. I claim

that only those verbs that express the motion, location or existence of an entity should be considered classifier predicates, and I will discuss their structure in more detail in the next chapter. I do not deny, however, that contour signs and verbs expressing the manner of motion are morphologically complex. I will discuss the structure of these signs in connection with the morphological structure of a large group of signs of NGT in Chapter 8.

Chapter 6

Classifiers as agreement markers

6.1 Introduction

I have argued that ‘classifier predicates’ consist of three types, in all of which the hand configuration is a meaningful unit, and that the hand configurations appearing on one of these types (VELMs) display different characteristics from those occurring in the other two types. I can now address the function of these hand configurations. In this chapter I will discuss the function of the hand configurations that appear on VELMs in the grammar of NGT, and to a certain extent, in sign languages in general. (The function of the meaningful hand configurations appearing on the other two types of predicates and in other signs will be discussed in Chapter 8.) We have seen in section 5.2 that the meaningful hand configurations in predicates expressing the motion, location or existence of a referent are systematically connected to the Theme argument of these predicates. In intransitive VELMs this is the subject and in transitive ones the object. In a discourse consisting of several clauses, the arguments are often left implicit after their introduction. Nevertheless, most of the time it is clear which referent is

involved in the motion, location, or existence that is expressed by the verbs, precisely because of the presence of these hand configurations. This suffices to keep track of the moving and located referents in such a discourse.

Linguistic referent-tracking devices come in various kinds. Verbal classifiers are among these, and I have shown that the meaningful hand configurations occurring on NGT VELMs share many characteristics with them. However, the occurrence of these hand configurations is even more systematic than verbal classifiers usually are. In this chapter, I will focus on an interpretation of these hand configurations as another well-known referent-tracking device, namely *agreement marking*. A similar interpretation was suggested earlier by, among others, Supalla (1982), Edmondson (1990), Janis (1992), Bahan (1996) and Benedicto & Brentari (to appear) for ASL, Bos (1990) for NGT and Glück & Pfau (1998, 1999) for DGS, although of all of these investigations, only the last presents an analysis in a clear theoretical framework. Sign languages have acknowledged agreement systems in which not hand configurations, but locations in signing space, function as agreement markers (as explained in section 1.5). Meaningful hand configurations therefore function as an additional agreement system. I will elaborate on the proposal by Glück & Pfau, and compare the meaningful hand configurations in NGT VELMs with noun class agreement systems of spoken languages. On the basis of this comparison, and taking into account the characteristics of the agreement system in which locations in signing space are used, I propose a feature-based account of agreement in NGT.

This chapter is structured as follows. In section 6.2, I discuss agreement systems in sign languages and argue (following Glück & Pfau) for an analysis of the meaningful hand configurations as agreement markers. I will focus on the morphological structure of VELMs in section 6.3. In section 6.4, I discuss some recent accounts of classifier predicates and compare them to my own analysis. Section 6.5 contains a summary.

6.2 Agreement

In this section I discuss the expression of agreement in connection with meaningful hand configurations on VELMs in NGT. First, I will discuss the connection between verbal classifier systems (including classifiers in NGT) and noun class agreement systems (section 6.2.1) and claim that while classifiers in NGT are very similar to verbal classifiers in spoken languages, they in fact function as agreement markers in a manner similar to noun class agreement. In section 6.2.2, I will propose a set of φ -features for the markers of agreement in sign languages. As a basis for the agreement account of classifiers, I outline the theoretical framework used (Distributed Morphology) in section 6.2.3. A discussion of the agreement account of Glück & Pfau (1998, 1999), which serves as a basis for my analysis, appears in section 6.2.4. In section 6.2.5, I provide my analysis of the implementation of agreement in sign languages.

6.2.1 Noun class agreement and NGT classifiers

In section 5.5, I have shown that the meaningful hand configurations on VELMs share many morphosyntactic and semantic characteristics with verbal classifiers in spoken languages. I have also shown that the use of

these hand configurations is even more systematic than that of verbal classifiers in spoken languages usually is, because the meaningful hand configurations occur obligatorily, in contrast to (most) verbal classifiers in spoken languages. Strikingly, there are also spoken languages in which verbal classifiers are used obligatorily. An example is Miraña, a Witotoan language spoken in the Colombian Amazon. According to Seifart (2002, to appear), the verbal classifier system of Miraña shares some of the characteristics of noun class systems.¹ In noun class systems (such as those of Bantu languages), agreement markers appear on several elements in a sentence, including elements within the DP and outside it, namely on the predicate. The morphemes that expresses agreement with a particular noun can show variation in form depending on (among other factors) their host. Some examples from Luvale are in (1), in which the agreement morphemes occurring on the predicates are printed in boldface:²

- (1)a. Vi-fuhwa vy-enyi vy-osena **vy-acilikikile**
 NC:4p-bone NC:4p-POSS NC:4p-all **NC:4p-became.crushed**
 ‘All his bones were broken’.

¹ Seifart claims that the verbal classifier system of Miraña is evolving towards a noun class system. Evolution is a common issue in the literature on classificatory devices, although the evolutionary stages of a system can not usually be verified, because of the scarcity of historical material. It is still rather early to discuss the evolution of sign language classificatory systems, since the available data go back just a few decades in the best case.

² Luvale is a Bantu language spoken principally in the northeast of Angola, the northwest of Northern Zimbabwe and along the frontier of the Belgian Congo.

- b. Mu-nwe we-nyi u-mwe **u-najimbi**
 CL:2s-finger CL:2s-POSS CL:2s-one **CL:2s-has.swollen**
 ‘His finger is swollen.’
- c. Va-kweze j-etu **va-mu-kwacile**
 NC:1p-youth NC:1p-POSS1 **NC:1Ps-NC:1Ss-catch.RMP**
 uze-m-wane wamu-pi
 that-NC:1s-child NC:1s-bad
 ‘Our youths have caught that wretched child.’

(adapted³ from Horton 1949: 26/29/37, ex. 50c/58c/84d)

I compared meaningful hand configurations on VELMs with spoken language verbal classifier systems in section 5.5, and here I will compare the morphosyntactic and semantic characteristics of these meaningful hand configurations with those of noun class agreement systems. For that purpose, I summarize a number of prototypical characteristics of noun class systems marking agreement on the verb from the overview literature (Aikhenvald 2000; Grinevald 2000) and from overviews of the noun class agreement systems of a number of Bantu languages (Horton 1949; Hyman 1979; Anderson 1980; Hedinger 1980; Stallcup 1980; Watters 1980; Carstens 1993). These characteristics are as follows:

³ Adaptation of the Luvale examples in this chapter consist of separating the different morphemes within a word (as far as possible from the descriptions of the examples), adapting the glosses accordingly and addition of a prose translation in English, based on the glossed translation.

- 1) A noun class agreement marker always indicates an argument of the verb.
- 2) A noun class agreement marker can indicate the subject/Agent or the direct object of the clause.
- 3) Noun class agreement markers are used to keep track of the referent arguments of the verb.
- 4) Noun class agreement markers appear obligatorily on verbs, although there are circumstances in which object agreement markers are left unexpressed.
- 5) Noun class markers appear on all verbs.
- 6) The assignment of nouns to noun classes is partly semantically based, but also related to the morphology or phonological characteristics of the noun.
- 7) Nouns are usually associated with one class, although some variability is possible, especially in systems in which the noun classes are semantically transparent. In the latter systems the choice of a noun class marker depends on the viewpoint of the speaker.
- 8) All nouns are member of a noun class.
- 9) The system has a limited, countable number of classes.

The prototypical characteristics of noun class agreement systems are summarized in Table 1 and compared to the characteristics of NGT meaningful hand configurations on VELMs.

Table 1 Noun class systems compared to NGT classifiers ^a

Noun class-gender systems	NGT classifiers
1. linked to arguments of the verb	yes
2. S/A or direct object	S/O
3. referent-tracking	yes
4. usually obligatorily present	yes
5. present on all verbs	no
6. assignment partially semantic, but also morphological and/or phonological	mainly semantic
7. nouns are basically uniquely assigned to a class (but some variation is possible)	no
8. classification of <i>all</i> nouns	?
9. limited number of classes	yes

^a *Deviances are shaded.*

The characteristics of these hand configurations are clearly similar to the prototypical characteristics of noun class markers that appear on verbs.⁴ They typically pattern like noun class agreement in Bantu languages.

⁴ Traditionally, ‘noun class’ and ‘gender’ have been distinguished in the linguistic literature. Corbett (1991:5) indicates that the difference between the two is marginal, based on the semantics of the classes, gender being sex-based and noun class having different bases such as humanness, animacy, and shape, and treats them as one, ‘gender’ system. For this reason, Van Gijn & Zwitserlood (2001, to appear) use the term ‘gender agreement markers’ for classifiers. Since I would like to maintain the terminology I have used so far, I will refrain from introducing this new term here.

First, both in noun class agreement systems and in VELMs, the marker that appears on the verb expresses the relation between an argument of the verb and that verb. The markers can be linked to the subject argument and to the object markers (In contrast to NGT, Bantu languages do not have different agreement markers for subject and object). As in Bantu languages, the markers in NGT function to maintain reference with a noun and appear obligatorily. Furthermore, both Bantu languages and NGT have a limited set of markers. For instance, Horton (1949) indicates that the Bantu language Luvale has eighteen classes, following the classification system of Proto-Bantu proposed by Meinhof (1948),⁵ whereas Kiswahili has fourteen (Carstens 1993). It should be noted that the classes as proposed by Meinhof include singular and plural classes, and thus the number of classes can be reduced as suggested by Carstens (1993). She indicates that the fourteen classes of Kiswahili should be reanalysed as nine classes, five of which have singular *and* plural markers, while the other four have only a singular marker. NGT, as we have seen in the previous chapter, also has a limited number of markers, namely fifteen entity classifiers and eight handling classifiers.

The characteristics of meaningful hand configurations in NGT and noun class agreement markers differ in the set of verbs on which they appear: in contrast to noun class agreement markers, the NGT meaningful hand configurations only appear on a subset of verbs. The non-occurrence of classifiers on the other verbs is explained by the phonological

⁵ Horton (1949) uses a different classification, of ten (general) classes that each have a singular and plural marker, and five subclasses. It is not clear to me why subclasses are distinguished.

According to Aikhenvald (2000:41-45) there is a larger amount of variability in noun class systems with semantically transparent classes. The variability serves to highlight a particular aspect of the referent (sex, particular shape, function, attitude of the speaker towards it). Since the classification in NGT is (still) largely based on semantic features of the referent noun, the larger variability is only to be expected.

I conclude that the deviance of the NGT meaningful hand configurations on VELMs with respect to the prototypical characteristics of noun class agreement systems does not justify exclusion of the meaningful hand configurations as members of a system of agreement markers. This conclusion follows from my generalizations over VELMs and the systematic pattern of meaningful hand configurations that occur on these predicates taken with morphosyntactic characteristics of verbal classifiers and noun class agreement systems. Although the NGT hand configurations sharing characteristics with prototypical verbal classifier systems,⁶ their obligatory presence on VELMs leads me to conclude that they function as agreement markers on these predicates, and that the classification of nouns in NGT is (still) semantically based. This conclusion is in line with previous proposals, as stated in Chapter 2, although by no means fully standard in the sign language literature.

⁶ And, since the prototypical characteristics of verbal classifiers are very similar to those of noun class agreement markers, there may actually not be as much difference between these systems as has previously been assumed in the literature.

6.2.2 ϕ -features in classifier agreement

In this section I will return to the issue of ϕ -features in sign languages, already briefly discussed in section 1.5. There it was stated that the commonly assumed features for person and gender may not be applicable in the recognized agreement system in sign languages, in which locations in signing space are used to mark the referents. The system makes use of a *locus* feature instead. I will now turn to list the features involved in the meaningful hand configurations, and then provide a feature-based account of agreement in NGT (and other sign languages), comparable to the feature accounts developed for spoken languages.

There do not appear to be separate features in the meaningful hand configurations for the signer, addressee and non-discourse participants in NGT. These can all be represented by the same meaningful hand configurations. A systematic number distinction is also lacking.⁷ I have shown in section 4.3.2 that the  hand can undergo number incorporation to indicate two, three, four and multiple animate referents, and that the  hand can be combined with a paucal to form a  hand configuration. For referents represented by hand configurations other than the  or  hands, a signer usually uses more than one VELM combined with a meaningful hand configuration to indicate plural referents. Taken with the analysis of ϕ -features in the location agreement system, these facts indicate that the ϕ -features in NGT appear not to contain person or

⁷ Notice that this is different from the agreement system of Bantu languages: these have special markers for first and second person, for non-discourse participants the noun class markers are used. Furthermore, there is a systematic difference between markings for singular and plural referents in these languages.

number features (see Van Gijn & Zwitserlood (to appear) for more detailed argumentation and Lillo-Martin & Klima (1990) and McBurney (2002) for a similar argument with respect to ASL pronouns).

The hand configurations may pattern like gender (or noun class) agreement features, however.⁸ Although NGT does not have distinct hand configurations for masculine (or male) and feminine (or female) referents, some sign languages do, notably Taiwan Sign Language (Smith 1989) and Nihon Syuwa (Fischer 2000). The inventory of meaningful hand configurations in NGT, furthermore, is similar to the noun class systems we see in Bantu languages. The number of classes found in Bantu languages and in NGT is larger than the two or three classes found in Indo-European languages. Bantu languages and NGT both classify referents according to animacy and shape, rather than sex as in Indo-European gender systems. However, I am not aware of a formalization of the features involved in noun classes; usually, numbers are used to indicate the noun classes. I will suggest a formalization for the representations of the classifiers in NGT, based on their denotation as stated in Chapter 4.

There appear to be three types of feature specification: (i) features indicating animacy and leggedness; (ii) features indicating shape; and (iii) features indicating the amount of control exercised by a manipulator. The [animate] and [legged] features are only relevant for entity classifiers, the [control] feature is only relevant for handling classifiers. The features concerning shape are [+straight], [+small], [+flat] and [+volume] and occur in entity and handling classifiers. The specifications

⁸ Recall that 'gender' and 'noun class' are not formally distinct (footnote 4).

for animacy, leggedness, straightness, roundness and size are straightforward. The feature [+flat] indicates that the referent is flat or thin, and [-volume] that the handshape indicates the outline of the referent, not its volume. Thus, the  and  classifiers have the same specifications for straightness, roundness, flatness and size, but they differ in that the  classifier is specified for [+volume] and the  classifier for [-volume].⁹

Note that some entity classifiers ( and ) are polysemous, and therefore are connected to two feature sets. Recall furthermore from section 4.2 that some classifiers are polysemous in that they can function both as entity and as handling classifiers; these hand configurations are also connected to two feature sets. For the sake of clarity, I will represent the feature specifications of entity and handling classifiers in separate tables (Table 2 and Table 3). Features that are not important for a particular type of classifier do not appear in the tables (such as the [control] feature for entity classifiers). Lack of marking of a feature implies the absence of that feature. Several hand configurations in a cell indicate the variants of a particular classifier.

The entity classifiers in NGT have the feature specifications in Table 2.

⁹ There are two entity classifiers that represent specific entities, namely trees and airplanes. Since these classifiers have such idiosyncratic representations, I do not specify features for them.

Table 2 Feature specifications for NGT entity classifiers

	animate	legged	straight	small	flat	volume
			+		-	+
	+					
			+		+	+
 , 			-		-	-
			-	+	-	-
 , 			-	+	+	-
			-		+	-
 , 			-	-	+	-
			+		+	-
 ,  ¹⁰			+		+	+
				+		+
						+
 , 		+				

The hand configurations , , ,  are not included in this table because they are analysed as instances of the  hand configuration, taking plural (dual, trial, quadral and paucal) features. Similarly, the 

¹⁰ Notice that the  and  share the feature sets. This is in accordance with the idea that the thumb, as well as the fingers, represents an entity (Shepard-Kegl (1985) calls it a *copy classifier*). The difference between the two hand configurations is that in the  hand configuration only one entity is represented, and in the  two (opposite) entities. I have as yet no feature set available for this difference. There may be a notion of plurality involved in the representation of the  hands.

hand configuration is analysed as a paucal variant of the  hand configuration and therefore not included either. The features specified do not exhaust the possible features we meet in sign language classifier systems, since some sign languages have classifiers denoting, for instance, vehicles (ASL) and males and females (NS, TSL). These should be established separately for each language. The feature specifications of handling classifiers appear in Table 3:

Table 3 Feature specifications for NGT handling classifiers

	straight	small	flat	control
	+	-	-	-
	-	-	-	-
	+		-	-
		-	+	+
		+		-
	+	-	+	-
	+	-	-	+
	+	+	-	-
	+	+		+
				

These features cannot be used in agreement verbs that use loci in signing space. As stated at the beginning of this section, this type of agreement employs plain locus features. Although different positions in signing space are used, there does not appear to be a systematic grammatical

distinction between them.¹¹ Therefore, I do not assume several different locus features, but follow Lillo-Martin & Klima (1990), Meir (2002) and Van Gijn & Zwitserlood (to appear) in assuming one abstract referential locus (R-locus), which has the feature [+loc]. Referents in the discourse have distinct loci, which are distinguished by abstract but overt indices. Thus, locus agreement uses abstract, overtly indexed loci.

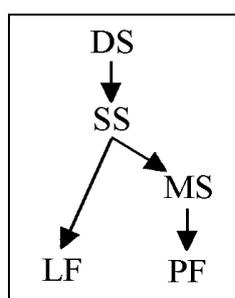
6.2.3 A basic outline of the framework of Distributed Morphology

Before I turn to a discussion of the analysis of meaningful hand configurations as agreement markers by Glück & Pfau (1998, 1999) and to my own analysis, I will explain the framework that is used in these accounts, namely that of Distributed Morphology (Halle & Marantz 1993). This framework (especially in its more recent form (Harley 2001; Harley & Noyer in press; Marantz 2001)) is well equipped to cover the phenomena. (Moreover, as we will see in Chapter 8, this framework can also account for signs other than VELMs that have a meaningful hand configuration.)

The framework extends the T-model used in generative linguistic theory by positing a separate morphological component (Morphological Structure or MS) in addition to Deep Structure (DS), Surface Structure (SS), Phonological Form (PF) and Logical Form (LF). This is illustrated in Figure 1.

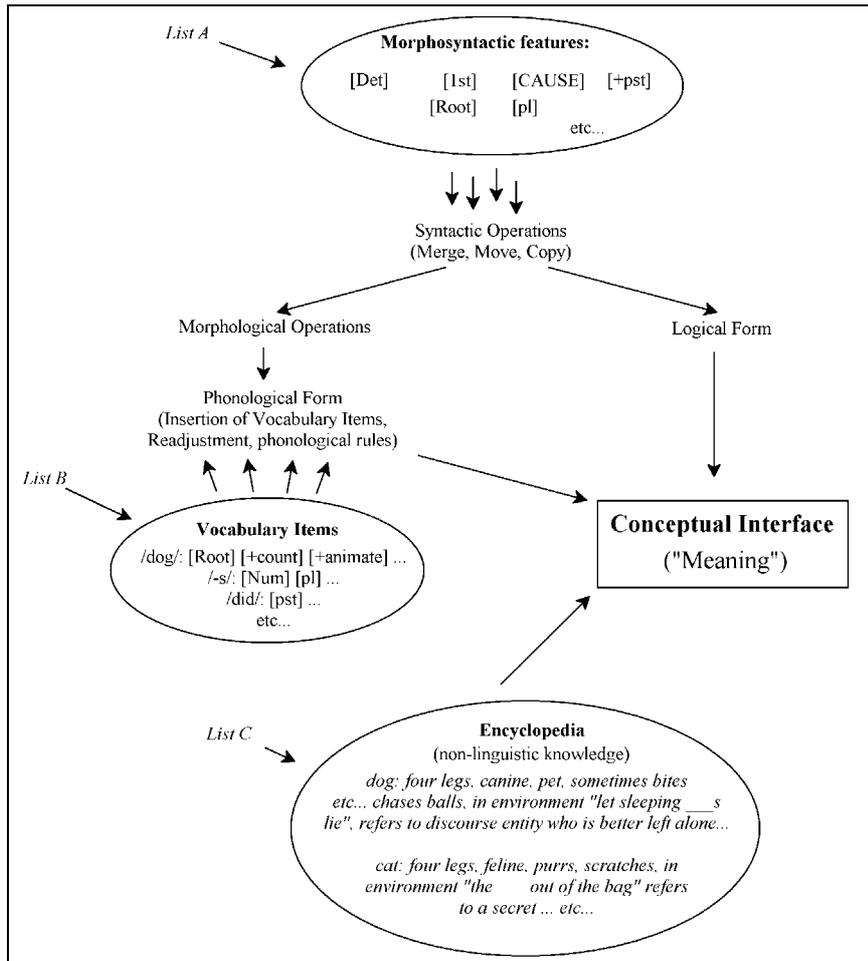
¹¹ Although there appear to be pragmatic conventions, such as the conventions of semantic affinity, comparison and iconicity. These have been described for DSL by Engberg-Pedersen (1993:71-78). I will refrain from discussing such conventions since they are not of importance here.

Figure 1 The five-level conception of the grammar in the DM framework



The model furthermore rests on the assumption that there is no lexicon in the sense familiar from earlier versions of generative grammar, specifically a list of items with i) one or more idiosyncratic characteristics; ii) a phonological specification; and iii) a meaning. Thus, the traditional lexicon contains items like ‘cat’ and ‘dog’, whose phonological features /kæt/ and /dog/ are connected to meanings like ‘furry feline domestic animal’ and ‘furry canine domestic animal’, and syntactic information, like grammatical category N, countability, animacy, and so on. Instead there are *three* separate *lists* in DM. *List A* contains morphosyntactic features (also called lexical items), such as [Determiner], [Root], [plural], [+past]. *List B* contains Vocabulary Items, that is, phonological features that are connected to morphosyntactic features. For instance, in English the phonological string /dog/ is connected to the morphosyntactic feature bundle [Root, +count, +animate], and the phonological string /əd/ is connected to the morphosyntactic feature [+Past]. Finally, *list C* contains encyclopedic knowledge (such as that a dog is a hairy canine domestic animal). This list is outside of the grammar. The lists are illustrated in Figure 2.

Figure 2 Structure of the grammar in DM
(Harley & Noyer in press: 465)¹²



¹² Illustration reproduced by permission of the publisher; © 2003 by Mouton de Gruyter, Berlin.

DM incorporates three important principles: i) Late Insertion; ii) Underspecification; and iii) Syntactic Hierarchical Structure All the Way Down. *Late Insertion* refers to the idea that phonological features (Vocabulary Items) are inserted into terminal nodes *after* syntax, in a process called Spell-Out. *Underspecification* means that the Vocabulary Items (the phonological feature bundles) are not connected to fully specified morphosyntactic features, but to underspecified ones. In fact, the Vocabulary items only have the minimally necessary set of features. For instance, instead of having complete specifications for person and number, the agreement affixes in Dutch are connected only to those features that are absolutely necessary,¹³ that is, although $-\emptyset$ has a fully specified set of features, $-t$ is only specified for number and tense, whereas $-en$ only needs a specification for tense, as shown in (3):

- (3)a. $-\emptyset$ ↔ [+1, +sg, +pres]
 b. $-t$ ↔ [+sg, +pres]
 c. $-en$ ↔ [+pres]

Vocabulary Items compete for insertion, which means that a given bundle of morphosyntactic features in a terminal node in syntax is inserted with *that* Vocabulary Item that shares most of these features without causing a

¹³ The Dutch agreement markers present tense are:

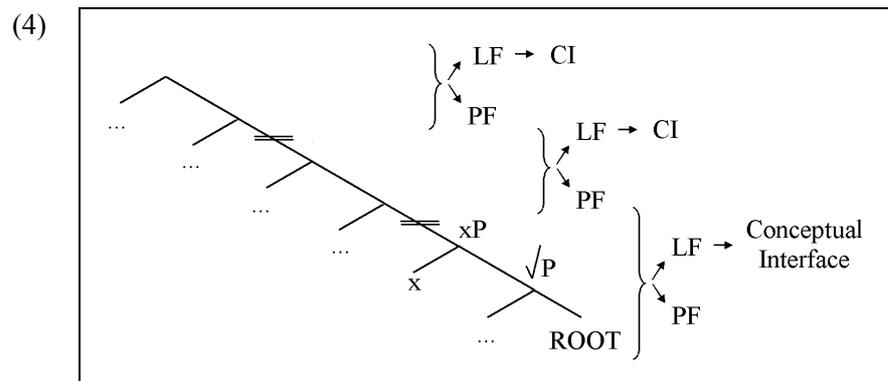
	<i>singular:</i>	<i>plural:</i>
1	$-\emptyset$	1 $-en$
2	$-t$	2 $-en$
3	$-t$	3 $-en$

feature clash. For Dutch this indicates that Vocabulary Insertion for an agreement affix for second person singular present tense will result in *-t* because this Vocabulary Item matches at least the singular and tense features and there are no feature clashes. Insertion of *-en* does not meet the requirement of insertion of the most highly specified Vocabulary Item; insertion of $-\emptyset$ results in a feature clash, because it has the feature [+1] that is not present in the agreement morpheme.

Syntactic Hierarchical Structure All the Way Down indicates that the terminal nodes into which Vocabulary Items are inserted are hierarchically structured according to principles and operations of the syntax. The operation we are specifically concerned with is *Merger*, which adds a new terminal node to the existing structure. Lexical items are merged into a hierarchical structure, in which no distinction is made between derivation and inflection.

Like all other items in List A, roots typically have neither a syntactic category nor phonological features (these being properties of Vocabulary Items). The construction in which a lexical item occurs is assigned a category through merger at MS with a category node (a head), called *little x*, in which *x* can be a verb (*little v*), a noun (*little n*), or an adjective (*little a*). *Little x* determines the edge of a cyclic domain. At cyclic domains derivations are shipped off to PF and LF, and subsequently to the Conceptual Interface (Marantz 2001) where Vocabulary Insertion takes place. There, outside of the grammar, the structure will be provided with non-linguistic, encyclopedic information. Cyclicity ensures that derivations are shipped off to PF and LF several times. Thus, after merger of the derivation with *little x* and subsequent Vocabulary Insertion and

interpretation, structures are further derived. This is illustrated in (4), in which root is abbreviated as \surd (thus \surd P means root phrase) and the double bars indicate cyclic domains.



Vocabulary Insertion is *cyclic*. Thus, it starts out from the most deeply embedded lexical item at Spell-Out and works its way outwards.

6.2.4 Meaningful hand configurations as agreement markers

Now that I have explained the basic principles of DM, we can turn to the analysis of the structure of VELMs that is proposed by Glück & Pfau (1998, 1999). As explained in Chapter 2, they argue that meaningful hand configurations function as agreement morphemes in DGS. Although the pro-drop evidence provided for this analysis is problematic (see section 2.3.3), the basic idea is workable. Glück & Pfau use the DM framework (Halle & Marantz 1993) in order to account for the different forms found in the agreement system of DGS, namely classifiers and loci. Note that this framework has undergone several changes since their analysis. I will

use a more recent version of the same framework in my own analysis, which is an extension of the analysis of Glück & Pfau (1999).

Glück & Pfau assume that agreement nodes are attached to verbs in the derivation and ϕ -features for person and number are copied. At Spell-Out, phonological material is inserted into some of these agreement nodes, namely loci in signing space. The singular forms of the Vocabulary Items that are inserted into these nodes are in (5), in which X is a point in the signing space and the subscript specifies that point:

- (5)a. $/X_{\text{prox.body-central-neutral}}/ \leftrightarrow [+1\text{sg}]$
 b. $/X_{\text{dist.body-central-neutral}}/ \leftrightarrow [+2\text{sg}]$
 c. $/X_{\text{dist.body-dominant-neutral}}/ \leftrightarrow [+3\text{sg}]$

Glück & Pfau assume that classifier predicates have full phonological specifications for the hand configuration. Merger of an agreement morpheme thus cannot result in insertion at Spell-Out of a Vocabulary Item consisting of a classifier, because the sign already has a hand configuration. Glück & Pfau solve this by arguing that not all Vocabulary Items contain phonological material: some of them are phonologically zero and trigger *phonological readjustment rules* that change the phonological form of stems.¹⁴ According to Glück & Pfau, the

¹⁴ There are also Vocabulary Items that are connected to person and number features that trigger *morphosyntactic* readjustment rules. For instance, the feature cluster [+1pl] triggers readjustment into the feature cluster [+1sg]. The reason for positing these rules is not clear to me, since phonological readjustment rules can have the same effect.

Vocabulary Items that are connected with (classifier) agreement morphemes are zero and trigger phonological readjustment rules that change the phonological feature value of the hand configuration of the stem into a particular classifier agreement marker.¹⁵ This is comparable to ablaut phenomena in some spoken languages.

Glück & Pfau's analysis is attractive because it captures the systematicity with which arguments are connected to meaningful hand configurations on VELMs and to loci in signing space on other agreement verbs. On the other hand, their account does not predict this systematicity other than by postulating different types of agreement verbs: i) agreement verbs that agree with their subject and object by means of points in signing space on the one hand; ii) intransitive verbs that agree with their subject by means of a classifier; and iii) transitive agreement verbs that agree with their object by means of a classifier. Their proposal is also not yet fully developed with respect to the features connected to classifier hand configurations. A disadvantage is that their account does not capture the fact that classifiers occur only on a subset of verbs: because 'classifier morphemes' trigger a readjustment rule changing the hand configuration of a sign, any verb could in principle have a classifier. Furthermore, the fact that there is a rigid assignment of person features to particular loci in signing space in their system (for instance, second person is always connected with a locus that is distal and central with respect to the signer) does not allow for the free use of loci that we actually encounter. I will adapt and extend their analysis to arrive at a unified account of (locus and classifier) agreement in sign languages,

¹⁵ Classifier agreement is only worked out for direct object agreement by these authors.

using a more recent form of the DM framework (Harley 2001; Harley & Noyer in press; Marantz 2001).

6.2.5 The implementation of agreement in sign languages

In this subsection, I address the implementation of agreement in NGT (and other sign languages). I follow Glück & Pfau in treating classifiers on VELMs as agreement markers. This implies that sign languages have two types of agreement systems: agreement by means of loci, and agreement by means of classifiers. Some verbs take locus agreement markers, other verbs take classifiers, and some verbs can take both. Moreover, there is also a set of verbs that do not show agreement at all, as explained in section 1.5. Padden (1988) claims that the (locus) agreement possibilities of a verb in ASL are determined by their phonological feature specifications. That is, a verb that is phonologically specified for place of articulation on or near the body cannot show locus agreement. Meir (2001) makes a similar claim with respect to the incorporation of classifiers in ISL: she claims that a verb that is phonologically specified for a particular hand configuration cannot be combined with a classifier. Furthermore, she claims that the agreement possibilities of a verb are determined by its semantics (Meir 2002): a verb can only show agreement if it has a denotation of motion and/or transfer).¹⁶ I combine these claims with the account of Glück & Pfau (1999) to arrive at a unified proposal concerning the agreement

¹⁶ In fact Meir (2002) claims that verbs per se do not show agreement, but that some verbs fuse with a morpheme (DIR) that takes spatial agreement morphology. I refer the reader to her work for details.

possibilities provided by meaningful hand configurations and loci in signing space, not just in NGT, but in sign languages in general.

Recall that I indicated in Chapter 1, section 1.6, that the sign language interface between grammar and phonological form (PF) forces signs into particular surface forms. That is, all uttered signs have at least one place of articulation and at most two. Furthermore, all signs have a particular configuration of the hand(s) and a particular orientation of the hand(s). All signs have a movement, either a change in place of articulation, a change in hand configuration, a change in orientation, or a combination of at most two of these.¹⁷ With these facts, it is possible to make predictions about the agreement possibilities of verbs in sign languages in the same vein as Padden and Meir, including classifiers in the analysis.

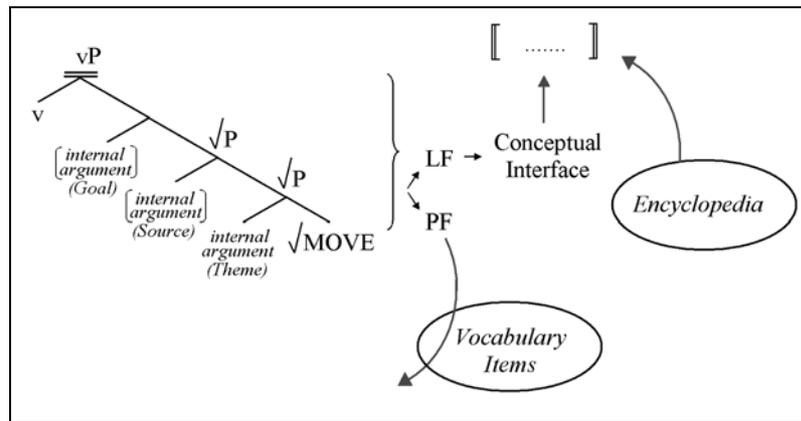
First, let us consider VELMs. I assume that a VELM consists of a root, selecting one obligatory internal argument and one or two optional internal arguments.¹⁸ This root has neither a syntactic category nor phonological material. The verb will acquire these after the point in the derivation where it merges with little *x* (in this case: little *v*), creating a little *v* phrase (*vP*). Recall that merger of little *x* establishes a cyclic domain after which the structure derived so far gets shipped off to PF, LF and the Conceptual Interface in order to be inserted with Vocabulary Items and to get an interpretation. The Vocabulary Item that is inserted

¹⁷ I disregard the non-manual component(s) in this analysis.

¹⁸ Hence VELMs are considered unaccusative roots. This is in line with arguments provided by Benedicto & Brentari (to appear) and work in progress by the author (Zwitserslood in prep.).

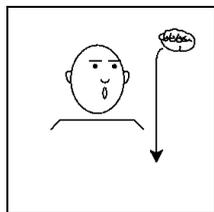
for the root consists of a path movement (or localization or a non-movement) in signing space. This is illustrated in Figure 3

Figure 3 Derivation until vP



The structure is then further derived above the little v node. Agreement nodes will be merged for the Theme argument and for the Source and Goal arguments if present. Again, the structure is shipped off to PF, LF and the Conceptual Interface. At Spell-Out, further phonological information is provided by the Vocabulary Items which spell out the terminal nodes consisting of the feature bundles of the agreement markers. I will illustrate this with the intransitive NGT VELM in (6).

(6)



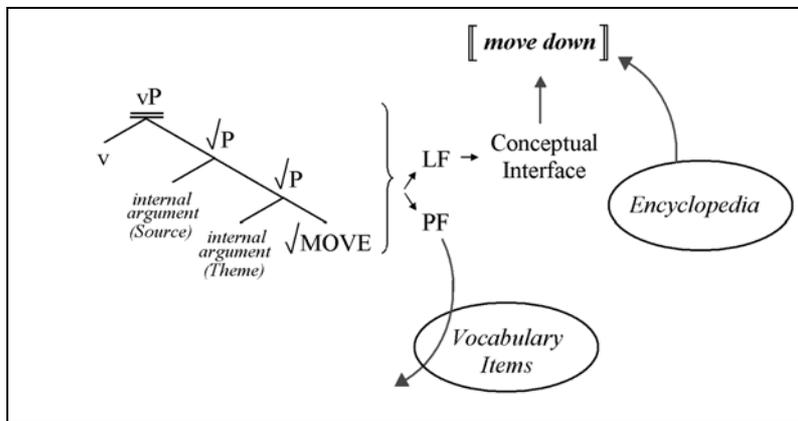
NGT

LOC_{shelf}-move.down-CL:flat ent

'The book falls down from the shelf.'

The example in (6) contains a VELM that shows agreement with two arguments: a Theme argument (a book) and a Source argument (a shelf). Agreement with the Theme argument is expressed by a classifier, and agreement with the shelf by a particular locus in space that has been established in the previous discourse. Derivation of this structure involves merger of two internal arguments with the motion root, a Theme and a Source. Subsequently a little *v* node is merged, creating a cyclic domain and the derivation is shipped off to PF and to LF and the Conceptual Interface. Vocabulary Insertion inserts the root with a movement and the structure will receive the interpretation *move down*. This is illustrated in Figure 4.

Figure 4 Derivation until vP, Vocabulary Insertion and Interpretation



The structure is further derived and agreement nodes and other material are merged. Since NGT has two agreement systems, the correct Vocabulary Items must be inserted into the correct agreement nodes. It is

obvious that all nouns can occur as all types of arguments. It is impossible to tell which ϕ -features should be connected to them in a particular construction, locus features or classifier features. Therefore, all DPs can be connected with both types of ϕ -features. Both the shelf and the book in example (6) are thus connected with locus features (which have been assigned to them in the previous discourse), for instance, $[\text{loc}_x]$ and $[\text{loc}_y]$. Furthermore, both are connected with classifier features. In this example both referents have the same features: $[\text{+straight}, \text{-small}, \text{+flat}, \text{+volume}]$. The relevant Vocabulary Items competing for insertion in the agreement morphemes of the derivation of (6) are in (7). Note that the morphosyntactic features of the classifier agreement morphemes are less specific than those specified in section 6.2.2: they are underspecified.

- (7) a.  ↔ $[\text{+straight}, \text{+flat}, \text{+volume}]$
 b.  ↔ $[\text{+straight}, \text{+flat}] / [\text{+voice}]$
 c. $[\text{loc}_{\text{shelf}}]$ ↔ $[\text{+loc}_x]$
 d. $[\text{loc}_{\text{book}}]$ ↔ $[\text{+loc}_y]$

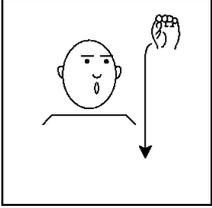
VELMs, like all structures in DM, have a hierarchical morphosyntactic structure, according to the principle *Syntactic Hierarchical Structure All the Way Down*. I assume that the order of merger of agreement nodes follows that of the arguments. When the derivation once again gets shipped off to PF and LF (recall that the derivation below little v already has phonological features and an interpretation), Vocabulary Insertion starts with inserting a Vocabulary Item for the innermost morphosyntactic feature bundle that does not have yet phonological

features. In this structure, this is the agreement node that is closest to the root, containing the agreement marker for the Theme argument. Competition of the Vocabulary Items ensures that the most highly specified, non-clashing Vocabulary Item is inserted. Since classifier agreement markers have more feature specifications than locus agreement markers, the Theme agreement marker is spelled out with the appropriate meaningful hand configuration: . Subsequent Vocabulary Insertion of the agreement morpheme connected to the Source argument could in principle spell out the most highly specified Vocabulary Item as well, namely a classifier agreement marker. However, because of the fact that the sign has already acquired phonological specifications for hand configuration this will result in a clash at PF: there would be two feature specifications for one phonological parameter within one sign. A locus marker is inserted instead. Cyclicity and the principle of Syntactic Hierarchical Structure All the Way Down thus predict that the agreement node connected with the Theme argument is always inserted with a Vocabulary Item consisting of a hand configuration (that is, in VELMs, where the Vocabulary Items inserted for the roots are not specified for a hand configuration).

The example just discussed concerns an intransitive VELM. We have seen that handling classifiers are only inserted in transitive structures. Since I have assumed that VELMs are basically unaccusatives, a transitive VELM needs a voice node projecting an Agent argument above little *v*.¹⁹ Only in that environment insertion of a handling classifier will

¹⁹ The argument goes along similar lines as that provided by Kegl (1985, 1990) and Benedicto & Brentari (to appear) in that the handling classifiers is connected to voice

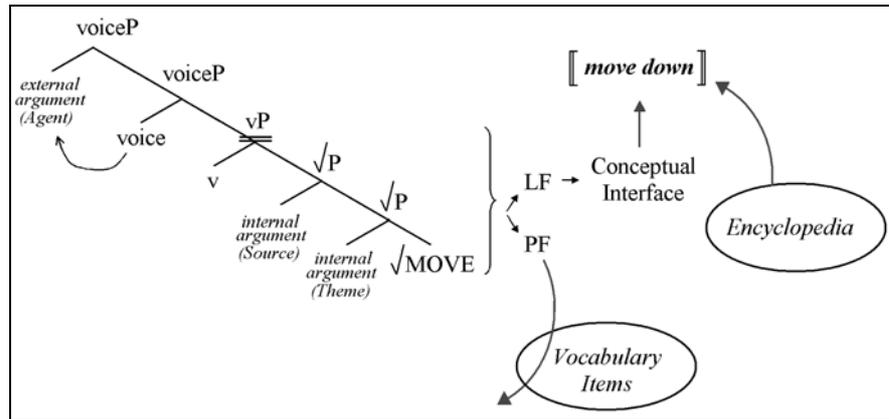
be spelled out. Let me illustrate this with the sign in (8), comparable to that in (6) except for the hand configuration, but differing in transitivity.

- (8)  NGT
- x-LOC_{shelf}-move.down-CL:flat ent
 '(Someone) takes the book down from the shelf.'

The derivation of both signs is the same until the point where little *v* is merged. As in the derived structure of (6), a root is merged with the internal Theme and Source arguments, little *v* is merged and the derivation is shipped off to PF, LF and the Conceptual Interface. The derivation of the structure of (8) is different from that in (6) from that point on: a voice node is merged in the derivation, which triggers merging of a node containing an external argument. This is illustrated in Figure 5.

marking. However, in contrast to these researchers, I do not claim that it is the handling classifier itself that heads the voice node.

Figure 5 Derivation until voiceP



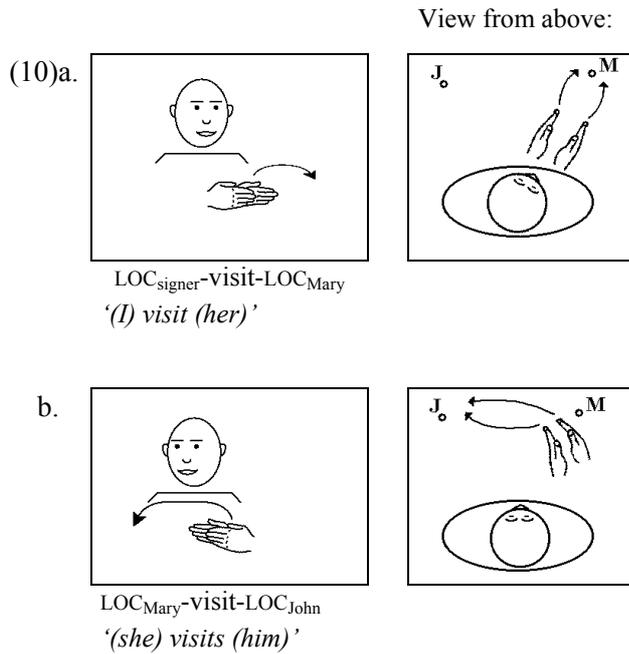
In the subsequent derivation, agreement nodes are merged (among others). When the derivation is once again shipped off to PF and LF, the relevant Vocabulary Item that will be inserted into the agreement node for the Theme argument is the  hand configuration. This hand configuration has the features [+straight, +flat] and, furthermore, is only inserted in the environment of a [+voice] feature. This Vocabulary Item is repeated here as (9).

- (9)  ↔ [+straight, +flat] / [+voice]

Since the  hand configuration is not specified for this environment, it will lose the competition for insertion to the more highly specified  hand configuration. The other agreement node that is merged (connected with the Source) will be inserted with a locus in signing space.

Let us now turn to agreement verbs. For the most part, these contain roots whose Vocabulary Item has a specification for hand configuration and movement, but does not have a (full) specification for place of

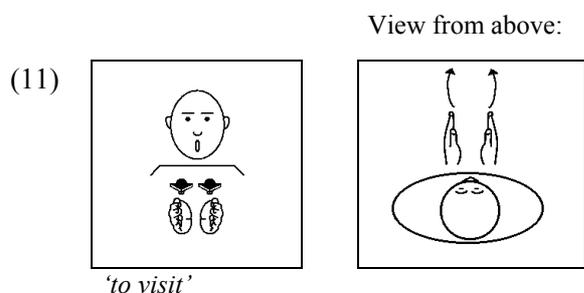
articulation. After merger with little *v* (and after having received phonological features and an interpretation), terminal nodes for agreement will be merged (among others). The morphological feature bundles in these nodes can not be inserted with Vocabulary Items consisting of the most highly specified phonological features (those for hand configuration), since the sign language interface prohibits double specifications for hand configuration. Therefore, they are spelled out with locus features. Consider the two inflected forms of the NGT sign for ‘to visit’ in (10a,b), where the locations *J* and *M* are connected to John and Mary, respectively.



The Vocabulary Item that spells out the verb root has phonological features for an arc movement and two  hand configurations, but not for

the places of articulation. These are provided by the Vocabulary Items that spell out the morphosyntactic feature bundles agreeing with the Source and Goal agreement markers, so that the sign moves from the locus of the Source to that of the Goal. In (10a) these are [$\text{loc}_{\text{signer}}$] and [loc_M] respectively, in (10b) [loc_M] and [loc_I].

A structure that, after Vocabulary Insertion into all of its terminal nodes, lacks phonological features for all of the components that are minimally necessary in view of the requirements of the sign language PF interface will receive phonological default specifications. The default specifications for place of articulation in agreement verbs are near the signer and slightly away from the signer.²⁰ Thus, the citation form of the sign for ‘to visit’ surfaces as a movement with a particular hand configuration from an underspecified, default begin locus to an underspecified, default end locus, as in (11).



²⁰ This is reversed in backwards verbs, that is in verbs that, in contrast to ‘normal’ agreeing verbs, do not move from the locus of the subject to the locus of the object but the other way around (Padden 1988; Bos 1994; Meir 1998). According to Meir, all agreeing verbs move from Source to Goal, and in backwards verbs the object happens to be connected with the Goal and the subject with the Source.

Finally, I assume that ‘non-agreement verbs’ as well as agreement verbs (including VELMs) are, in fact, combined with agreement morphemes. However, the roots of non-agreement verbs are connected to Vocabulary Items that have full phonological feature specifications. Therefore, any agreement marker spelled out with a Vocabulary Item carrying phonological feature specifications for locus or hand configuration would result in a clash of phonological features at PF. Instead, the agreement markers are left phonologically unspecified.

The analysis presented here accounts for the agreement phenomena we see in sign languages in a way that combines two agreement ‘systems’ into one. The phonetic output is predictably determined by the morphosyntactic features of the lexical items from List A, the phonological feature specifications of the Vocabulary Items of verb roots, the presence of voice nodes, agreement morphemes, and the application of properties of the DM framework such as cyclicity, late insertion, competition of Vocabulary Items and Underspecification. I have used and extended the ideas put forward by Glück & Pfau (1999), using a more recent version of the DM framework. Since I assume that the Vocabulary Items of some verb roots are not specified for all of the phonological features that are necessary for a sign to be spelled out, and since I assume competition between Vocabulary Items for the agreement morphemes, my analysis gives a unified account for all verbs and the agreement phenomena in NGT, and predicts which verbs will show agreement morphology. It also predicts the type(s) of agreement that will surface on an inflected verb. In this, my analysis makes use of earlier suggestions of Padden and Meir about the possibility of agreement marking on verbs,

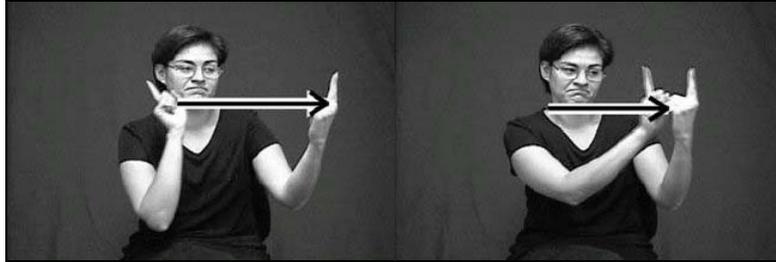
but I have worked these out in the DM framework. Finally, I have argued that the absence of person features in the agreement system of sign languages is accounted for in this analysis: agreement morphemes have classifier agreement features and a [loc] feature.

6.3 The morphological structure of the VELM

In the interest of completeness, this section treats the morphological structure of VELMs and compares my analysis of the meaningful hand configurations in these verbs with previous analyses. It has been claimed in the literature that classifier predicates have considerable complexity (Supalla 1982; Shepard-Kegl 1985; Liddell 2003; Talmy 2003). For some researchers, this complexity poses problems for morphological, syntactic and phonological theories of sign languages and language in general. The morphological structures proposed sometimes combine a large number of morphemes, usually not attested even in polysynthetic spoken languages. For instance, Liddell (2003) observes that the predicate in (12) must consist of at least 18 (and at most 44) morphemes, four of which are roots (namely a hold root on the non-moving hand; and a hold root, a movement root, and another hold root on the moving hand), and 14 of which are affixes: classifiers and affixes for orientation, facing, placement, distance, directionality and repetition.²¹

²¹ Note that this example does not show two signs, but one. The first photograph shows the initial location of the hands, the second shows their end locations.

(12)

UPRIGHT-PERSON₁-WALK-TO-UPRIGHT-PERSON₂ASL (Liddell 2003:202, Fig. 95)²²

Morphological complexity in itself should not be a reason for concern in linguistic theory, provided that evidence exists for the proposed morphemes in the structure and for the complex structure itself. I join Liddell (2003) and others in questioning the validity of some of the proposed morphemes and part of the proposed structure of classifier predicates.

I will begin with a discussion of the movement of the hand in section 6.3.1, then proceed to the manner of motion in section 6.3.2. In section 6.3.3, I discuss the orientation of the hand and the spatial relations between referents. I compare my analysis to previous analyses of the morphological structure of VELMs in section 6.3.4, and section 6.3.5 contains a summary.

6.3.1 The movement in the classifier predicate is the root

Supalla (1982, 1986) and many other investigators of classifiers in sign languages assume that classifier predicates consist of a root and several

²² The illustrations from Liddell (2003) *Sources of Meaning in ASL Classifier Predicates* are reprinted by permission of the publisher; © 2003 by Lawrence Erlbaum Associates, Mahwah NJ.

affixes. The root is expressed by a movement of the hand(s). McDonald (1982) and Engberg-Pedersen (1993) disagree with this assumption. First, the hand configuration affects the argument structure of the verb; second, the movement of the hand does not have a consistent meaning: it can indicate a motion, but can also indicate the size and/or shape of a referent. This is considered counterevidence for the status of the movement as the root of a classifier predicate. Instead, McDonald & Engberg-Pedersen consider the hand configuration to be the stem of the verb, which can combine with a movement. The grammatical status of the movement remains unclear. According to Engberg-Pedersen (1993:252); “[I]t is not yet clear how the movement morphemes should be classified morphologically, as stems, derivational affixes, or inflectional affixes.”

If the movement were analysed as a stem, the structure of the classifier predicate would conform to the ideas of Slobin *et al.* (2003). Slobin *et al.* do not consider one element of the predicate as a root, but consider the classifier predicate as consisting of more than one root, with the hand configurations functioning as roots as well as the movement. Other components of the sign can also function as roots. None of the components can stand alone as a complete sign. Furthermore, all of these components can be substituted by others. This is an interesting line of thought that will be pursued in the analysis of motivated signs in Chapter 8.

However, in VELMs there appears to be only one root. VELMs are unmistakably verbs, expressing an event or a state. These are expressed by the movement (or non-movement) of the hand(s). The hand configurations systematically provide information about the referent

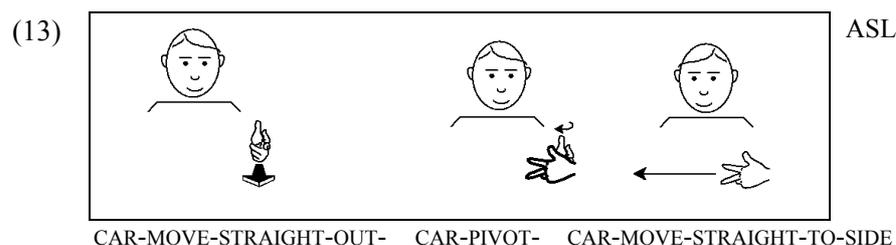
involved, and are interchangeable with other hand configurations, depending on the particular referent involved. The hand configurations thus form a *paradigm*. Moreover, they form a closed class. For these reasons, an analysis of the movement of the predicate as the root and the hand configuration as an agreement morphemes is preferable over an analysis in which the latter is analysed as a stem or root.

The observation by Engberg-Pedersen and McDonald that there is a systematic relationship between the type of meaningful hand configuration (entity versus handling) and the argument structure of the verb is confirmed by my data: entity classifiers occur on intransitive verbs and handling classifiers on transitive verbs. However, they explain the difference in argument structure by assuming different stems, and alternative accounts are possible. I provided an alternative account in section 6.2.5 and others have connected the transitivity alternation with elements outside the stem (for instance Kegl 1985, 1990; Benedicto & Brentari to appear).

The fact that a movement in a sign can indicate either motion of a referent or the outline of a referent gives rise to homonymy: different predicates are involved that have the same form but a different meaning. The morphemes in VELMs (especially the movement) may have a different grammatical status from those in contour signs .

On the basis of the arguments above, I will assume that the movement of the hands in VELMs functions as the root, and will now discuss the VELMs that, according to proposals in the literature, combine several movement roots, either sequentially or simultaneously. First, consider the structure in (13), which in Supalla's analysis is a classifier predicate in

which three roots are combined sequentially: a movement, a pivot and a movement.²³



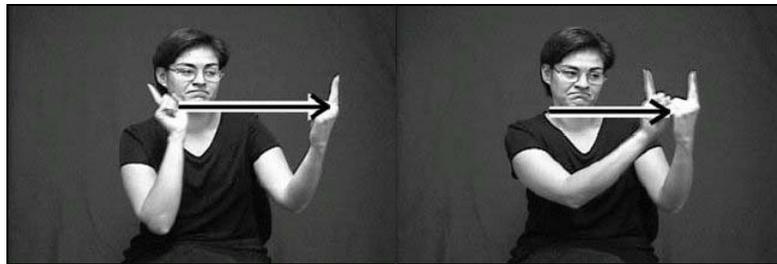
Supalla's proposed structure seems unnecessarily complex. Clearly, three different events are expressed, involving the same referent. In my data, I have observed that such sequences often show intonational breaks, that is, non-manual signals that indicate the boundary of an intonational phrase. Such signals include radical changes in head position and/or eye gaze, changes in body posture and/or eye blinks. This is independent evidence that such structures form not one predicate, but several. My claim is that (13) consist of three VELMs, each heading its own clause that consists solely of the verb (that is, there are no overt arguments or other signs such as adverbials present in the clause). The verbs in this sequence are all inflected with a subject agreement marker that agrees with the referent in motion (a car). This marker is spelled out with a Vocabulary Item that consists of the ASL classifier for vehicles. In principle, it should be possible to express more signs in each clause and thereby interrupt the sequence of VELMs, but in the typical discourse, a signer will choose to

²³ The example is reconstructed using an interpretation of Supalla's proposals by Newport (1981:116).

focus on the sequence of events. This can be compared with an English sequence such as *the car drove, turned, drove on and ...*, in which three verbs form a continuous sequence.

Second, consider the ASL predicate which expresses that one person moves to another person, repeated here as (14).

(14)



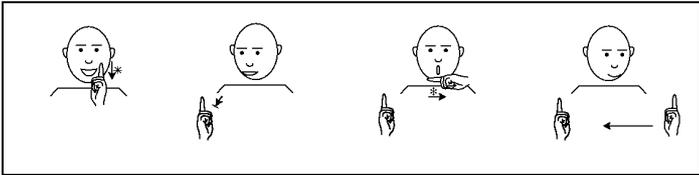
UPRIGHT-PERSON₁-WALK-TO-UPRIGHT-PERSON₂

ASL (Liddell 2003:202, Fig. 95)

According to Supalla's analysis, this predicate consists of (at least) a hold root on the non-dominant hand and a movement root on the dominant hand.²⁴ I suggest instead that *two* VELMs are articulated *simultaneously* in the construction in (12) and similar two-handed constructions. Thus, each hand articulates one VELM, and each VELM is affixed with one subject agreement marker. The non-dominant hand indicates the existence of an upright person at a particular locus in signing space. The dominant hand indicates the path motion of an upright person from a particular locus to another particular locus (the latter connected to the other person). A more literal translation of the sign (or rather: signs) in (12), then, is: *An upright person is located here. An upright person moves*

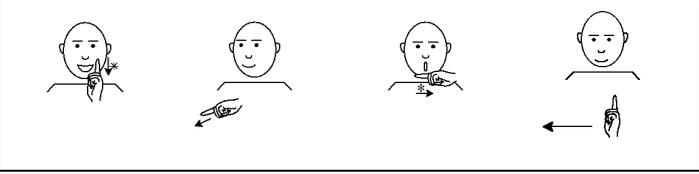
²⁴ I disregard here the hold roots at the beginning and end of the movement.

from here to here. Since the end locus of the verb expressing the path motion of one person coincides with the locus of the verb expressing the existence of the other person, we interpret and translate the structure as: *One person moves to another person*. However, in contrast to this translation, there is not one predicate (and clause) involved, but two. My analysis of such constructions is supported by the fact that there is no difference in interpretation of the construction in (12) and a similar construction which consists only of a movement of the dominant hand when the end locus of this movement is connected with another person. I illustrate this with the examples in (15a,b).

(15)a.  NGT

father	LOC _x -be.at-	RH: mother	RH: LOC _y -move-LOC _x -
	CL: animate	LH:LOC _x -exist-	CL:animate ent
	ent	CL: animate	LH:LOC _x -exist-
		ent	CL: animate ent

'There's (a) father, here. (The) mother moves towards him.'

b. 

father	be.at-LOC _x	mother	RH: LOC _y -move-LOC _x -
			CL:animate ent

'There's (a) father, here. (The) mother moves towards him.'

In both examples, the signer relates that mother moves towards the father. In the a) example the father is localized by means of a verb of location

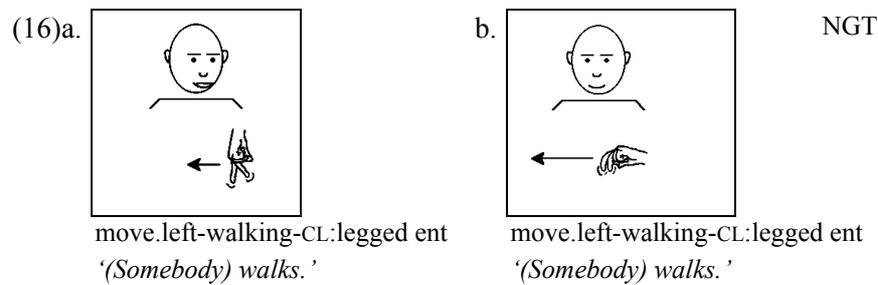
that has a subject agreement marker consisting of the  hand configuration. In the b) example he is localized in the same way, but now the subject marker consist of the default  hand configuration. Thus, in both examples the locus to the left of the signer is connected to the father. In the a) example the  hand is maintained throughout the following clause; the existence of the father at the locus to the signer's left is thus expressed by a separate VELM. This is not the case in the b) example. In the second clause of both examples the mother is introduced and a VELM is used to express the motion of the mother towards the father. Apparently it is not necessary to express the existence of the father during the expression of the motion event to do this: (15b) shows us that a VELM indicating a motion towards the locus connected with the father still expresses the motion of the mother towards him, even if the father is not simultaneously represented. The analysis of such 'two-handed classifier constructions' in which both hands represent a referent as two (simultaneously expressed) VELMs is, therefore, independently motivated.

In short, then, VELMs sequentially and simultaneously consist of one root only, which is spelled out as a movement of the hand(s) and interpreted as a motion, localization or existence of a referent. Each VELM can combine with one classifier agreement marker (and maximally with two locus agreement markers). Constructions that have been analysed as two-handed classifier predicates consist of two VELMs. Classifier predicates that have been analysed as sequences of roots, too, consist of more than one VELM.

6.3.2 Manner of motion is affixed in VELMs

In section 5.4, I discussed verbs that express the manner of motion of a referent, such as flying and running, and I argued that these are not classifier predicates. The expression of manner of motion is, however, not (completely) restricted to these signs: there is a limited possibility of expressing manner of motion in VELMs as well.²⁵ I will discuss these possibilities here, focusing on four types of manner of motion that can be combined with a path motion in VELMs: i) the concept of *walking*; ii) the concept of *rolling*; iii) the random movement of many referents along a path; and iv) speed and intensity. I will argue that manner of motion is affixed and not part of the root in these constructions, although it is not always easy to distinguish root and manner affix.

First, the concept of *walking* is often expressed by the wiggling of the fingers of the  or  hand configurations, as illustrated in (16a,b).

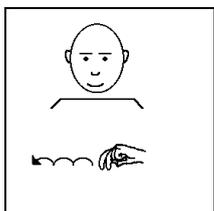


The root of the classifier predicate expresses the path motion (or the location or existence) of a referent. The  or  hand configurations can

²⁵ See also Supalla (1990) for a discussion of the expression of manner of motion in classifier predicates.

also occur on a path movement *without* finger wiggling. In that case the predicate has the interpretation that a legged entity (for instance a person or animal) is moving along a path, but it does not indicate *walking* along a path. It simply denotes a motion of a legged entity, for instance the motion of a person on an escalator. Thus, to indicate that the referent is walking, the signer has to do something extra, namely add wiggling. I therefore conclude that the walking manner of motion in verbs such as the ones in (16a,b) is not part of the root, but affixed. The walking event can also be expressed by a slight hopping movement instead of the wiggling of the fingers of the  hand, as can be seen in (17). (This may be easier to articulate than wiggling two bent fingers.)

(17)

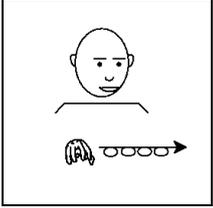
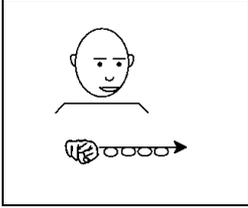


NGT

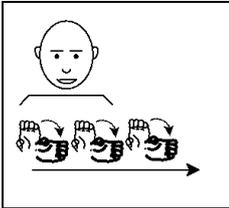
move.left-walking-CL:legged ent
'(Somebody) walks.'

Apparently, in this construction the indication of the walking motion has been transferred from a bending of the MCP joints to bending of the wrist, resulting in a repeated small arc movement along a path. This sign, although it *can* mean 'to move in small arcs along a path' (for instance jumping along a path as in a sack race), can also mean 'to walk along a path'. The surface form of this sign is ambiguous in this respect.

The concept of *rolling* is expressed by a circular movement of the hand along a path, as illustrated in (18a,b).

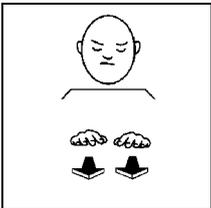
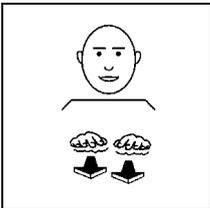
- (18)a.  b.  NGT
- move.right-circling-
CL:round ent
'(The ball) rolled from the
left to the right.'
- move.right-circling-
CL:unspecified ent
'(The ball) rolled from the
left to the right.'

Superficially, it seems as if the rolling manner of motion is expressed by the root, because there is a circling motion along a path. However, these constructions do not necessarily mean that a referent (for instance a ball) undergoes various circular motions (although that is a possible interpretation), but rather that the referent follows a straight path, with a rolling manner of motion. Articulatory constraints account for this “conflation” of path and manner: the wrist does not allow the hand to rotate and with the elbow joint allows at best a rotation of 180°. As we saw in Chapter 4, orientation and orientation changes of a referent are mostly expressed by a particular orientation of the hand in VELMs. The most realistic expression of a rolling movement by orientation change would be repeated partial rotation of the hand, as in (19).

- (19)  NGT
- * move.right-circling-CL:round ent
* '(The ball) rolled from the right to the left.'

Such a construction, however, indicates partial rotation of several referents at various loci in signing space instead of a rolling motion along a path. Thus, it appears that the expression of the orientation change of a referent in the event of rolling is transposed from the elbow joint to the wrist joint. Since a straight movement of the hand is possible, indicating a gliding motion of the referent, I conclude that the rolling manner is affixed.

Wiggling of the fingers is also observed in predicates indicating the path motion of many small entities,²⁶ such as insects and drops of water, but also of larger entities, such as people. In this case the finger wiggling does not necessarily indicate walking, nor is it obligatory. As illustrated in (20a), a verb of motion with the  hand configuration (the palm is oriented downward) is used to indicate the straight path motion of many referents, such as soldiers marching in line.²⁷

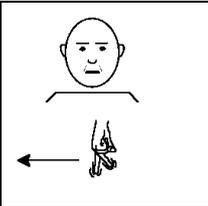
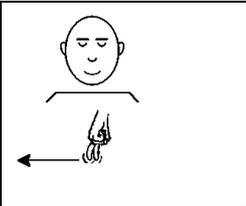
- (20)a.  b.  NGT
- move.out-CL:many ent move.out.randomly-CL:many ent
'Many entities move forwards.' *'Many entities move forwards randomly.'*

²⁶ It is not yet clear to me whether this hand configuration and wiggling can also occur at a verb expressing the existence of these referents.

²⁷ Note that the sign does not express 'marching' as a manner of motion.

A wiggling motion indicates that the motion is more random. The referents still follow a path, but do not keep the same position and distance with respect to each other. This is illustrated in (20b). Here we see another way of expressing a manner of motion: a random path motion that can only be expressed when many referents are involved. Since this manner is not obligatory and occurs simultaneously with a path motion, it must be affixed.

Fourth, consider the expression of fast, slow, tense and relaxed motion. None of these manners of motion is obligatory, but they can occur simultaneously with the path motion. The pace of the motion of the referent is expressed by a faster or slower movement of the hand than normal. Tense and relaxed path motions are indicated by the tenseness of the hand configuration. The muscles of the hand can be strained or relaxed, as illustrated in (21a,b), respectively.²⁸

- (21)a.  b.  NGT
- move.left-tense-CL:legged ent
'(Somebody) walks in a tense manner.'
- move.left-relaxedly-CL:legged ent
'(Somebody) walks in a relaxed manner.'

In sum, the optionality of the various manners of motion discussed allows them to be analysed as affixed to the root expressing the path motion.

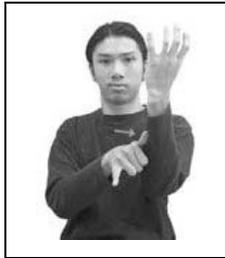
²⁸ Pace and tenseness are also expressed by non-manual markings. I will not discuss these here.

6.3.3 Orientation and spatial relations

All signs, including VELMs, have a particular hand configuration in a particular orientation. The orientation of the hand, as we saw in Chapter 4, gives information about the (relative) orientation of the referent in VELMs.²⁹ I follow Supalla's analysis that orientations are affixed in the VELM, but not his suggestion that the orientations are morphemes that attach to classifiers (that is, that they have scope over the classifier, not over the VELM). I claim that orientations are affixed to the root.

Tang (2003), discussing Hong Kong Sign Language, follows other researchers in claiming that orientation changes express 'manner', as well as a static orientation. For instance, the orientation of the  hand configuration (which represents animate referents in this language) in the sign in (22) expresses a manner of existence of the referent, namely *leaning*.

(22)

HKSL (Tang 2003:151, Fig. 7.7)³⁰

'A man leans against a tree.'

²⁹ Except in predicates with the default classifier , which does not indicate any characteristics of the referent.

³⁰ Illustration reprinted by permission of the publisher; © 2003 by Lawrence Erlbaum Associates, Mahwah NJ.

I adopt Tang's analysis and claim that, alongside the manner affixes discussed in the previous section, morphemes expressing the orientation of a referent also indicate manner of motion or manner of existence. Like the manner morphemes in section 6.3.2, orientation morphemes are affixed. Underlying this claim is the fact that the exact orientation need not be expressed: a signer can choose not to specify the orientation of a referent. This has been described in some detail by Wallin (1990) for SSL, but is also attested in my data from NGT. Consider two examples from Wallin (1990), presented here in (23), in which the hand configurations represent cars.

(23)a.



'2 2-D-object-be-located
(next to each other)'

b.



'2 2D-objects-be-located
(one behind the other).'

SSL (Wallin 1990:144, Fig. 17/19a)

The cars seem to face away from the signer in (23a) and to face each other in (23b), since the fingertips of the  hand represent the front of a car in SSL and the fingertips of both hands are oriented outward and towards each other, respectively. However, this is not necessarily the case. According to Wallin, the cars described in (23a) could just as well be both facing the signer, or one could be facing the signer whereas the other faces away from the signer. Those in (23b) could equally well be

both facing left, or right. Thus, a signer can choose to leave the orientation (partially) unspecified, for instance when he considers (one of) the orientation(s) of the referent unimportant. In the example in (23b) the signer apparently considered the direction in which the cars face to be less important than the fact that they were lined up. The orientation *can* be fully specified, but need not be.³¹

Liddell (2003) questions the presence of some of the morphemes proposed by Supalla to express spatial relations in VELMs between two or more referents. According to Liddell, the set of loci needed to express particular loci must be infinite. Likewise, the set of ‘distance morphemes’ that express the positioning of a referent with respect to other referents must be infinite. For that reason, Liddell suggests that part of the information provided by classifier predicates is not linguistic but can be inferred from the visual image. I disagree with his conclusions about the connection of referents to loci in signing space. Instead, I follow Lillo-Martin & Klima (1990) and Meir (2002) in their analysis of such loci as abstract morphemes that only consist of a locus (see section 6.2.2). Loci are associated with indices, which connect them to the correct referents (in sign languages, these indices are overt). However, I share Liddell’s conclusion that there is little independent evidence for a ‘distance morpheme’. Signers deliberately position referents in signing space and assign them particular loci. These loci are sufficient to express and understand the spatial relations between referents and there is no need to

³¹ Specification of (one of) the orientations can also be overruled by the constraints of the physiology of the articulators. However, this is outside the discussion of the morphological status of the orientation.

posit morphemes expressing the distance between them. Therefore, I do not analyse VELMs as containing ‘distance morphemes’.

6.3.4 VELMs and phonological constraints

It has been claimed in the literature that classifier predicates have considerable complexity (Supalla 1982; Shepard-Kegl 1985; Talmy 2003). Some researchers have argued that the observed complexity poses problems for syntactic and phonological theories of sign languages and language in general (among others, Cogill-Koez 2000; Aronoff *et al.* 2003). I will briefly focus on the latter, and discuss the former in section 6.4.2.

Aronoff *et al.* (2003) claim that VELMs in ASL and ISL freely violate phonological constraints on (prosodic) signs, such as the Selected Finger Constraint, monosyllabicity and Battison’s (1978) Dominance and Symmetry Conditions. For instance, the ISL sign in (24) violates the Dominance Condition. This condition states that if the hands of a two-handed sign do not share the same specification for handshape, then: i) one hand must be passive while the active hand articulates the movement; and ii) the specification of the passive handshape is constricted to one of a small set: . As can be easily seen, the hand configuration of the non-dominant hand (a lax form of the  hand) in example (24) does not belong to this small set.

(24)



*ISL (adapted³² from
Aronoff et al. 2003:71, Fig. 3.7)³³*

'A person approached an airplane.'

The Symmetry Condition is violated in the ASL example in (25). This condition states that if both hands of a sign move independently, then both hands must have the same specifications for location, handshape, movement (symmetrical or alternating), and orientation (symmetrical or identical). However, in this example the hands differ with respect to the specifications of handshape, movement and orientation.

(25)



*ASL (adapted from
Aronoff et al. 2003:71, Fig. 3.8)*

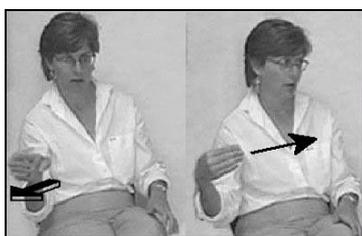
'A person walks dragging a dog.'

³² The adaptations in the examples of Aronoff *et al.* (2003) consist of addition of the arrows that indicate the movements of the hands, based on the description of the signs in the text and video examples.

³³ The illustrations from Aronoff *et al.* (2003) '*Classifier Constructions and Morphology in Two Sign Languages*' are reprinted by permission of the publisher; © 2003 by Lawrence Erlbaum Associates, Mahwah NJ.

Furthermore, VELMs can violate the constraint of monosyllabicity, as Aronoff *et al.* illustrate with the ASL example in (26) in which the hand of the signer first moves to the right, then to the left, creating a bisyllabic sign:

(26)



ASL (adapted from
Aronoff *et al.* 2003:71, Fig. 3.9)

'Car turns right || car turns left.'

In order to account for the latter phonological violation Aronoff *et al.* suggest that VELMs may spread over larger constituents than the prosodic sign and may even span several intonational phrases. The boundaries of intonational phrases are determined by non-manual markings such as a change in head position and a change in facial expression in ISL, longer duration of signs at the end of an intonational phrase in ASL and eyeblinks in both sign languages. I have made the same observations from my NGT data, which has led me to conclude that structures similar to that in (26) do not form one VELM but a *sequence* of VELMs (section 6.3.1). Consequently, such structures do not violate the monosyllabicity constraint, since they do not consist of one bisyllabic sign, but of two (or more) monosyllabic signs.

With respect to of the Dominance and Symmetry Conditions, I question the claim made by Aronoff *et al.* (and others) that these are violated in (24) and (25). Recall that I have argued in section 6.3.1 that

these two-handed constructions do not form one VELM, but two VELMs that are articulated simultaneously. Each hand thus articulates one VELM, with one subject agreement marker. A VELM is a prosodic sign that can be articulated simultaneously with another VELM. It thus appears that VELMs do not violate these conditions at all.

In sum, my analysis of VELMs as consisting of one root (that is combined with several affixes), sometimes occurring in uninterrupted sequences, *predicts* the possibility of constructions which, superficially, violate phonological constraints such as the ones discussed. Therefore, my analysis has a considerable advantage over analyses that need ways to explain the frequent ‘violations’ of these constraints.

6.3.5 Summary

In this section I have argued that a VELM always contains a root indicating the path motion of a referent, its localization, or its existence in signing space. The root can be affixed with morphemes that can indicate the manner of motion, such as walking and rolling, and (changes in) the orientation of the referent, for instance rotation. Morphemes expressing the manner of motion are not always recognizable as affixes; sometimes they are conflated with the path motion. This is often the result of articulatory limitations. Since the arm, wrist and hand joints do not allow certain movements, the required movements are sometimes transposed to other joints or to the path motion. Because of this, it sometimes looks as if the manner is expressed by the root as well as the path. However, I have argued that the expression of path and manner can still be separated into distinct morphemes. I have also argued that the structures that have

been previously proposed for VELMs are unnecessarily complex, posing morphemes for which there is no independent evidence and giving rise to violations of phonological constraints. I have reduced this complexity by showing firstly that the structures that have been analysed as sequential root combinations actually form a sequence of VELMs, each heading their own clause and secondly, that ‘two-handed VELMs’ in which the hand configurations represent different referents are distinct VELMs that are articulated simultaneously.

6.4 Comparison to recent views on classifier predicates

Since the work by Supalla (1980, 1982) and McDonald (1982), most sign language researchers who dealt with predicates that express the motion, location, and existence of referents and the size and shape of referents have analysed these as complex predicates, in which the hand configuration has a particular meaning. These constructions were usually thought to involve classifiers. More recently, however, the latter idea has been called into question. It has been claimed that meaningful hand configurations are *not* classifiers (Engberg-Pedersen 1993:243-252; Emmorey 2001:97-102; Slobin *et al.* 2003). This criticism of the earliest analyses is based on literature on classifiers in spoken languages that, with hindsight, is relatively unsophisticated in comparison to the most recent work (such as Aikhenvald 2000; Grinevald 2000).

This work has provided much more insight into classifier systems (in spoken languages), especially into verbal classifier systems. It criticizes the assumption that ‘classifier predicates’ in sign languages form a homogeneous group of signs whose members should therefore show a

similar structure and behavior. In Chapter 5, I showed that the group of ‘classifier predicates’ consists of at least three different types of structures, with different morphosyntactic characteristics. Thus, it cannot be expected a priori that these separate types, as well as their individual components (particularly the hand configurations), have similar characteristics. Furthermore, I showed that for a subgroup of these predicates, namely VELMs, the meaningful hand configurations behave in a way that is strikingly similar to verbal classifiers in spoken languages, and even more strikingly, in a similar way to noun classes as well.

Although my analyses are based on NGT data, I claim that they basically hold for most (if not all) of the sign languages investigated to date. Sign languages, even unrelated ones, appear to be very similar in the domain of VELMs, as has been observed by Schembri (2001) and others. The main differences are found in the inventories of meaningful hand configurations of different sign languages, although they all share hand configurations that primarily denote shape, such as ‘long and thin’, ‘flat and wide’, and ‘cylindrical-shaped’. The structure of the VELM and the function of the hand configurations seem to be consistent across sign languages.

The fact that the structure of ‘classifier predicates’ in various sign languages has been found to be so similar has recently led some researchers to suggest that classifier predicates are not fully linguistic, but rather partly linguistic and partly paralinguistic (for instance Liddell 2003). Cogill-Koez (2000) even makes the extreme claim that they are not linguistic at all, but rather schematized visual representations. In this

section I will address the arguments of these researchers. I will discuss Liddell's arguments in section 6.4.1 and those of Cogill-Koez in section 6.4.2.

6.4.1 Classifier predicates as unanalyzable lexemes?

Liddell (2003) considers the structure of classifier predicates as proposed by Supalla (notably VELMs) not only as "extremely complex", but argues that the affixes for orientation and distance and the placement affixes (*loci*) suggested by Supalla (1982) are problematic in a morphological theory because it is impossible to list them exhaustively in the lexicon: there are infinitely many orientations, distances and *loci*. He claims that the information conveyed by these elements is analogical and gradient instead of contrastive, and that these elements therefore are not discrete morphemes. He proposes that the information that is revealed about the spatial positioning of the elements and the spatial relations between two classifiers is not linguistic, but deictic. Thus, classifier predicates (and this also holds for agreement verbs) do not contain locus morphemes, nor morphemes that express the orientation of referents, nor indicate distance between the referents. Instead, *loci* are non-linguistic, and classifier predicates and agreement verbs (the latter are, in his terms, 'indicating verbs') move to, from or between non-discrete locations, that do not have linguistic features (Liddell 1995, 2003; Liddell & Metzger 1998). What is left as a linguistic sign, he argues, is a form that is analyzable in a particular classifier, a particular path or locational

movement, and the orientation of the hand with respect to the base plane.³⁴

Notwithstanding the fact that such signs have distinct morphemes, Liddell claims that there is no productive process in which new forms can be created from such morphemes. His argument is that a productive process predicts the existence of a large number of complex signs. While many such signs are not attested in ASL and are not accepted by ASL consultants. He illustrates this with the ASL sign in (27), which shows a repeated up and down movement of a  hand configuration along a path, indicating that a person walks leisurely from an original position to a final position.

(27)



UPRIGHT-PERSON-WALK-ALONG

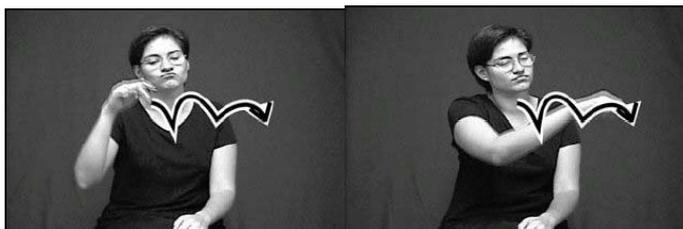
ASL (Liddell 2003:210, Fig. 9.8b)

According to Liddell, the up and down movement does not denote a bouncing movement as might be expected, but an unhurried manner. This manner, however, is not productive, because it cannot be used in a similar structure with any other classifier, not even with a  hand configuration.

³⁴ It is not clear to me why this part of the orientation features is linguistic while the other orientation features (such as the facing of the hand) are not.

The latter construction (see (28)) in the meaning ‘legged entity walks along in an unhurried manner’ is not accepted by ASL signers.

(28)



BIPED-WALK-ALONG (non-existent sign)

ASL (Liddell 2003:210, Fig. 9.8d)

Liddell mentions several other gaps that are to be unexpected if the sign formation process is productive. He thus concludes that the attested forms (such as the one in (27)) are fixed lexical signs that may be analyzable into separate morphemes, but the sign formation process which builds them is unproductive.

As described in section 6.3.3 I agree with a number of Liddell’s ideas on the (non-)linguistic status of some of the elements of classifier predicates. However, Liddell’s claim that there is no productive sign formation process underlying VELMs is doubtful, given standard morphological views. Liddell seems to confuse morphological (or morphosyntactic) productivity with a full range of attested forms, and he sees unacceptability of forms and non-attested forms as evidence for the unproductivity of the process. The fact that a morphologically complex word or sign, or a group of words or signs could be formed but is not attested does not imply that the morphological process that creates these words or signs is not productive. Even though a particular word formation rule is productive, a language may not contain all the forms

that are possible outputs of that rule. Native speakers do not accept all possible grammatical outputs. There are a number of reasons why such forms may not exist. There may be phonological restrictions on combinations of morphemes, morphological constraints on the combinations of certain morphemes, or semantic reasons for the non-existence of particular forms. Also, the formation of a complex form may be blocked by the existence of a homonym (for instance in English the complex word *stealer* is blocked by the existence of the homonym *thief*), or a language user may prefer to use another form.

As for the unattested or unacceptable forms in ASL mentioned by Liddell, it seems likely that signers see no need to express a number of forms, or they use an alternative form. An alternative analysis of the structure in (27) can relatively easily explain the non-existence of the structure in (28). As I discussed in section 6.3.2, in NGT a walking manner of motion can be affixed to a movement root. This is usually indicated by wiggling of the fingers of the  or  hands. However, we have seen that a walking motion can also be expressed by a slight hopping motion. A similar difference in the expression of a type of manner of motion could also be present in ASL, especially since wiggling in the  hand configuration would not indicate a walking manner. Therefore, the hopping motion could be argued to express the walking manner instead of relaxedness, as was claimed by Liddell. The relaxedness could just as well be expressed by the non-manual adverb consisting of pursed lips (usually glossed as ‘mm’) (following Liddell 1980). This would predict that we would not see the same hopping motion in VELMs when the walking manner of motion is already spelled

out by a wiggling of the fingers (as in (28), or when no morpheme expressing a walking manner of motion is present, as in VELMs that express the motion of a car.

In short, I do not accept Liddell's notions about most of the extra-linguistic structure of classifier predicates, since my analysis can explain for the attested phenomena in a linguistic framework. Furthermore, I do not share his opinion that the rules which derive classifier predicates are unproductive (in my analysis this would boil down to stating that inflectional processes are unproductive): there are alternative explanations for the fact that some of the forms that might be expected to occur or to be possible appear not to exist and/or are not accepted by ASL signers.

6.4.2 Classifier predicates as non-linguistic units?

I now turn to the views of Cogill-Koez (2000) on the structure of classifier predicates (in AUSLAN). I will not go into the details of her analysis of these structures, but focus on and discuss the validity of her arguments against an analysis of classifier predicates as linguistic structures. According to Cogill-Koez, structures analyzed as linguistic should display a number of characteristics. She claims that classifier predicates in AUSLAN do not display most of these.

First, Cogill-Koez claims that classifier predicates should pattern similarly to structures in the rest of the language in phonological and morphological structure and syntax. She notes that many of the phonemes (handshapes and locations) in classifier predicates are not meaningless (for example, those in monomorphemic signs), and she adheres to the

statements mentioned in section 6.3.4 that classifier predicates do not obey the same phonological constraints as prosodic (in her terms, monomorphemic) signs. Also, she indicates that the hand configurations in classifier predicates are drawn from a larger set than the set of phonological handshapes in monomorphemic signs (in ASL and AUSLAN). In addressing syntax, Cogill-Koez claims that classifier predicates may violate the hierarchical syntactic structure of the clauses in which they occur, since they allow rather free reversibility and different orderings of classifier predicates without rendering the sentence ungrammatical. Also, she argues that in contrast to other complex structures, the structure of classifier predicates is ‘flat’; that is, there is no recursive hierarchy.

Second, Cogill-Koez claims that the meaningful units in the classifier predicate should show duality of patterning, that is, they should be arbitrary symbols, just like monomorphemic signs. From a comparison of several characteristics of classifier predicates with those of monomorphemic signs, she concludes that classifier predicates are not linguistic.

Cogill-Koez’s arguments show some severe weaknesses. Her phonological arguments are dubious given that research into the phonology of sign languages is still largely undeveloped and it is not well understood what the phonological features of sign languages are. It is likely that the set of phonological handshapes proposed for many sign languages are not phonemic after all, but that manual phonemes consist of more abstract features, and the set of phonemic hand configurations is much smaller and subject to allophonic variation, as argued by Crasborn

(2001). Thus, a comparison of the hand configurations attested in classifier predicates with the set of phonological hand configurations of a language seems premature. It is also not clear why the components (hand configuration, movement, place of articulation) of classifier predicates should necessarily be meaningless like those in monomorphemic signs, since they constitute *morphemes* in these predicates.

Cogill-Koez's claims are based on previous analyses of classifier predicates which make no distinction between the different types, but even if we set this issue aside, her arguments regarding the syntactic structure of classifier predicates remain unconvincing. First of all, when Cogill-Koez considers symmetric contour signs in which both hands trace the outline of a referent, she treats the fact that the begin and end locations of such signs can be reversed (and consequently, the movement between points is reversed) as a syntactic phenomenon. However, this is a *phonological* phenomenon, namely metathesis (which also occurs sporadically in monomorphemic signs (Wilbur 1979; Brentari 1990)).

Secondly, we have seen in section 6.3.1 that classifier predicates (that is, VELMs) can form clauses on their own. A sequence of these predicates forms a sequence of clauses, and reversal of the predicates is thus not a reversal of constituents within a clause (which would disrupt the hierarchical syntactic structure of that clause), but a reversal of *clauses*.

Thirdly, her claim that classifier predicates do not show a recursive, hierarchical structure is unfounded: even in the earliest discussions of these predicates, a distinction is made between roots and affixes, which clearly implies a hierarchical structure. Furthermore, the simultaneous

expression of morphemes does not entail that they do not show hierarchical structuring.

Finally, Cogill-Koez's claim that the elements within classifier predicates should show duality of patterning is no longer supported in generative linguistic theory. As argued by Armstrong (1995) and Aronoff *et al.* (2000), among others, duality of patterning is a generalization formulated on the basis of spoken languages that have existed for a long time. However, it is not a requirement for language and it apparently does not apply to sign languages. Rather, as exemplified by Aronoff *et al.* (2000), the structure of sign languages is such that they can directly reflect visual information about size, shape and spatial relations by using signing space and particular hand configurations.

I conclude, then, that Cogill-Koez's arguments are invalid, partly because of false assumptions and partly because of erroneous analyses of the phenomena. Some of her arguments are falsified by the linguistic analyses presented in this thesis.

6.5 Summary

The complexity of classifier predicates and the problems they pose in a linguistic-theoretical context have been reduced considerably now that the meaning and structure of these predicates have been investigated more thoroughly; not only morphologically, but also morphosyntactically. In this chapter, I have shown that the meaningful hand configurations on VELMs are not only very similar to verbal classifiers, but also to noun class agreement markers. Following and extending analyses by Glück & Pfau (1998, 1999) for DGS, I have shown

that these hand configurations function as subject and direct object agreement morphemes on these predicates. I have further explored the morphological and morphosyntactic structure of VELMs, showing that parts of Supalla's (1982, 1986) analysis of their morphological structure are correct, such as that of the path motion or the non-motion of the hand(s) as the root of the predicate and that other material in the predicate, such as manner, orientation, loci in signing space and classifiers are affixed. I have argued that sequential VELM roots do not form one predicate but are separate VELMs, and that two-handed constructions in which the hand configurations represent different referents are separate VELMs, too, that are articulated simultaneously.

I have contested Liddell's claim that VELMs are not formed by productive sign formation processes but are fixed lexical items. I have argued that these claims are based on misinterpretation of the notion of productivity and insufficient linguistic knowledge about the structures involved. I have also refuted Cogill-Koez's claim that classifier predicates are non-linguistic elements. I have argued that a number of assumptions underlying her claims are based on generalizations about spoken languages that do not necessarily hold for sign languages. Her faulty conclusions are also in part due to a lack of knowledge of sign language structures in general and of classifier predicates in particular. Classifier predicates (VELMs, contour signs, manner of motion predicates) occur in linguistic contexts and fit seamlessly in sentences and discourse. Because of that, linguistic analyses of these predicates (like the one provided in this thesis) are preferable over those that require recourse to representations other than linguistic ones

7.1 Introduction

In Chapter 1 (section 1.4) I mentioned that meaningful hand configurations do not only occur in VELMs, but also in other signs. This holds true for several (if not all) sign languages. Such signs are usually subsumed under the term as (partly or wholly) ‘iconic’ or ‘motivated’. I will use the term *motivated signs* (following Van der Kooij 2002). The views in the literature on the structure of motivated signs are heterogeneous. Three views prevail. Firstly, motivated signs are considered signs that were originally formed by productive word formation processes but have been lexicalized. According to many researchers (such as Supalla 1980; McDonald 1982; Newport 1982; Supalla 1982; Wilbur 1987, Aronoff *et al.* 2000, 2003), such signs have even become monomorphemic, although other researchers claim that these signs are still morphologically complex (Johnston & Schembri 1999).

Some researchers do not claim that motivated signs are lexemes, but rather that motivated signs are morphologically complex signs, formed by productive rules. This view is held by Brennan (1990) for BSL and, (at least for a subset of signs) by Meir (2001) for ISL.

A third group of researchers (Boyes-Braem 1981; Taub 2001) claim that motivated signs are instances of the signed equivalent of sound symbolism. There are several types of sound symbolism (see for instance Fischer 1999). In sign languages, the equivalent of auditory iconicity in spoken languages is claimed to be used. Auditory iconicity indicates the representation of sounds in the real world by phonemes of a language (for instance in the English word *splash*). In sign languages, shape(s) connected to a referent are represented by forms that are found in the phonological inventory (Taub 2001). Without discussing the morphological structure of such signs, Taub and Boyes-Braem claim that in the production of such signs visual characteristics of an entity or action are mapped on the phonemes of the sign language that are most similar in shape to these visual characteristics. For instance, human legs are mapped on the  phoneme (shape-for-shape iconicity), and the outline of a prototypical house is traced with the hands (path-for-shape iconicity). An equivalent in a spoken language is the English word *ding* for the sound of a bell. This is an example of sound-for-sound iconicity: /d/ represents the sharp onset, /i/ the clear high tone, and /ŋ/ the muffled die-off we distinguish in the ringing of a bell (Taub 2001). Sound symbolism is claimed to be very productive in sign languages.

NGT also has many signs in which meaningful hand configurations (and other meaningful components) can be found (Schermer *et al.* 1999;

Van der Kooij 2002). This and the following chapter will explore morphological, syntactic and semantic characteristics of such signs, using a sample of 1016 motivated NGT signs. Following analyses of Brennan (1990) and Meir (2001), I claim that such signs are morphologically complex, and I will elaborate the idea that such signs are compounds. I will, furthermore, relate the structure of motivated signs to that of VELMs and argue that analyses of motivated signs as lexicalized, even monomorphemic signs are not plausible. I will make use of the insights of sound symbolism gained in the sign language literature (especially Taub 2001), but since these accounts do not discuss morphological structure, they will not be focused on in this thesis.

The structure of this chapter is as follows. Section 7.2 focuses on the accounts of productive sign formation by Brennan (1990) and Meir (2001), restricting the discussion to the set of signs in which the hand configuration plays a central role. In section 7.3, I present the method I have used in gathering and analyzing a sample of motivated NGT signs. Section 7.4 is descriptive and contains an inventory of the meaningful hand configurations that occur in the motivated NGT signs in my corpus.

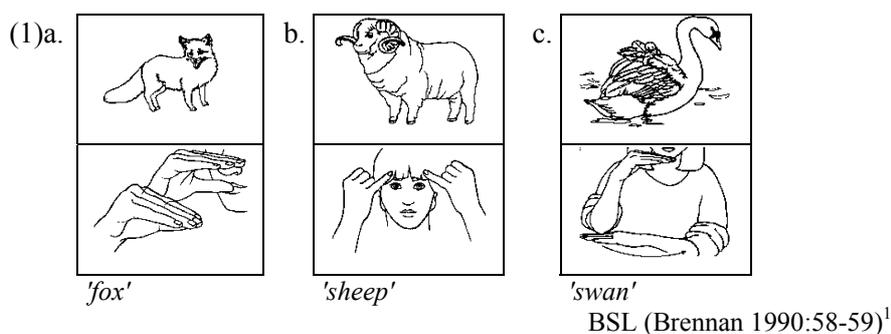
7.2 Morphological complexity in signs

In this section I will give a brief overview of the relevant literature on motivated signs. I will discuss the proposals according to which these signs are analysed as productively formed, complex signs, namely Brennan (1990) for BSL (section 7.2.1) and Meir (2001) for ISL (section 7.2.2). This serves as a basis for a more detailed analysis of such signs in

NGT (which will probably hold for such signs in other sign languages as well), to be given in the next chapter.

7.2.1 Productive morphology in BSL

Like Boyes-Braem (1981) and Taub (2001), Brennan argues that a signer can choose a particular characteristic of an entity or event and denote that characteristic within a sign. This is illustrated in some of Brennan's examples in (1).



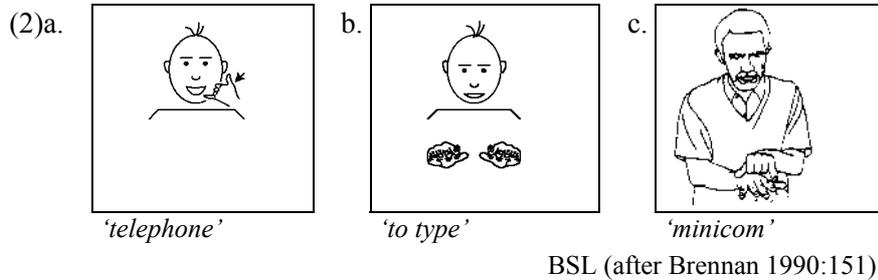
In the BSL sign for 'fox', for instance, emphasis is on the snout of a fox. The typical shape of a fox's snout is outlined in this sign, near the nose of the signer. It is possible to express such a characteristic by a classifier, by a particular meaningful place of articulation or a meaningful movement, or by a combination of these. Knowledge of the world and culture, choice of a symbolic representation and mapping of this choice on linguistic items provided by the language are key notions in the realization of such new signs. The choice of a particular characteristic of an entity or event is

¹ The illustrations from Brennan (1990) *Word Formation in British Sign Language* in this thesis are reprinted with permission from the author; © 1990, M. Brennan.

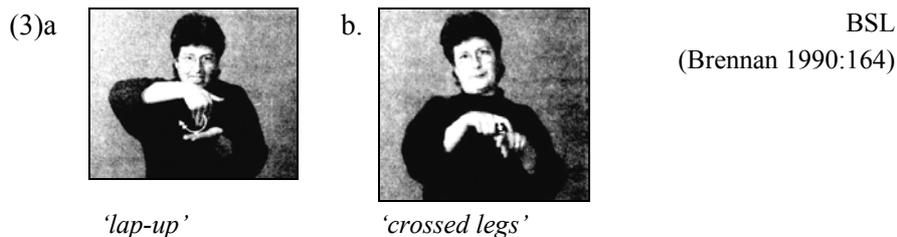
no longer possible when the sign for that entity or event has entered the established lexicon, because the sign has been conventionalized, although it is still possible to substitute a meaningful sign part of that sign by another meaningful sign part to form a new sign.

There are two types of motivated signs in BSL in Brennan's (1990) account: simultaneous compounds and signs that Brennan calls "mix 'n' max" signs. The latter are signs in which meaningful components can be distinguished, but the morphological structure of these signs is not clear.

Simultaneous compounding is very productive in BSL, according to Brennan. These compounds appear to be formed by combining two signs that can occur in isolation and removing and/or changing some of the components of the individual composing signs so that the signs can be articulated simultaneously. Brennan notes that the meaning of compounds is not fully predictable from the meaning of the compound parts. According to her, 'classifier signs' are often used in this type of compounding. Unfortunately, she leaves unclear what is meant by 'classifier signs'. Judging from a number of Brennan's examples, it seems as if the classifier signs are merely meaningful hand configurations, but on the other hand, she claims that classifier signs can occur in isolation as well. An example of a simultaneous compound is the sign for 'minicom', a compound of the signs for 'telephone' and 'type'. The movement of the sign for 'telephone' has been removed in the compound and its place of articulation has changed. The non-dominant hand has been removed from the original sign for 'type' in order for this sign to fit into the simultaneous compound. The signs are illustrated in (2).



“Mix ‘n’ max signs” are motivated signs for which Brennan indicates that she finds the structure not quite clear. The meaningful components of these signs may be classifiers, metaphor morphemes, symbolic locations, symbolic handshapes and meaningful non-manual components. Some examples are shown in (3). In (3a), the  hands represent flat entities: a saucer and a cat’s tongue, and the compound means ‘lap-up’. The  hands in (3b) represent long thin entities: legs, combining into a compound meaning ‘crossed legs’.

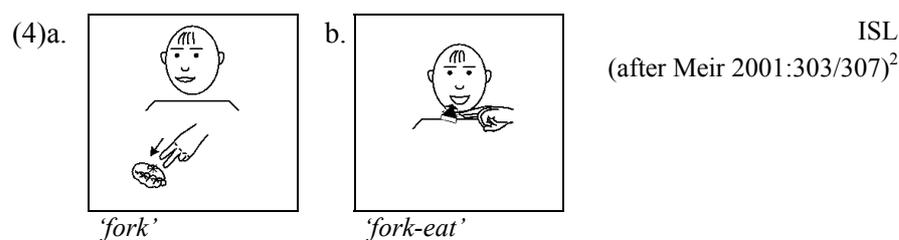


Simultaneous compounds and “mix ‘n’ match” signs are terms that Brennan creates in order to contend with as yet unclear or underdeveloped aspects of morphology and morphological structure. In particular, Brennan argues that the component parts can occur in isolation as well as in the compound signs, and that the meaning of the compounds

usually is not fully decomposable. Questions that remain unanswered concern the difference between simultaneous compounds and “mix ‘n’ max” signs and their internal morphological structure(s).

7.2.2 Noun Incorporation in ISL

Meir (2001) also shows that compounding is a way to create motivated signs in ISL. ISL contains many verbs in which the hand configuration (more or less) transparently appears to contribute to the meaning of the whole. Meir claims that such verbs are the result of a compounding process in which a classifier (or noun root) is incorporated into a verb (following analyses by Rosen 1989 and Mithun 1984, 1986 for spoken languages such as Eskimo, Mohawk and Southern Tiwa). For instance, the ISL nouns for ‘fork’ and ‘spoon’ can incorporate into the verbs for ‘to eat’ or ‘to feed’. The compound sign in which the sign for ‘fork’ is incorporated into the verb for ‘to eat’ is illustrated in (4b).



Meir observes that such compounds have certain syntactic and phonological characteristics. The syntactic characteristics include the effect of incorporation of the noun on the argument structure of the verb, so that the internal argument is saturated in the compounding process.

² The example is reconstructed from descriptions in Meir (2001).

Sentences that contain a verb with an incorporated noun cannot have an overt argument expressing the referent of the incorporated noun as well. Meir illustrates this with the following examples from ISL, showing that doubling of the reference to the spoon is not allowed (note that the internal arguments that are incorporated in ISL are *Instruments* or, in Meir's terms *secondary Themes*):

- (5)a. I BABY INDEX_a ₁SPOON-FEED_a
 I baby that I-spoon-feed-him
 'I spoon-fed the baby.'
- b. * I SPOON BABY INDEX_a ₁SPOON-FEED_a
 I spoon baby that I-spoon-feed-him
 'I spoon-fed the baby with a spoon.'

ISL (Meir 2001:304, ex. 10/11)

The compound parts have full phonological specifications for hand configuration, place of articulation and movement.³ This account resembles Brennan's idea of simultaneous compounding, but gives more information about the internal structure in that the compound consists of a verb and a noun root that is an argument of the verb. Nevertheless,

³ According to Meir, this explains why in some cases compounding is not possible: in these cases the sets of feature specifications clash. For instance, the sign for 'binocular' in ISL is specified for (among others) 'constant contact (with the face)'. The sign for 'to look' is specified for 'no contact'. Combination of these two signs would result in a clash of feature specifications and therefore the compound 'binocular-look' is phonologically blocked.

Meir's account presents some problems, which I will discuss in detail in section 8.3.2.

In sum, Meir considers such complex structures in ISL to be endocentric verbal compounds with incorporated nouns. These resemble simultaneous compounds in the sense of Brennan (1990), in which some of the phonological specifications of both signs have to be eliminated in the compounding process. Incorporation (compounding) saturates the internal (Instrument or secondary Theme) argument of the verb.

7.2.3 Summary

Brennan's and Meir's analyses share the idea that motivated signs are simultaneously expressed compounds. According to Meir they have a (verbal) head and they are compositional in meaning, whereas Brennan claims that many compounds are semantically non-decomposable. In the next chapter I will investigate the structure of motivated signs, especially those with meaningful hand configurations, and compare it with these analyses. First, however, I will explain the method of gathering data and of analysis and give an inventory of the meaningful hand configurations I have found in my sample of motivated NGT signs.

7.3 Corpus and analysis

For the purpose of giving a more detailed morphological analysis of a number of motivated signs in NGT, I have analysed a sample of these signs. I will describe the sample collection and initial analysis in this section. My corpus was compiled from four types of sources. First, I used the SignPhon NGT database of the University of Leyden (with permission of the developers). This database was set up in order to get a

large sample of NGT signs for phonological analyses (Crasborn *et al.* 2002). Unfortunately, the database contains no pictures or movies of the signs. Specific phonological information is provided with each entry with regard to the number of articulators and their spatial relation; the handshape(s), orientation(s), location(s) and changes in these parameters; contact, path shape, secondary movement, repetition, speed and intensity, register (soft versus loud), facial movement, head and body posture, and mouth patterns. Information about the semantic field and motivatedness of the signs is also provided. Information on the entries includes morphological analyses wherever possible. The analysis of motivated components was done on an intuitive basis, meaning that a sign was analysed as iconic or consisting of iconic components if a relation was recognized between the form of the sign and the referent or action expressed by that sign, using common sense and knowledge of the world and the culture in which NGT functions.

Second, I used Dutch-NGT dictionaries that provide movies of signs (and sometimes additional information about the signs). These are available on CD-ROM (IvD *et al.* 2002; Nederlands Gebarententrum 2000; NSDSK 1996, 1997a,b, 1999). The dictionaries are mainly intended as a means for hearing non-signers to learn basic vocabulary for communication with Deaf people, especially in order to help hearing parents learning NGT in order to be able to communicate with their deaf children. They are also useful for looking up the NGT sign for a Dutch word or the meaning of a particular sign. Besides basic vocabulary, more abstract concepts are also included. This vocabulary contains signs pertaining to school themes, clothing, food, sexuality, holidaying, going

out, sports, religion, emotions and linguistics. Although the dictionaries were not meant for linguistic analyses, they proved to be extremely helpful in providing visual representations of the signs. The signs in all of the sources were gathered on the basis of lists of Dutch words.

Third, I used signs occurring in my own data (the means of elicitation of which was described in Chapter 3). Finally, I collected motivated signs through observations in conversations with and between native signers.

I set up a new database, making a reasoned selection of the signs that were entered into it as follows. First, only one token per sign was entered.⁴ For entries consisting of more than one sign sequentially (a compound or a phrase), I entered the separate signs as entries, in order to avoid too much complexity in the description of the sign components. If I could not discern the meaning of such a separate sign, I left it out. Second, the VELMs discussed in the previous chapters were not part of this research, for which reason I did not include them. When entering the signs, I used the labels provided in the sources in entering the signs or a Dutch translation. I specified information about the components of every sign entered as follows:

- Hand configuration(s): I specified the shape of the dominant (and, if applicable, of the non-dominant) hand and, in case the handshape(s) changed within the sign, the initial and final handshape(s). For this, I used the shorthand symbols provided by the HamNoSys transcription system, for instance $\text{a} \text{ } \text{b} \text{ } \text{c} \text{ } \text{d} \text{ } \text{e} \text{ } \text{f} \text{ } \text{g}$.

⁴ Because I used various dictionaries and the SignPhon database, the entries of which were based on a frequency list of Dutch words, there was considerable overlap.

- Orientation: I described the orientation of the palm side of the hand and the direction in which the fingers pointed.
- Place of articulation: I scored stomach, chest, shoulders, neck, chin, cheek, mouth, nose, ear, eyes, eyebrows, forehead, temple, top of head and non-dominant hand. For the signs that were made in signing space, I made a subspecification for low, medium and high, where ‘low’ means ‘about as high as the stomach’, ‘medium’: chest and neck height and ‘high’: face height and higher. I also made a subspecification for middle, ipsilateral and contralateral.
- Movement: I specified the size, shape and direction of the movement, for instance, small, medium and large; straight, arc, circle, spiral, zigzag, random, other; and towards signer, away from signer, ipsilateral, contralateral, up, down. If a secondary movement (such as wiggling of the fingers) was present, this was specified as well.

For every sign, I considered whether any of its components or changes in the components might be meaningful in their own right, based (as in Van der Kooij 2002) on the meaning of the sign, on common sense and on encyclopedic knowledge about the entity or event to which the sign refers and about the Dutch culture. I also discussed many signs with a native signer, in the course of which I learned much about the structure of signs and the intuitions a native signer may have about the sign structure. I was aware of the possibility of overinterpretation, that is, of seeing meaning in a component where there may be none. On the other hand, (slight) changes in a sign may have caused me not to see meaning where there

(synchronously or diachronically) may have been meaning. On the whole, however, I assume that my analyses would hold valid to a large extent: the corpus held 1688 entries, 1312 of which I analysed as consisting of at least one meaningful component. Since my interest is in the subset of meaningful hand configurations that acts as classifiers, I left out of consideration some signs in which the hand configuration contributes in another way to the meaning of the sign.⁵ These were (i) number signs or signs with number incorporation, and (ii) signs that contained one or more fingerspelled elements.^{6, 7} An inventory of the meaningful hand configurations in the signs in the database is provided in section 7.4. My analysis of these signs will be presented in the next chapter.

7.4 An inventory of meaningful hand configurations in motivated signs in NGT

From the 1688 entries in the database, 1312 had one or more meaningful components as distinguished according to the procedure sketched in section 7.3. Of the 1312 motivated signs, 1090 had meaningful hand

⁵ In this, my analysis will differ from that by Van der Kooij (2002).

⁶ In some signs the hand(s) have one or more configurations taken from the manual alphabet. Particularly clear examples are the signs for ‘blue’ (in which the hand changes from a ‘B’  hand configuration to an ‘L’ hand configuration , representing the initial letters of the Dutch word *blauw*) and ‘lazy’ (in which the hand configuration has an extended thumb and all fingers except the ring finger are extended, simultaneously representing the letters of the Dutch word *lui*).

⁷ It is possible that a few signs with fingerspelled elements have crept into the analysis, despite my efforts to filter these out, because many hand configurations from the manual alphabet are also hand configurations from NGT.

configurations. That is, in these signs, the hand configuration clearly represented the entity to which the sign refers, or an entity in the event to which the sign refers. In this section, I will present an overview of the hand configurations that I observed as meaningful in these signs.

Recall that I gave an overview of the meaningful hand configurations functioning as agreement markers on VELMs in NGT in Chapter 4. All these hand configurations also figure in other signs than VELMs. There are some similarities between the hand configurations in motivated signs and VELMs, but there are also differences. The hand configurations that appear on VELMs and in motivated signs have a similar meaning. As in VELMs, in motivated signs, there is a distinction between the meaningful hand configurations that *directly* represent entities and those that *indirectly* represent entities (by rather representing the holding or manipulation of entities). 366 signs contain meaningful hand configurations that represent an entity and 288 signs indicate the manipulation of an entity. Furthermore, there are 165 signs for which I could not definitely say whether the hand represented a manipulation of an entity or the entity itself: the hand configurations are polysemous in this respect.

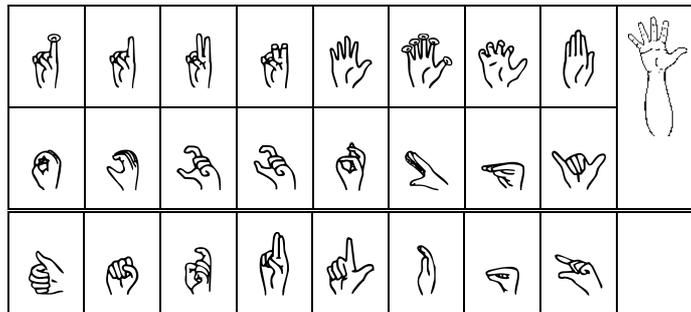
The motivated signs contain a set of signs in which a hand configuration appears to indicate both the manipulation of an entity and the entity itself; in this they differ from the VELMs. Furthermore, meaningful hand configurations that appear in both VELMs and in motivated signs appear to have more meanings in the latter case than in the former. Finally, the set of meaningful hand configurations observed in

VELMs appears to be slightly smaller than the set occurring in the motivated signs.

In the next three sections I will give brief overviews of the meaningful hand configurations that appear in non-VELMs. I present the meaningful hand configurations that *directly* represent an entity in section 7.4.1 and the meaningful hand configurations that *indirectly* represent an entity in section 7.4.2. In section 7.4.3, I will present the hand configurations that seem to represent an entity both *directly* and *indirectly*. Not only the hand configuration, but also the orientations of the hand, the movements and the place of articulation contribute to the meaning of the whole sign. In section 7.4.4, I will briefly focus on these components and the relations between them within signs. This section is primarily descriptive; my analysis of the motivated signs is presented in Chapter 8.

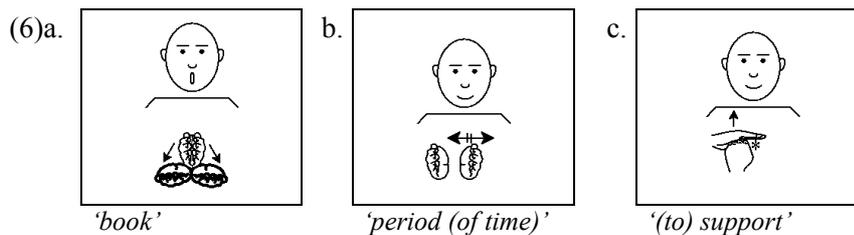
7.4.1 Direct representation of entities

The meaningful hand configurations that appear in non-VELMs and directly represent entities (or parts of entities) are presented in Figure 1. Those in the first two horizontal rows appear also as subject agreement markers on VELMs (I do not present the hand configurations in which number incorporation for a specific number had taken place), while those in the third row only appear as direct representations of entities in non-VELMs.

Figure 1 NGT hand configurations *directly* representing entities

In discussing the meaning these hand configurations, I will not go into full details of all of the hand configurations, but address some of the meaningful hand configurations also occurring as subject agreement markers (namely , , ,  and ). I will also describe all of the meaningful hand configurations not encountered on VELMs.

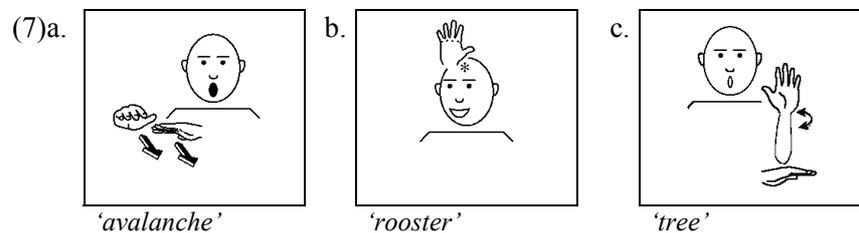
The meaningful hand configurations that occur most frequently in the motivated signs is the  hand configuration, representing a flat and wide entity, such as the cover and pages of a book (6a), a mirror or a door.



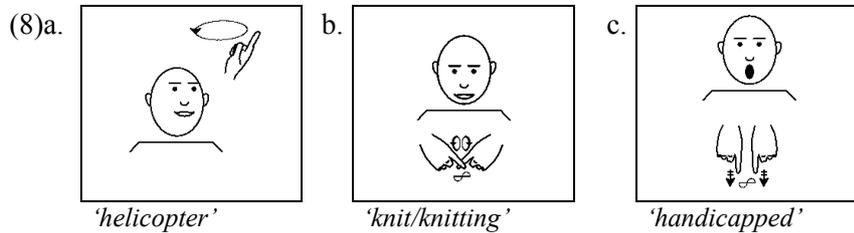
This hand configuration can also frequently indicate a boundary in signs that are related to time. An example is given in (6b), where the non-dominant hand represents the beginning of a period, and the dominant hand the time between the beginning and end of that period. There are

also other signs in which this hand configuration does not indicate the shape of entities. The entities represented can be more abstract, such as a person, a group of persons or a company, as in the sign in (6c), which indicates that such an abstract entity is supported. The meaning of the hand configuration of the dominant hand in this sign will be discussed later in this section.

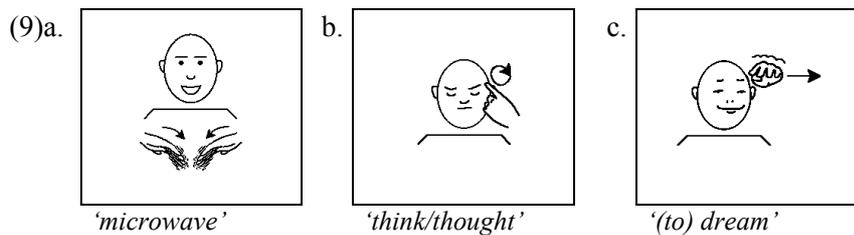
Another hand configuration that occurred frequently in the data set is the  hand. This hand configuration represents a large, wide surface, such as a mass of snow or lava, as in the sign for ‘avalanche’ in (7a). It also represents many long and thin entities. We see this in the signs for ‘rooster’, where the hand represents the rooster’s crest, and in one of the signs for ‘tree’, where it represents the branches of the tree (7b,c).



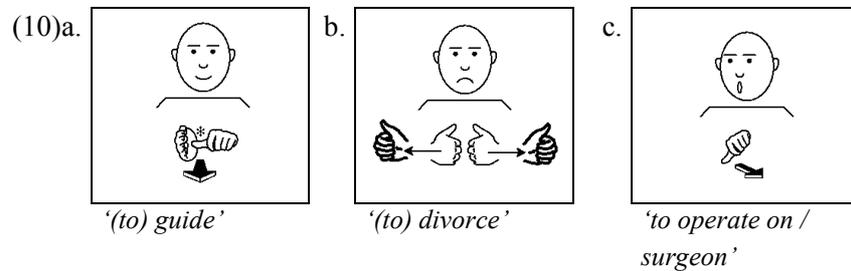
The  hand configuration represents animate entities. It occurred much less frequently than in the VELMs, likely due to the high frequency in the materials of animate entities, agreement with which was often signaled in VELMs by this hand configuration. This hand configuration also represents long and thin entities, such as the blade of a helicopter, knitting needles or legs in the signs in (8).



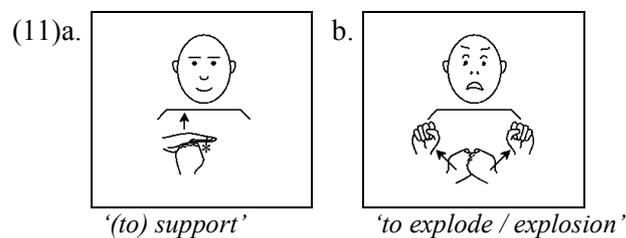
The  and  hand configurations also figured prominently in the compiled data set, indicating one or many very tiny entities or abstract entities, such as radiation parts in the sign for 'microwave' in (9a), a thought in the sign for 'to think/thought' in (9b) and many thoughts in the sign for '(to) dream' in (9c).



I now turn to an overview of the meaningful hand configurations that do not occur on VELMs. The  hand configuration represents people, but also small instruments, such as a scalpel or a lipstick. These meanings are illustrated in the signs for '(to) guide' in (10a) and '(to) divorce' in (10b), where the hand configuration represents the separating persons and the guiding person, respectively, and in the sign for 'to operate on/surgeon' in (10c), where it represents the scalpel.

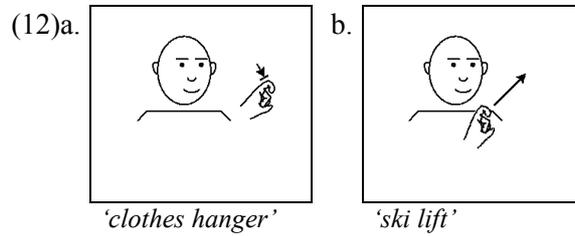


The  hand configuration figured in the data set as a representation of a solid entity, such as a lump or a prop.⁸ This can be seen in the signs for ‘(to) support’ (11a), in which the  hand configuration represents the prop and the  hand (as we saw in (6c)) the supported entity, and ‘to explode/explosion’ in (11b), where the hand configuration indicates two lumps tearing apart and.

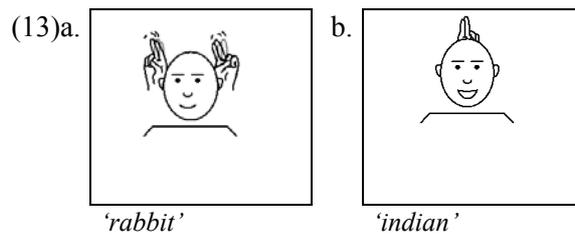


Besides the  hand configuration, a bent form of the extended finger () appeared occasionally, indicating bent long and thin entities. Examples are found in the signs for ‘clothes hanger’ and ‘ski lift’, in which the hand configuration represents the hook of the clothes hanger and the skibob.

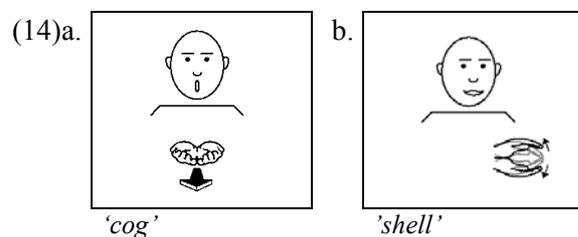
⁸ This hand configuration also occurred on VELMs, but always as a handling classifier, never as an entity classifier.



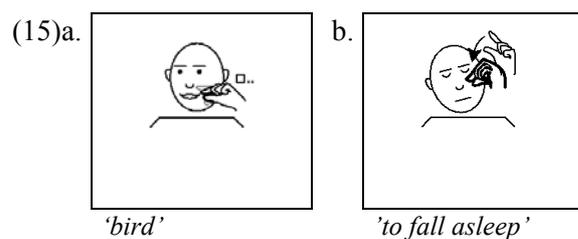
In the set of non-VELMs, a hand configuration appeared that represents long and narrow entities: entities that were not thin, but also not wide. This hand configuration represents (narrow) ears and a feather in the signs for rabbit and indian, respectively, in (13).



Besides the  hand configuration, in a number of signs I also observed a  hand configuration. This hand configuration also represents a flat entity, but the entity is bent or curved instead of flat. Some illustrative signs are shown in (14), namely the sign for 'cog', in which the hand configurations represent its curved bottom, and the sign for 'shell', also indicating curved flat entities, namely the two shells of a mussel.

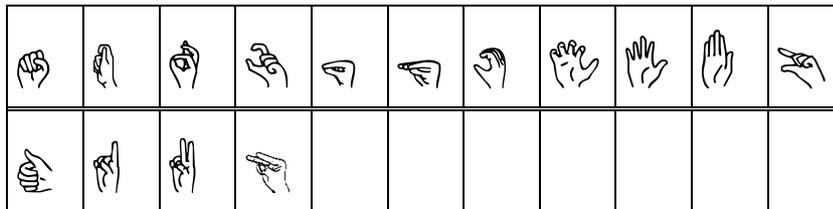


Finally, I found a  and  contributing to the meaning of some signs. These hand configurations represented two long and thin entities opposite one another, as in the beak of a chicken and in eye lids. This is seen in the signs for 'bird' and 'to fall asleep' in (15).

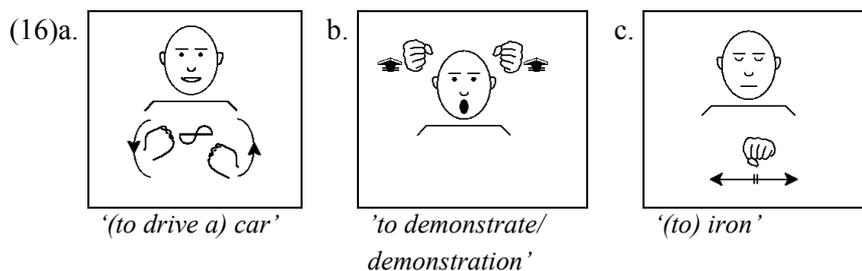


7.4.2 Indirect representations of entities

In this section I give an overview of the meaningful hand configurations that represented the manipulation of (a part of) an entity in signs referring to entities and events. Also, I give a brief description of their meaning. The set of hand configurations contains 11 hand configurations that also occur as object agreement markers in VELMs, and four hand configurations that only occur as manipulating hand configurations in non-VELMs. These hand configurations are presented in Figure 2.

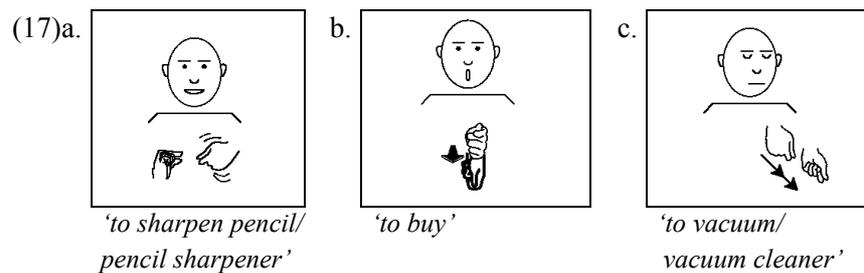
Figure 2 NGT hand configurations *indirectly* representing entities

The  and  hand configurations were by far the most frequent. Both represent the manipulation of small and thin entities. The hand configurations differ with respect to the measure of control. The  hand configuration usually indicates that the entity is held with some force, the  hand configuration indicates manipulation with delicacy, a difference between comparable hand configurations that also occurred in the VELM data. This is illustrated by the signs in (16) and (17). The signs in (16), meaning ‘(to drive a) car’, ‘to demonstrate/ demonstration’, and ‘(to) iron’, respectively, indicate that the entities (a steering wheel, a demonstration placard, and a flat-iron) that are manipulated and held with some force.

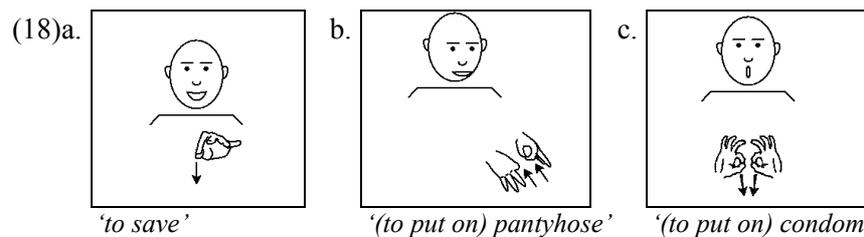


In contrast, the hand configurations in the signs in (17) indicate that the entities are held with some control. This can be seen from the

manipulation of the pencil in the sign for ‘to sharpen pencil/pencil sharpener’ in (17a), the money in the sign for ‘to buy’ in (17b) and the handle of a vacuum cleaner in (17c).

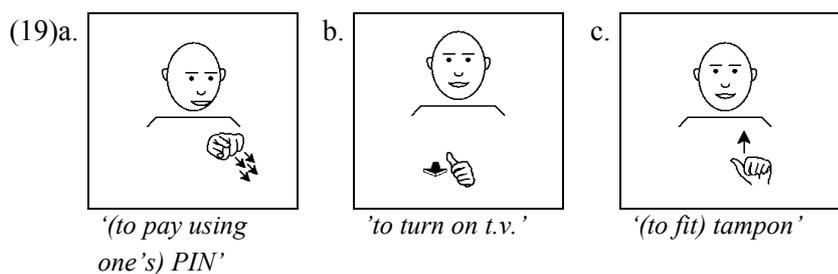


Small thin entities that are manipulated with even less force are represented with the  hand configuration. This concerns, for instance, a coin in the sign for ‘to save (money)’ in (18a), but also the cloth of a pantyhose in (one of) the sign(s) for ‘(to put on) pantyhose’ (18b), or the thin material of a condom as in the sign for ‘(to put on) condom’ in (18c).

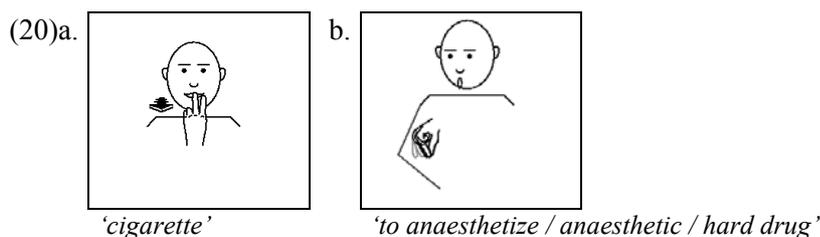


I will now turn to the four manipulating hand configurations that were not attested on transitive VELMs. First, the  hand configuration is used to indicate the manipulation of small entities, such as buttons. This is illustrated in the sign for ‘(to pay using one’s) PIN’ in (19a). Another hand configuration that indicates manipulation of small entities is the 

hand. This hand configuration is used in signs in which the manipulation takes some more force, as in the signs for ‘to turn on t.v. set’ and ‘(to fit) tampon’. This is illustrated in (19b,c)



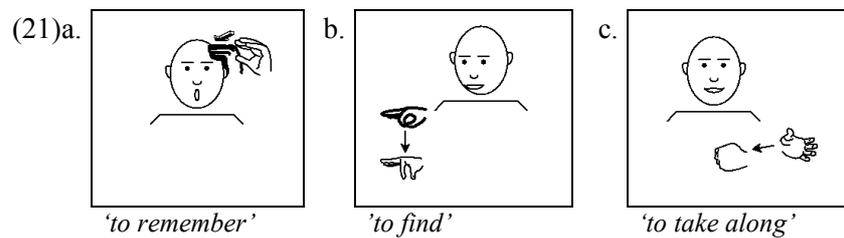
The hand configurations  and  occurred only a couple of times in the data. An example of the  hand configuration is in the sign for ‘cigarette’ (in (20a)), in which an entity is represented as being held between the index and middle finger. There are few entities that are held in this way. Another example of such an entity is a syringe, represented in the sign that means ‘anaesthetic’ or ‘hard drug’ in (20b).



In the latter hand configuration, besides the index and middle finger, the thumb is also meaningful, indicating forceful pushing of something small. This hand configuration seems in fact to be a combination of the 

and  hands. Thus, it may be the case that the  hand configuration is complex itself.⁹

So far, I have given examples of signs in which the manipulated entity could be easily recognized by the particular shape of the hand and, additionally, by other meaningful components that indicate how the entity was moved and what the prototypical place of the entity was (this will be discussed in more detail in section 7.4.4). However, an entity is not always easily recognizable. In many cases, the hand configuration seems to grab or hold or otherwise manipulate entities, but the shape of the entity cannot be guessed from the hand configuration. Some examples are given in (21).



Abstract entities that do not have a shape are also often represented by the hand configurations used to represent concrete entities. This can be seen in the sign for 'remember' in (21a), where the hand indicates grabbing something and putting it into the head (brain). The hand configuration

⁹ As stated in Chapter 2, Supalla (1982, 1986) claims that some types of classifiers are morphologically complex in ASL. In Chapter 4, I have shown that this is not the case for classifiers that appear on VELMs in NGT. However, it may be possible that the meaningful hand configurations in motivated signs do show some morphological complexity.

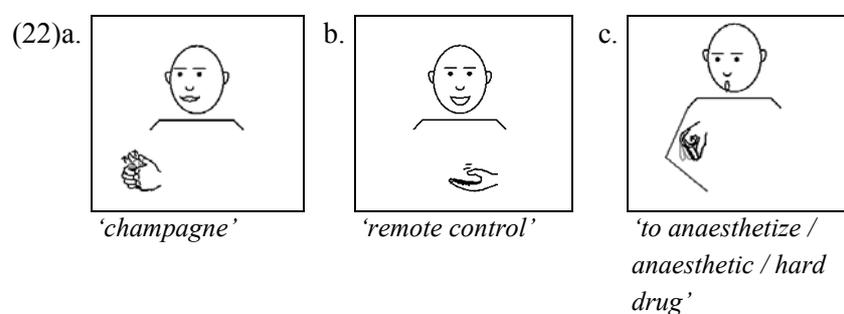
suggests that this ‘something’ is flat or small. However, a thought or a thing to remember has no shape and the hand configuration is rather arbitrary. In some signs the same hand configuration can represent entities of various shapes, even if the hand would never have this shape in the real manipulation of such an entity: people, books and handkerchiefs would all invoke different shapes of the hand. In these signs, however, unlike in VELMs, the hand configuration is not variable. Therefore, it seems as if either a hand configuration with a more general meaning taken from the set of manipulatory meaningful hand configurations is used in (some of) these signs, or an arbitrary one. Hand configurations that fit this description are particularly the ,  and  hands.

7.4.3 Meaningful hand configurations with more than one representation

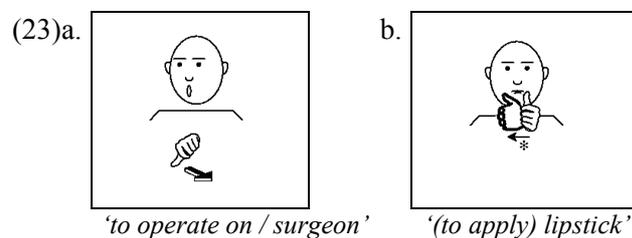
So far, the representation of entities by the various hand configurations I have given has been rather straightforward. They involve either the direct representation of an entity or a single manipulation of an entity. However, in the motivated signs, in contrast to VELMs, the hand configurations in some signs had more complex representations. It seems as if these hand configurations actually consist of two hand configurations, at least one of which represents the manipulation (holding) of an entity. I distinguish two types: i) hand configurations in which two types of manipulations are expressed; and ii) hand configurations in which manipulation (holding) of an entity and the entity itself are expressed.

In all of the signs with double manipulation, the thumb plays a meaningful part, indicating for instance pushing or rolling buttons. The

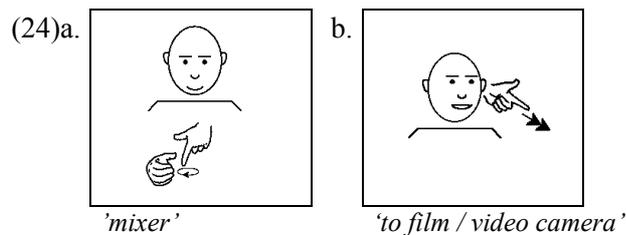
other part of the hand indicates the holding of another part of the entity. For instance, in the signs for ‘champagne’, ‘remote control’, and ‘to anaesthetize/ anaesthetic/ hard drug’ in (22), the thumb indicates manipulation of the cork, the buttons of the remote control and the piston of a syringe, while the other part indicates holding the champagne bottle, the remote control and the syringe, respectively.



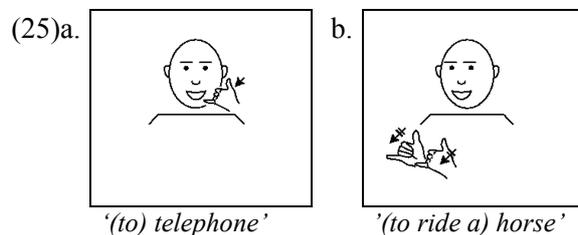
In contrast to this, the thumb does not have a manipulating function in the signs in which the hand configuration indicates manipulation of (holding) a referent and the manipulated referent itself. Examples of such signs are given in (23), (24) and (25). In the signs in (23) the thumb represents rather small, thin entities. The rest of the fingers, that are folded into a closed fist, seem to hold and manipulate the entity.



In another interesting set of signs, the  hand configuration represents entities that have some extension and that are usually manipulated by humans. The index finger represents, for instance, the extensions of a video camera (the lens), a mixer, a drill, a gun, or the nozzle of a gasoline pump tube. The thumb is consistently extended, although I cannot see that it plays a particular part in the representation. The remaining fingers, however, are closed into a fist and represent holding the entity. This is illustrated with the signs in (24).



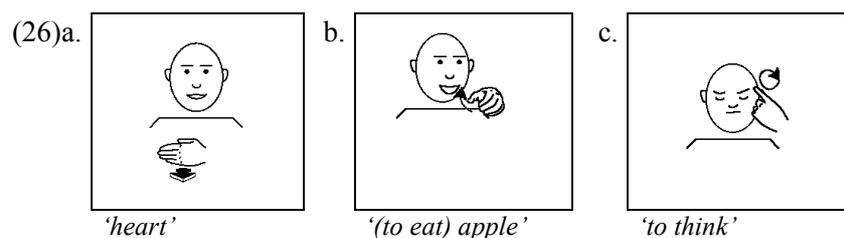
Similarly, the  hand configuration indicates both a long and thin entity, expressed by the extended thumb and pinky finger, and holding the entity, as expressed by the fist that is formed by the other fingers. Entities that are thus represented are a telephone receiver and reins in the signs for '(to) telephone' and '(to ride a) horse', illustrated in (25).



7.4.4 Other meaningful sign components

Not only the hand configuration but also the other components of a sign may carry a meaning of their own, that contributes to the meaning of the whole sign. That is: the orientation(s) of the hand, the movement(s) of the hand (including movements through space, orientation and handshape changes and secondary movements such as wiggling) and the place of articulation in the examples shown in the previous sections. The strong correlation between sign components and the meaning of many signs has also been noted by several other researchers, such as Boyes-Braem (1981), Brennan (1990), Johnston & Schembri (1999), Taub (2001) and, for NGT, by Van der Kooij (2002), as I noted earlier in section 7.1.¹⁰ I will discuss the role of the other components here, because it will prove to be important for the analysis of the morphological structure of signs, as will be shown in section 8.2.2.

Let us look at a number of examples: the signs for ‘heart’, ‘(to eat) apple’ and ‘to think’ in (26).



¹⁰ Van der Kooij indicates that motivated signs (signs that have a semantically based iconic form) may be morphologically complex, but does not deal with their morphological structure.

In the sign for ‘heart’, besides the meaningful  hand configuration that represents a flat wide entity (the heart), the orientation of the hand, the place of articulation and the movement of the hand each contribute to the meaning of the sign. The orientation of the hand indicates how the heart is positioned. If the palm of the hand were facing downward instead of towards the body, this would indicate a different (wrong) positioning, just as a different finger orientation would (for instance if the fingers were oriented away from the body). The place of articulation clearly indicates the place where we think the heart is: slightly to the left side in the chest. Furthermore, the movement component consists of a repeated short, outward movement, representing the beat of the heart.

Similarly, the place of articulation in the sign for ‘(to eat) apple’ is near the mouth, which is connected with the concept of eating. The movement here consists of a change of orientation of the hand that represents the typical movement when eating an apple. Furthermore, the hand configuration represents the holding of a round entity (an apple) and the orientation of the hand is such that the apple (not the hand) is near the mouth.

The signs in (26a,b) refer to rather concrete entities and events. But the meaningful contribution of the components of a sign is not restricted to concrete entities or events. The sign for ‘to think’ in (26c) refers to an abstract event, namely *thinking*. In this sign, the hand configuration  represents a tiny entity or an entity without a salient shape, that is, a thought. The place of articulation is near the temple. This place of articulation appears to be used often when referring to cognitive

processes, such as thinking.¹¹ The movement, a small repeated circling one, represents the fact that the thought is circling in the brain. (Orientation is not expressed by this hand configuration).

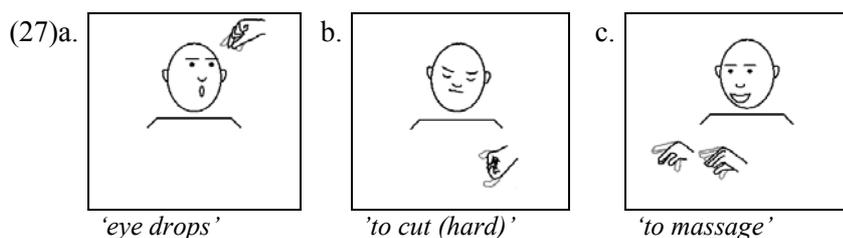
Places of articulation can refer to concrete body parts, indicating the body part themselves or the body parts at which a particular garment is usually worn. Examples are goggles, spectacles and contact lenses near the eyes, hats and caps on the head, gloves on the hands. Furthermore, places of articulation are connected with particular activities, both concrete and abstract: eating and talking are connected to the mouth, listening is connected to the ears, looking to the eyes. Cognitive processes are connected with forehead and temple and emotions are connected with the chest. This is not to say that *all* signs expressing a cognitive process are made near the forehead or temple, or that *all* signs expressing an emotion have a place of articulation near the chest, but there is a strong correlation between these places of articulation and the meanings of the signs that are articulated at these locations.

In summary, alongside the hand configurations, the place of articulation, the orientation of the hands and the movement in a sign can also contribute to the meaning of the whole sign. They can represent abstract as well as concrete entities, locations and movements.

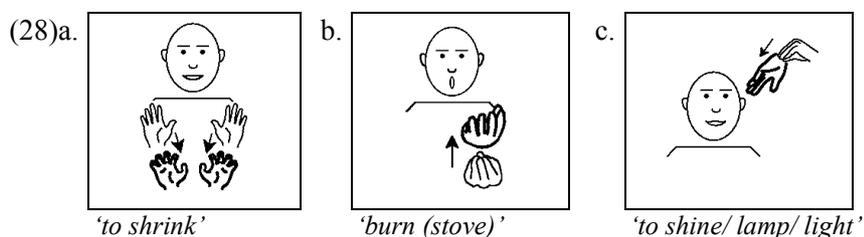
Finally, in some of the signs in which the hand configuration contributes some meaning to the meaning of the whole, the (meaningful) movement consists of a change in the hand configuration. Mostly, this concerns an opening or closing of the hand, and this is most frequently

¹¹ This has been reported for several sign languages, such as BSL (Brennan 1990) and ASL (Taub 2001).

attested in the hand configurations that indicate manipulation of an entity, although we see it in hand configurations that directly represent entities as well. A closing of the fingers or of the hand, for instance, indicates grabbing, pushing or pinching. An example of pushing is the sign in (20b), meaning ‘to anaesthetize / anaesthetic / hard drug’. A sign in which the closing of the hand indicates pinching is that for ‘eye drops’ in (27a): the fingers represent the pinching of a pipette. (27b) gives the sign for ‘to cut (hard)’, in which the fingers represent pinching the scissors. The sign for ‘(to) massage’ also has a closing hand configuration, indicating kneading.



In signs with a meaningful hand configuration that directly represents entities, handshape changes occur less often. In some signs, a (slight) closing of the hand can be seen, indicating that the size of the entity represented decreases, as in (28a).



The signs in (28b,c) show an opening of the hand, which occurs more often in signs with a hand configuration that directly represents entities. Usually, it indicates emission and divergence of many small or abstract entities, or thin entities, such as petals, flames (emerging from a stove) or light beams. The last two are illustrated in (28b,c).

7.4.5 Summary

I have shown in this section that the meaning of hand configuration and of changes in hand configuration contributes to the meaning of many NGT signs. Furthermore, it appears that other sign components also can contribute to the meaning of the whole sign in which they occur. Place of articulation, orientation of the hand and movement can all have their own meaning. Although not all signs appear to consist of meaningful components, the presence of a large number of signs which have meaningful components in my sample invites investigation of the structure of these signs and the way in which these meaningful components are combined. I propose, following Brennan and Meir, that these motivated NGT signs are morphologically complex. I will analyse the morphological structure of these signs in the next chapter, and relate my analyses to the previously proposed analyses described in section 7.2 of this chapter.

Chapter 8

Meaningful hand configurations as roots

8.1 Introduction

In this chapter, I will propose an analysis of the structure of motivated signs in NGT that have (a) meaningful hand configuration(s), based on the generalizations resulting from the data described in section 7.4. Again, I will use the framework of Distributed Morphology, and I will compare my analysis to previous analysis of similar signs (in other sign languages). I will show that Brennan's (1990) and Meir's (2001) analyses of motivated signs as compounds is applicable to motivated signs in NGT. Brennan's account, however, stops short of proposing actual (morphological) sign structure. My analysis of these compounds also differs from Meir's. I suggest that the signs in which meaningful hand configurations occur are compounded from roots, and that many of the compounds are exocentric in nature. I will unify my analysis of these compounds and that of VELMs, and compare the result to the proposals of Brennan (1990) and Meir (2001). I will, furthermore, discuss the issue of 'lexicalization' of signs.

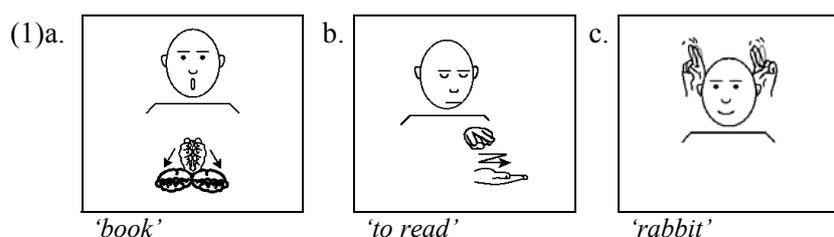
Section 8.2 contains my analysis of the structure of motivated NGT signs and the connection between these signs and VELMs. In section 8.3, I will compare my analyses to the previous accounts by Brennan and Meir and discuss the advantages of my analyses over analyses in which these signs are considered as lexicalized forms. My conclusions follow in section 8.4.

8.2 The structure of motivated signs

The analysis of the current sample of NGT lexemes shows that NGT, like BSL, ASL, AUSLAN and other sign languages has, beside VELMs, signs that are not only ‘motivated’, but composed from meaningful components. In this section, I will focus on the structure of these motivated signs. First, in section 8.2.1, I will claim that such signs are compounds. These compounds do not pattern like most compounds in languages like English, but show similarities with compounds in some other spoken languages (Mohawk, for instance). I will propose an analysis for their structure in section 8.2.2, using the framework of Distributed Morphology. In section 8.2.3, I compare the structure of the compounds with that of VELMs, and argue that both types of signs are formed by similar rules, but that their structures differ at the points in the derivation where particular nodes are merged. In section 8.2.4, I briefly focus on the structure of verbs expressing the manner of motion and contour signs, and argue that these are compounds, too. In the same section, I will briefly discuss the issue of the use of classificatory devices in lexicogenesis in spoken languages. Section 8.2.5 is the summary of this section.

8.2.1 Motivated signs are root compounds

Recall from the previous chapter that both Brennan (1990) and Meir (2001) consider ‘motivated’ signs to be morphologically complex, namely compounds the composing parts of which are articulated simultaneously (and “mix ‘n’ match” signs in Brennan’s case). The motivated signs in NGT appear to be compounds, too. I will discuss their meaning and structure in this section. Let us consider the motivated NGT signs for ‘book’, ‘to read’ and ‘rabbit’ in (1).



As in VELMs, the hand configuration in these signs represent (a part of) an entity. Let us assume that they are not only meaningful in VELMs, but also in other signs, and that they combine with other (meaningful) components to form morphologically complex signs. We have seen that the  hand configuration (that is, entity classifier) in VELMs represents flat and wide entities. In the NGT sign for ‘book’ this hand configuration appears to have the same meaning: this sign has two  hands that represent two flat and wide entities: the cover and/or pages of a book. Not only the hand configurations, but also the hand movement, consisting of an orientation change of the hands, is meaningful, indicating that a book opens. (The palms of the hands represent the text side of the pages.) We see the same configuration on one of the hands in the sign for ‘to read’,

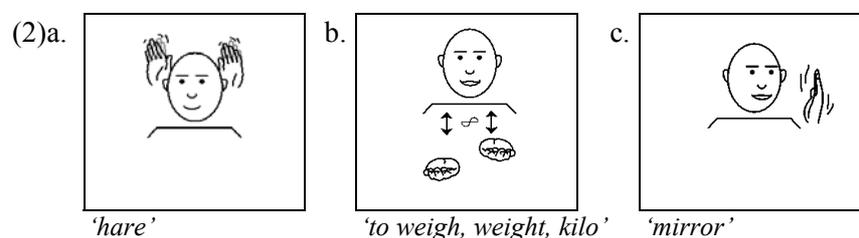
again representing a flat wide entity, such as a sheet of paper or a book.¹ The other hand in this sign () also occurs in VELMs, representing two long and thin entities (usually legs). In the sign for ‘to read’, it also represents two long and thin entities (though not legs), abstractly referring to eye-gaze. The hand movement is also meaningful, indicating the direction of the eye gaze when reading, going to the right, returning to the left but somewhat lower, where the next line is. In these two signs, the hand configurations can be argued to be meaningful. The orientation and the movement are meaningful as well.

In the NGT sign for ‘rabbit’ we see two  hand configurations. These did not occur on the VELMs in my data. Nevertheless, they can contribute to the meaning of a sign in which they occur. Their shape, in between the hand configuration representing long and thin entities () and the one representing flat and wide entities (), appears to represent long and narrow entities: the ears of a rabbit. The hands are oriented upwards and forwards, like the ears of an alert rabbit. Thus, the orientation also contributes to the meaning of the sign. I assume that the small, repeated movements of the hands are meaningful in this sign as well, indicating quivering of ears. Finally, the place of articulation is meaningful, too. The hands are positioned near the top and to the sides of the head, the typical location of a rabbit’s ears. I therefore conclude that these three signs are composed of smaller meaningful elements. We could literally translate the sign for ‘book’ as ‘two.flat.wide.entities-

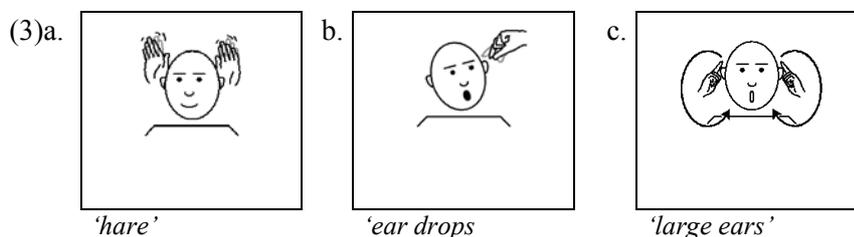
¹ I am not completely sure whether this hand configuration represents the reading material or the *holding* of such material. However, for the moment, this is not really important.

open.to.signer' and the sign for 'to read' as 'signer's.eyegaze-follow.lines-on.flat.entity'. The sign for rabbit, then, could be literally translated as 'two.long.narrow.entities-oriented.upwards.and.outwards-quiver-at.side.of.head'.

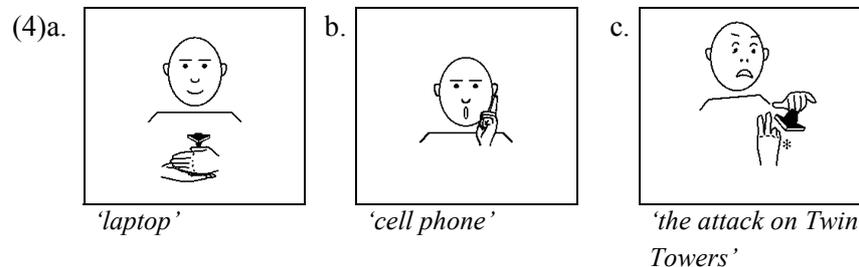
If we assume that signs such as the ones in (1) are morphologically complex, we predict that the meaningful elements occur consistently and *systematically* in complex signs. That is, that the hand configurations, movements and place of articulation in the signs in (1) are not incidental, but reoccur in several signs. This appears to be true in NGT. For instance, the  hand configuration occurs in several other signs, as in the signs for 'hare', '(to) weigh/weight/kilo' and 'mirror' in (2): in all cases, the hands represent flat and wide entities (hare ears, the scales of a pair of scales and a mirror).



Similarly, the place of articulation occurs consistently with the same denotation, as shown in the signs in (3): the side(s) of the head indicate(s) the place of one or two ears in all these signs, namely those of a hare, that of a human taking eardrops and the large ears of Dumbo (the flying elephant).



Another important notion when discussing morphological complexity of words or signs is that of *productivity*: the ability of the language user to form and understand new words or signs within the rules of the language system. NGT signers frequently form new signs in which meaningful hand configurations and other meaningful components play a role. This became apparent in discussions with some NGT signers who showed signs that they had recently made up because they did not know the sign for particular concepts (or whether there were already existing NGT signs for these concepts). Furthermore, in the NGT data and in conversations with native signers, I encountered many signs that must have been recently formed, since they refer to entities and events that have only recently become common property or of interest. This is illustrated in the two signs in (4), in which the , , , and  hand configurations are used to indicate the flat and wide parts of a laptop (4a), the thin extension of a cell phone (4b), two long and thin entities, namely the Twin Towers, and an airplane in (4c).

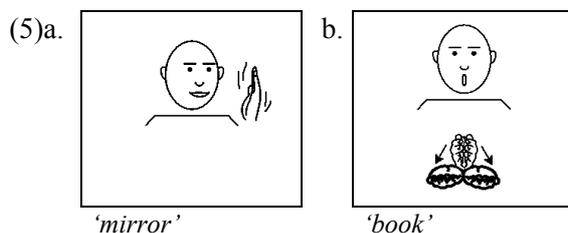


Based on these observations and generalizations, I conclude that my initial assumption that 'motivated' signs are morphologically complex is correct, and, furthermore, that these signs are formed by a productive sign formation process. I will discuss the structure and nature of these signs below, starting with the meaning of the components in relation to the meaning of the whole sign. I will proceed with a discussion of the grammatical status of the components in respect to the complex signs.

The components in many of these complex signs describe a cluster of typical characteristics of an entity. For instance, a rabbit has long ears, which are obviously at the sides of its head and typically upright. However, besides these characteristics, a rabbit has several other characteristics. It is an animal, it is furry, it has large front teeth, it is a silent animal, it is a rodent, it lives in holes, etc. The NGT sign for 'rabbit' indicates a subset of the characteristics of the referent and thus, represents the referent in a *pars-pro-toto* way. The same is true for other complex signs. Brennan (1990) indicates that the meaning of the whole is not fully predictable from the meanings of the components. In the sense that 'two.long.narrow.entities-oriented.upwards.and.outwards-quiver-at.sides.of.head does not necessarily indicate a rabbit, this is true.

Morphologically complex structures that focus on particular characteristics of a referent or event without actually containing a morpheme that indicates the referent or event are *exocentric*. In English we find some examples of exocentric compounds, such as *skinhead*, *waxwing*, *pickpocket*, and *redskin*. In contrast to endocentric compounds, in which the righthand part determines the meaning of the whole, like in *book cover*, *rattlesnake*, and *telephone call*, exocentric compounds lack a semantic head. A skinhead is not a type of head, but a person with a shaved head, a waxwing is a type of bird, a pickpocket is not a type of pocket but a person who steals from other people's pockets, and a redskin is another word for an Indian (considered typically to have a reddish skin). The composing parts describe some typical characteristics of the referent, but not all of them (*pars-pro-toto*), and the morpheme for the referent itself is not part of the compound.

In addition to the *pars-pro-toto* cases, there are signs in which one of the components represents the referent itself. For instance, the  hands in the sign for 'mirror' (repeated in (5a)) represents the mirror itself, as a flat and wide entity.



The sign for 'mirror' could, thus, be argued to have a semantic head, that is modified by the meaningful place of articulation. The construction

could have the interpretation of ‘flat.wide.entity-typically.at.eye.level’. Similarly, the hand configurations in the sign for ‘book’ in (5b) could be argued to form the semantic head and the sign for ‘book’ be interpreted as ‘two.flat.wide.entities-that.typically.open’. The full interpretation and whole range of meanings of the NGT signs were not available to me, because the corpus I have used in this research were bilingual dictionaries that merely give translations of NGT signs and Dutch words. Therefore, it is very difficult to judge whether complex signs such as those in (5) have a semantic head or not. This should be further investigated (preferably by native signers). For the moment, I will assume that there is a group of exocentric complex signs and possibly a group of complex signs that are endocentric.

I now turn to a discussion of the morphological structure of such complex signs. These signs do not appear to contain morphemes that occur in isolation or affixes. My data show that meaningful hand configurations always combine with a meaningful movement or with a meaningful place of articulation, sometimes with both. Furthermore, none of the meaningful components appears to have an inflecting function or to (systematically) influence the syntactic category of the whole sign. Thus, none of the meaningful components can be argued to be an affix. The components appear to function as roots. Such roots, then, are combined simultaneously into *root compounds*.

I have not found evidence for morphological headedness in these compounds. At first sight, there may be indications for morphological headedness. Generalizing over the data, it appears that when the hand configuration(s) in a sign is meaningful, it always represents an entity,

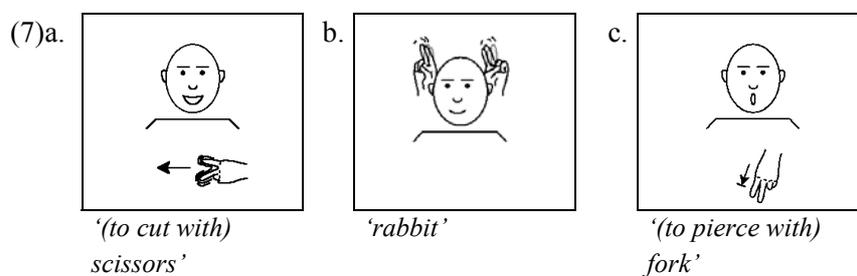
never an event. The meaningful hand configurations, thus, can be argued to be nominal in nature. In contrast, the movement within a complex sign, that is, the path movement of the hand, an orientation change, a handshape change, or a combination of these, always indicates an event. Therefore, the movement in these signs could be verbal in nature. The place of articulation, if contributing to the meaning of the sign, is less clear in this respect. It represents neither an entity, nor an event. It provides predicative, rather than representational, information. Therefore, the place of articulation can be argued to be verbal or appositional. If we consider the signs for 'book' and 'to read' in this light, it seems as if the morphological head in the sign for 'book' is formed by the hand configuration, since the hand configuration has a nominal interpretation and the sign is a noun. In the sign for 'to read', the movement could be argued to be the head, since it denotes an event and the sign is a verb, expressing an event. Possible counterevidence is the fact that a large group of signs in my database can be used as a verb and as a noun; there is no form difference in these different uses of a sign. For these signs, it is not possible to connect the category of the sign to one of its components. The existence of single category signs, such as that for 'to read', seems to be coincidental rather than structural, then, caused by a need from the part of the language users for a verb rather than a noun (at a particular moment). I expect that signs with a single syntactic category will receive an extra syntactic category as soon as the need arises to express the nominal or verbal counterpart of the sign. As a consequence, it is not possible to assume that these compounds have a syntactic head.

NGT root compounds, then, are often exocentric and do not have a syntactic head. The latter is also often true of exocentric compounds in spoken languages, as can be seen from an example from Dutch. The Dutch word *schreeuwlelijk* (bawler) is a compound formed from the words *schreeuw* (to bawl) and *lelijk* (ugly). The compound has pars-pro-toto semantics. The first compound part is a verb and the second one an adjective. The compound is a noun and hence its syntactic category does not percolate from one of its parts. Exocentric compounding in English and Dutch is not very productive, but it is productive in other languages, such as Sanskrit (Thumb 1905), Vietnamese, French (Bauer 1988), Mohawk (Bonvillain 1973) and Niger-Congo languages like Supyire (Carlson 1994). In order to gain some insight in the structure of such compounds, I will briefly examine the formation of exocentric compounds in a polysynthetic spoken language which appear to have some resemblance to those of NGT, namely Mohawk (Bonvillain 1973; Michelson 1973; Beatty 1973; Deering & Harries-Delisle 1984).

Mohawk has a productive system of ‘root compounding’. Although the roots are analysed as noun roots or verb roots (Michelson 1973), the roots do not necessarily form the syntactic (or semantic) head of a compound. The syntactic category is often indicated by (nominal and verbal) suffixes and the presence of pronominal, aspect, and tense prefixes, and prefixes with adverbial functions in verbs. Some examples appear in (6).

- (6)a. te- wa- ta'- shar- í:s- as
 DUAL PL RECIIP knife rub HAB
 two knives repeatedly rub each other
 'scissors'
- b. t- ahuht- a- né:kv
 DUAL ear INCR to.be.side.by.side
 two ears side by side
 'rabbit'
- c. enyaʔt- áthvs
 throat be.dry
 'to be thirsty'
- d. te- ie- 'wahr- awe'e- stá- hkw- a'
 it meat pierce INSTR I INSTR II HAB
 it is habitually used to pierce meat with
 'fork'

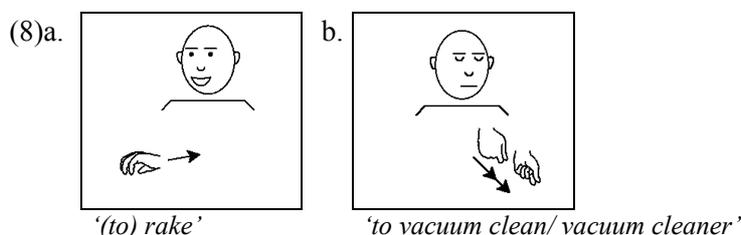
In these examples, a noun root and a verb root are combined in a compound. Additionally, several affixes add to the meaning of the compounds. It is not transparent whether any of the roots forms the head of the word, semantically nor morphologically. In some cases, either the verb root or the noun root could have formed the morphological head, but it is not clear whether either does. In other cases, such as (6d), the grammatical category is determined by the instrumental suffixes. The structure of the Mohawk compounds is reminiscent of the structures we see in NGT. Compare the Mohawk examples in (6) with the NGT signs in (7):



Without suggesting that NGT compounds are in all respects comparable to Mohawk compounds, the comparison illustrates the possibilities in natural languages for several meaningful components describing some characteristic of an entity or event (sometimes in a *pars-pro-toto* way) to form a complex word or sign that lacks a clear syntactic or semantic head. It seems likely that further studies of polymorphemic languages, both spoken and signed, and comparison between them can reveal more about the structure of NGT signs. For instance, it may be possible that repeated movements, such as the repeated opening and closing of the index and middle finger in the sign for '(to cut with) scissors' has an aspectual function like the habitual in Mohawk, or that the meaningful hand configuration that indicates manipulation of an entity has a function similar to the instrumental suffixes. This presents an interesting avenue for (much needed) further research.

Before I turn to my analysis of root compounds in NGT, I will discuss a final observation on the contribution of the hand configurations in these signs, which an analyses of these signs also needs to account for. Several researchers (including myself) observe that, unlike VELMs, many compounds do not show a systematic relation between the hand

configuration and an argument of the sign (Shepard-Kegl, 1985; Johnston & Schembri 1999). In VELMs, the hand configurations are always linked to the Theme argument. That this is not apply to non-VELMs is clear from many nominal signs that lack an argument structure. It is also obvious in many verbal signs that the hand configuration(s) do not refer to the arguments, for instance, in the signs for ‘(to) rake’ and ‘to vacuum clean/(vacuum cleaner)’ in (8).



The hand configuration in (8a) represents a rake. The verb is optionally transitive, having an Agent argument (the raker) and optionally a Patient (the rakee). The rake does not relate to either of these arguments, as also remarked by Shepard-Kegl (1985) and Meir (2001), although the latter claims that such hand configurations do represent arguments, namely Instruments. Similarly, the sign for ‘to vacuum clean’ (8b) is optionally transitive, with an Agent argument (the cleaner) and an optional Patient (the cleanee). The entity that is represented by the hand configurations is the hose of a vacuum cleaner, not one of the arguments. A related observation is that the type of hand configuration does not have a systematic relation to the argument structure of the verb, unlike in contrast to VELMs. We have seen in Chapter 6 that entity classifiers only occur in intransitive VELMs and handling classifiers only in transitive

VELMs. The hand configuration in the sign for ‘to rake’ represents the rake *directly* (just like an entity classifier). The hand configurations in the sign for ‘to vacuum clean’ represent the hose of the vacuum cleaner *indirectly* (just like a handling classifier). However, both verbs are optionally transitive, and thus, the type of hand configuration is not linked to (in)transitivity of the verb.

A linguistic account of root compounds needs to account for i) the fact that these compounds do not (always) have a semantic head; ii) the fact that they do not have a syntactic head; and iii) the absence of a relation between the hand configurations and an argument of a verb. As in my analysis of VELMs in Chapter 6, I will use the framework of Distributed Morphology, which is suited to account for these facts, as well.

8.2.2 The structure of root compounds

In this section, I will discuss the structure of root compounds and propose a DM account for them. I will briefly recapitulate the principles of DM that are of importance. Recall from section 6.2.3 that DM is based on the principle that the various tasks of the grammar are assigned to different components that become active at different points in the derivation. In DM there is no lexicon in the traditional sense, where lexemes are stored as combinations of phonological and morphosyntactic features, associated with a particular meaning. Instead, in DM there are three *lists*, each of which contains items of a specific kind. List A contains morphosyntactic features (such as [Root], [1st], [pl]). These have no phonological features nor meaning. Phonological features (Vocabulary Items) are in List B, and List C contains non-linguistic, encyclopedic

knowledge. A linguistic element or structure will receive phonological features or a meaning only after syntactic and morphological operations have taken place. At PF phonological features (Vocabulary Items) are inserted into the terminal nodes of the derivation. The meaning of structures is negotiated after the level of LF, namely when (parts of) the structure enter(s) the Conceptual Interface. Here, they are associated with non-linguistic knowledge (from List C).

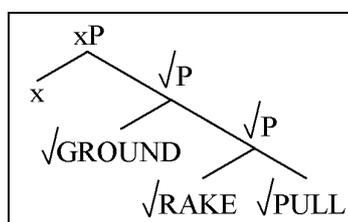
I now turn to a discussion of the structure of NGT root compounds. Like all elements from List A, have no intrinsic syntactic category. A syntactic category is only assigned when a derivation merges with a category node, called little *x*, where *x* can be a verb, a noun or an adjective. Merger with the category node determines a cyclic boundary. The structure built until that point is shipped off to PF, LF and the Conceptual Interface. In PF, the terminal nodes are inserted with Vocabulary Items and the structure is associated with a meaning at the Conceptual Interface. After that, the structure is derived further. A structure is derived cyclically, and can be shipped off to PF and LF (and the Conceptual Interface) several times. Each time Vocabulary items are inserted into terminal nodes that do not yet have phonological features, and each time the meaning of (part of) the structure is negotiated.

Based on these principles, my proposal is that motivated signs in NGT are derived below little *x*. They are formed from combinations of roots. Neither the roots nor the compounds that are formed from them have a syntactic category. They also do not have phonological features yet, or a meaning. The compound receives a syntactic category (and a meaning) only until after merger with little *x*. When the compound subsequently

gets shipped off to PF and LF, it will be inserted with Vocabulary items and it will receive a meaning.

I will illustrate this with the derivation of the NGT sign for ‘(to) rake’. The surface form of the sign consists of three parts: i) a hand configuration, indicating many long and thin, bent entities (the rake); ii) a movement, straight towards the signer (pull); and iii) a place of articulation, low (on the ground). These parts are roots, and thus do not yet have a syntactic category or any phonological features. I will indicate them by the notation $\sqrt{\text{PULL}}$, $\sqrt{\text{RAKE}}$, $\sqrt{\text{GROUND}}$. I assume that $\sqrt{\text{PULL}}$ is the first lexical item to merge in the structure, and that it is merged first with $\sqrt{\text{RAKE}}$, resulting in a root phrase ($\sqrt{\text{P}}$) and then with $\sqrt{\text{GROUND}}$. Then, the structure will merge with a little x (which can be a noun or a verb), and the structure becomes an xP, as illustrated in Figure 1.

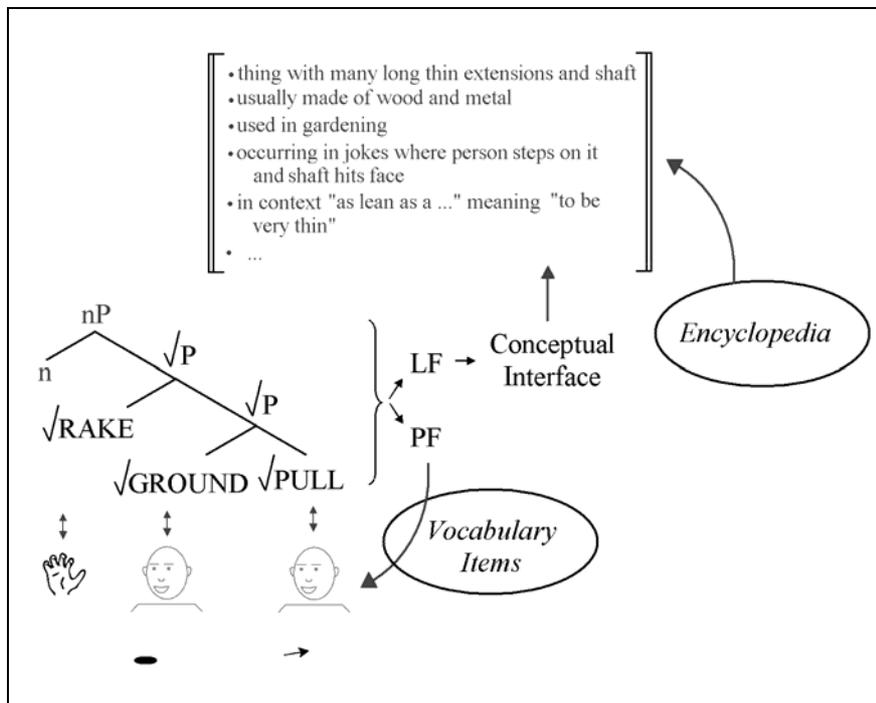
Figure 1 Derivation of the root compound until little x



An important point in my analysis is that the roots within the structure have no meaning yet. The structure receives a meaning *after* it has been merged with little x and is subsequently shipped off to LF and the Conceptual Interface. Only there is its meaning negotiated. Morphologically simplex but also morphologically complex structures, from compounds to phrases to idioms, receive a particular meaning in the Conceptual Interface, after syntactic and morphological operations

(Marantz 1997a). This is exactly what we see in the case of root compounds in NGT: it is not the separate roots that necessarily receive a meaning at the Conceptual Interface, but the compound as a whole. This is illustrated in Figure 2.

Figure 2 Vocabulary Insertion and negotiation of meaning



Of course, the \sqrt{P} can also merge with a little v node, which turns the category of the structure into a verb.

The DM framework thus allows for an explanation for the fact that the characteristics of a root compound are not fully predictable from its parts, namely that the compound does not automatically have the same syntactic category as one of its roots (the head), and that it has a meaning that is not always (completely) predictable from the meaning of its parts.

8.2.3 Comparing the structures of VELMs and root compounds

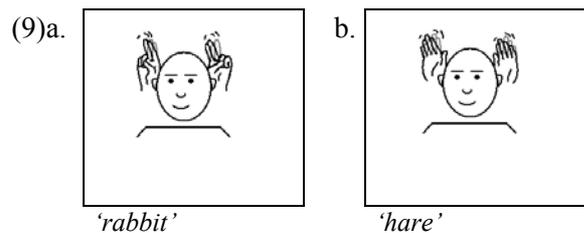
Many researchers have observed the similarities between VELMs and the signs I analyse as root compounds, namely the fact that both have meaningful components and are similar in form. Many of these researchers assume that the former signs are ‘lexicalized VELMs’, which means that they were (originally) produced by productive word formation processes, but that some of their characteristics differ from those of VELMs. The differences are found in the argument structure and the meaning, and in the fact that the morphemes (notably the hand configuration) are not variable, in contrast to those in VELMs. In this section, I will show why VELMs and root compounds are similar in form and to a certain extent in meaning, but still have different morphosyntactic characteristics.

Within the DM framework word formation occurs at two places in the derivation: below little *x* and above little *x*. Both root compounds and VELMs are derived by the same morphosyntactic rules as hierarchical structures. The crucial difference between root compounds and VELMs is the point in the derivation at which the components are combined: root compounds are derived *below* little *x*, whereas VELMs are derived *above* little *x*. In section 8.2.2, I showed that root compounds are hierarchical structures, formed from different roots. These roots merge with little *x*, which defines the boundary of a cyclic domain, and the derived structure moves to PF, LF and the Conceptual Interface. At Spell-Out, the structure will receive phonological features for hand configuration, movement and/or place of articulation. Furthermore, its interpretation is negotiated

at the Conceptual Interface. The structure is further derived, and if little x happens to be little v, functional elements are merged.

I showed in section 6.2.5 that VELMs have only one root at the point in the derivation where little x (little v in this case) is merged. When the derived structure of a VELM moves to PF, LF, and the Conceptual Interface, it will be inserted with a Vocabulary Item that is *only* specified for a movement, and it will *only* receive a motion (or non-motion) interpretation. Further derivation of the structure above little v consists of merger of functional elements, such as voice nodes and agreement morphemes. These nodes, too, will be inserted with Vocabulary Items which specify the phonological features for hand configuration and location. Thus, the crucial difference between root compounds and VELMs lies in the fact that in root compounds, the elements that will be inserted with phonological features for hand configuration and/or places of articulation are roots, and are merged *below* little x, and in VELMs these elements are morphosyntactic feature bundles, and are merged *above* little x. To put it crudely, hand configurations and places of articulation have a different function, depending on the position in which they are merged in connection with little x: if they are merged *below* little x, they will have a *lexical* function, whereas if they are merged *above* little x, they will act as *functional* elements. A functional element can be easily interchanged with another functional element of the same set without seriously affecting the meaning of the whole word or sign. Variation of the person or tense features of an English verb does not affect the meaning of the verb. Similarly, variation of the hand configuration in a VELM (above little x) does not affect the meaning of

that VELM, but indicates a different referent. However, this is different for elements with a lexical function. Replacing a compound element (for instance a root) with another element (root) that has the same morphosyntactic features will affect the meaning of the whole word or sign, but not its morphosyntactic characteristics. In English, if we substitute the word *cover* for *case* in the compound *book cover*, the result will be a compound with the same morphosyntactic characteristics, but a different meaning. Along the same lines, varying the hand configuration in a root compound (below little x) affects the meaning of that compound. For instance, if we substitute the roots connected with the  hand configurations in the root compound meaning ‘rabbit’ with the roots connected with the  hand configuration (see (9a,b)), the sign gets a different meaning. That is, the sign in (9b) refers to another animal (a hare) with upright, quivering ears that are somewhat bigger than the sign in (9a). These signs are still related in meaning because the other roots are the same.



The DM analysis of VELMs and root compounds also predicts differences in argument structure and in the relation of arguments to the elements connected to hand configurations. Recall the systematic connection between the morphosyntactic feature bundles connected to

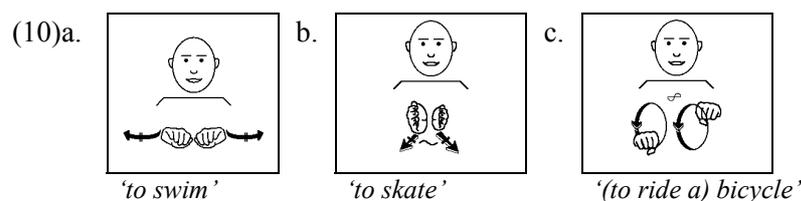
hand configurations and the Theme argument of VELMs (section 6.2.5). I showed that the type of classifier that appears in a VELM is determined by the presence or absence of a voice node. If the structure has no voice node and is thus intransitive, the agreement morpheme linked to the Theme argument will be spelled out with a Vocabulary Item of the entity classifier type. Vocabulary Items of the handling classifier type only occur in the environment where a voice node has been merged; that is, with transitive VELMs. This systematicity is not observed in root compounds. Recall from section 8.2.2 that i) the roots in these compounds that are inserted with hand configurations are not necessarily connected to arguments, and ii) transitivity or intransitivity of the verb does not affect the type of hand configurations that appears in the surface sign. The lack of systematicity is explained by the fact that in root compounds, Vocabulary Insertion has already taken place *before* the structure is merged with a possible voice node, since voice nodes are merged *above* little v. Little x defines a cyclic domain, a boundary between the structure below it and above it. Therefore, merging of a voice node above little v with a root compound structure has no influence on the Vocabulary Items that have been inserted already.

8.2.4 Final remarks

In this section I will briefly discuss two further issues. The first is signs that are usually considered to be classifier predicates in the literature: verbs expressing manner of motion, and contour signs (signs that indicate the size and/or shape of a referent by a tracing movement of the hands in

signing space). The second is the role of classifiers in spoken languages in lexicogenesis.

First, in Chapter 5, I indicated that manner of motion verbs and contour signs have different characteristics from VELMs, for which reason I have considered them different in their morphosyntactic structure. This does not imply that they are morphologically simplex. As a matter of fact, verbs of motion pattern much as root compounds. Consider the examples in (10).



The hand configuration and motion contribute to the meaning of the whole sign in these signs. The hand configurations in the NGT sign for ‘to swim’ represent the human hands and the typical curved motion made in the action of swimming (breast stroke). Similarly, the sign for ‘to skate’ in NGT consist of hand configurations that represent the blades of skates, and the movement of the hands indicates the typical sideward alternating movement repeatedly made in skating. Although the status of the hand configurations in the NGT sign for ‘(to ride a) bicycle’ is not entirely clear (they might represent the pedals), the movement clearly indicates the repeated rotating alternating movement of the pedals. One of the important differences between manner verbs and VELMs is that the hand configuration in manner verbs does not necessarily have a relation to an argument of the verb. Furthermore, the components in

manner of motion verbs highlight particular aspects of the event, for instance, the pedaling motion used when riding a bicycle in the sign for ‘(to ride a) bicycle’ or the prototypical swimming stroke in Europe in the sign for ‘to swim’. Thus, manner of motion verbs represent the event in a *pars-pro-toto* way. We have seen that the same holds for root compounds (8.2.2) and in exocentric compounds in spoken languages (8.2.1). Therefore, I propose to analyse these verbs as root compounds.

The morphological structure of contour signs is less clear. A recent account by Wallin (2000) of such signs in SSL provides information about the choice of hand configuration, which clearly contributes some meaning to the sign. The hand configurations in a contour sign specifically indicate the dimensionality of the entity that is outlined by the hands. For instance, the  hand configuration indicates that an entity is three-dimensional, and a  hand configuration that it is two-dimensional. However, it is not completely clear how the lexical items connected with the hand configurations contribute information. In VELMs and root compounds, the hand configurations represent entities, but in contour signs, they do not. Instead, they modify the size or shape of the entity that is already indicated by a root with a movement of the hands. Thus, they may have attributive value. I propose that the morphemes that are spelled out as hand configurations are not functional elements in contour signs, but rather roots that are merged below little *x*, like the roots in root compounds described in 8.2.2. Their structure, however, still needs extensive further research.

Second, it has been remarked in the sign language literature (Engberg-Pedersen 1993; Schembri 2001) that classificatory devices are not (or

only sparsely) used in lexicogenesis in spoken languages. The fact that meaningful hand configurations appear to be used frequently in the formation of signs has been an additional reason to doubt the status of these hand configurations as classifiers. However, recent accounts of classificatory systems in spoken language suggest that classificatory devices are more frequently used in lexicogenesis than previously assumed. Classificatory devices appear to be used as derivational elements, that is, as category changing elements, and in compounding (Aikhenvald 2000). Compounding with verbal classifiers is observed, for instance, in Amazonian languages (Barnes 1990; Aikhenvald 1994; Van der Voort 2000; Seifart 2002, in press). Some examples from one of these languages, Miraña, are shown in (11):

- (11) a. úhĩ -kó -ʔá:mĩ
 banana -CL:shaft -CL:leaf
 'a leaf of a banana plant'
- b. úhĩ -ʔó -βí: ù
 banana -CL:oblong -CL:chunk
 'a chunk of a banana (fruit)'
- c. áβè -^hpá'kò
 pain -CL:liquid
 'liquor'
- d. g^wáhákù -ʔá:mì
 know.NMZ -CL:leaf
 'book'

Miraña (Seifart 2002:27-28, ex. 23/27)

These compounds involve a noun (or nominalized verb) to the left and one or more classifiers to the right. The resulting word is a noun. The meaning of the whole compound is related to that of the compound parts, sometimes in a *pars-pro-toto* way (for instance in (11c,d)). Although the information provided by such compounds is still scanty, they suggest that elements that have a classifying function can be used in word formation in spoken languages, too. It is even the more striking that the same elements (classifiers) have varying functions: as agreement markers (as discussed in Chapter 6) and as word formation devices, comparable to the functions of classifier elements in NGT and other sign languages.

8.2.5 Summary

In this section, I have discussed the characteristics and structure of motivated signs in NGT. I have shown that these are morphologically complex and I have sketched their internal morphosyntactic structure, arguing that they are root compounds. I have used the framework of DM to explain the morphosyntactic, phonological and interpretational characteristics of these signs. Furthermore, I have shown to what extent the morphosyntactic structure of root compounds differs from the structure of VELMs. For both sign types, the function and interpretation of the components is dependent on the position where they are merged in the derivation. When components are merged above a category node (little x), they will behave as functional elements, whereas merging of the components below a category node ensures that they function as lexical elements. I have, furthermore, argued that verbs expressing manner of motion and contour signs are best analysed as root compounds. Finally, I

have shown that, in contrast to what has been claimed in the literature, classificatory devices in spoken languages can have different functions, similar to the functions of meaningful hand configurations in signed languages: they can act as functional elements, for instance as agreement markers, as described in Chapter 6, and as lexical elements, used in the formation of words. In this, meaningful hand configurations in sign languages appear to be very similar to (some) classificatory devices in spoken languages.

8.3 Advantages to previous accounts of motivated signs

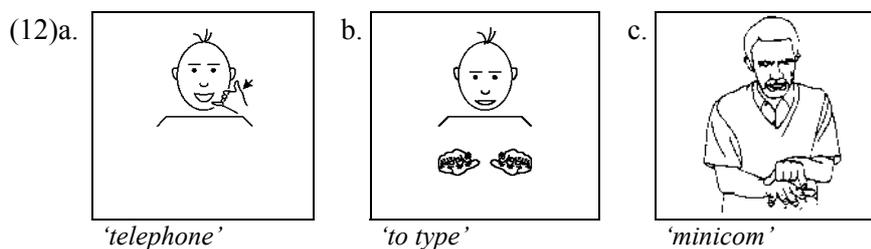
In this section, I will compare my analyses of motivated signs to previous accounts. I will start with Brennan's (1990) account in section 8.3.1 and proceed to the account of Meir (2001) in section 8.3.2. I will discuss lexicalization accounts in general in section 8.3.3.

8.3.1 Simultaneous compounds in BSL

Brennan (1990) distinguishes two types of complex signs (leaving sequential compounds out of consideration): i) simultaneous compounds, which are composed of signs which can also occur in isolation (such as 'classifier signs'); and ii) "mix 'n' match signs", in which various meaningful elements (such as hand configurations, place of articulation and movement) can combine into complex signs.

According to Brennan, the parts of simultaneous compound signs can freely occur as signs in the language (Brennan 1990:152-153). Classifier signs are very often used in simultaneous compounds. It is not completely clear to me what Brennan means by 'classifier signs', that is, whether these are signs that consist of a classifier alone, or signs in which a

classifier occurs. It seems as if the latter is the case. In a simultaneous compound, some elements in the compound parts have to be eliminated, as in the BSL compound that is constructed from the signs for ‘telephone’ and ‘to type’, meaning ‘minicom’, repeated in (12).



BSL (after Brennan 1990:151)

In the compound, the sign for ‘telephone’ is adapted in its place of articulation, and one of the hands from the sign for ‘to type’ is eliminated.

“Mix ‘n’ match signs” combine several meaningful components into a complex sign. Brennan does not address their structure, but clearly distinguishes them from simultaneous compounds. The crucial difference between simultaneous compounds and “mix ‘n’ match” signs is that the components of simultaneous compounds can occur as free morphemes, whereas those of “mix ‘n’ match” signs cannot. It is, however, not necessary to make such a distinction. In my analysis, meaningful components occurring in the signs for ‘telephone’ and ‘to type’ are (productively) used in the formation of these signs, namely the  and  hand configurations, the places of articulation and the wiggling motion. Some of these meaningful components are also productively used in the construction of the sign for ‘minicom’. Thus, the signs for

'telephone' and 'to type' can themselves be considered simultaneous compounds, just as the sign for 'minicom'. Brennan's motivation for distinguishing simultaneous compounds from "mix 'n' match" signs may be that some signs, like those for 'telephone' and 'to type' are attested as separate signs in BSL and contain recognizable components that reoccur in signs related in meaning, like the sign for 'visicom', whereas there may not be attested signs relating to the components of "mix 'n' match" signs. My analysis of root compounds does not depend on the status of the composing parts as signs that can occur in isolation. In contrast to Brennan, then, I do not distinguish a group of root compounds that are composed from isolated signs. Furthermore, I provide an analysis of their morphosyntactic structure: all root compounds and all VELMs can be formed according to the same principles in the DM model, as explained in section 8.2.3.

8.3.2 Noun incorporation

Meir (2001) gives a structured, though not morphologically or syntactically developed, account of a group of complex signs in ISL. Recall from the previous chapter that she analyses these signs as endocentric verbal compounds with incorporated noun roots. Several types of incorporation are distinguished in the literature. Meir's type of incorporation is characterized by saturation of an internal argument of the verb (because that argument is incorporated into the verb).² In the case of

² Following Mithun (1986), Mithun & Corbett (1999) and Rosen (1989), Meir treats noun incorporation as a morphological process, in contrast to other accounts (Baker 1988, 1996) in which it is argued to be a syntactic movement operation.

ISL, the incorporated internal argument usually has the thematic role of Instrument. This is illustrated by the example in (13).

- (13)a. I BABY INDEX_a ₁SPOON-FEED_a
 I baby that I-spoon-feed-him
 'I spoon-fed the baby.'
- b. * I SPOON BABY INDEX_a ₁SPOON-FEED_a
 I spoon baby that I-spoon-feed-him
 'I spoon-fed the baby with a spoon.'
- ISL (Meir 2001:304, ex. 10/11)

Although Meir mentions the fact that in some cases Patients or Themes are incorporated (for instance, in the ISL verbs 'to eat', 'to break', and 'to put on some garment'), it is not possible to incorporate the Patient argument (for instance, the noun sign for 'porridge') in the example in (13a).³ (13b) shows that the Instrument argument cannot show doubling: it cannot occur both as incorporated element and as overt noun in the sentence.⁴

As Meir notes, noun incorporation usually (in spoken languages) concerns Patient arguments. Spoken languages in which Themes or Instruments are incorporated are rare, whereas in ISL, although Patient

³ Unfortunately, Meir does not elaborate on the incorporation of Patient arguments, which hampers cross-linguistic comparison. It is not clear whether incorporation of these arguments allows doubling in ISL or not; in NGT doubling appears to be possible in the verbs such as those for 'to eat' and 'to put on some garment'.

⁴ This is possible in ASL, however, as remarked by Benedicto & Brentari (to appear), which is one of their reasons to reject this analysis for ASL.

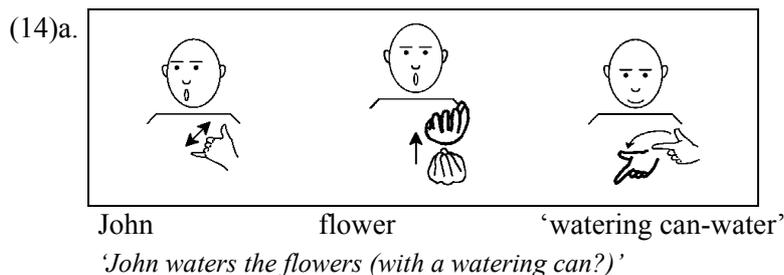
arguments are incidentally incorporated, incorporation more often concerns Instruments. Meir explains this by appealing to the different modality of ISL and spoken languages. First, she claims that the incorporated Instruments can be treated as ‘secondary Themes’, in that their referents are somehow in motion, even though the verb does not express motion. For instance, in the compound SPOON-FEED, it can be argued that the verb indicates a motion of an entity from a dish to a person’s mouth. This entity is the Instrument argument, namely the spoon. Second, she follows Jackendoff (1987, 1990) in assuming that arguments may be connected to two thematic roles, each on a different tier, a spatial tier and an action tier. Sign languages, she argues, can express spatial relations in a way spoken languages cannot. Therefore, the spatial tier may be more prominent in sign languages than in spoken languages. She concludes that noun incorporation in ISL is an operation on the spatial tier, and that in spoken languages, incorporation is usually an operation on the action tier.⁵

Meir’s analysis is similar to mine in that the structure resulting from the combination of meaningful elements is a (root) compound. Many of the complex NGT signs are verbs that seem to express an action executed

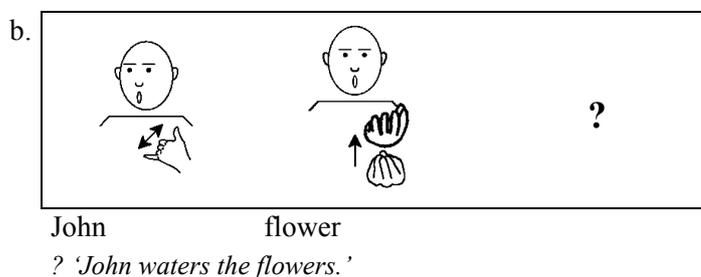
⁵ Meir suggests that her account can be generalized over spoken languages that allow incorporation of Instrument or Location arguments in that the incorporated Instruments or Locations are secondary *Patients* (like the incorporated Instruments in sign languages are secondary Themes) and can be incorporated on the action tier. This claim is inconsistent with the theory that an argument can be connected to one thematic role on the action tier and one on the spatial tier, because the thematic role Instrument is already connected to the action tier. Furthermore, this would predict that a language such as Nahuatl, in which incorporation of a Patient *and* an Instrument argument is possible, can show incorporation with *two* Patient arguments.

with an instrument, such as shoveling, raking, vacuum cleaning, dusting. The meaningful hand configuration(s) and orientation(s) of the noun sign for that instrument seem to be incorporated into these verbs. However, an incorporation analysis is problematic for NGT and for some other sign languages, such as DGS as reported by Glück & Pfau 1988 and ASL (Benedicto & Brentari to appear).

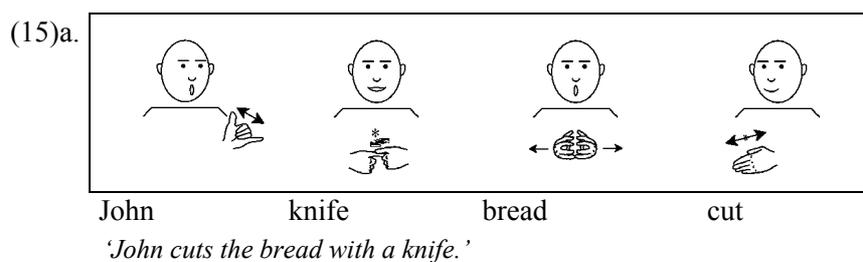
First, like Brennan, Meir claims that the parts of the compounds (that is, the verbs and the incorporated nouns) also occur in isolation.⁶ This is in line with the general observation in the literature that syntactic paraphrasing of all complex verbs that are formed by noun incorporation is possible. This generalization does not hold for the majority of the verbal root compounds in NGT. Some complex verbs do not have a free verbal counterpart. Thus, no syntactic paraphrase of the NGT sentence in (14a) is possible. It is not even possible to express the sentence without indicating the ‘Instrument’ because there is no isolated verb for ‘to water’ (see (14b)).



⁶ Unfortunately, Meir does not provide an example of a syntactic paraphrase alongside the incorporation examples.



Other complex verbs contain 'noun roots' that differ from the nouns that can occur in isolation. For instance, the  hand configuration in the verb for 'to cut' represents a broad flat entity: a cutting device, such as a knife (or a saw) and the movement of the hand represents the (cutting) motion of that entity. This verb is a root compound. Although the verb in the sentence is complex, it cannot be argued that an Instrument argument (or any other argument of the verb) has been incorporated, since the hand configuration of the verb is different from those in the noun . This is illustrated in (15).



In other cases, there is no difference between noun and verb, as the NGT signs for '(to) rake' and 'to vacuum clean/vacuum cleaner' in (8).

The above observations, especially the fact that some verbs *always* incorporate the Instrument in NGT leads me to question the incorporation

analysis. In the theory, incorporation is not obligatory. Moreover, the fact that the incorporated nouns in these verbs are *Instruments* renders this analysis even less plausible, since Instruments are seldomly obligatory elements.

Meir's analysis covers only verbal compounds. In NGT, as we saw, there are not only complex verbs, but also complex nouns and complex signs that can be both verbs and nouns. Although it would be possible to stipulate a conversion process that derives nouns from complex verbs, another analysis would be needed for complex nouns that are not derived from verbs (that is, when there are no verbs attested in the language from which they could be derived). Furthermore, since the analysis treats these signs as instances of noun incorporation, all of the compounds are necessarily endocentric. In NGT, however, many root compounds are exocentric.

Based on generalizations over the NGT data, I conclude that a noun incorporation analysis is not applicable to the NGT (verbal) root compounds. Rather, I have provided a clear analysis of these signs as exocentric compounds without an intrinsic syntactic category. The syntactic category of all root compounds is accounted for by merger with little *n* or little *v*, which explains the large number of signs that occur both as verbs and nouns. Furthermore, in my analysis, the components of these compounds are not necessarily related to any argument. The meaning of the root compounds is not necessarily or systematically connected to the meaning of one of its parts, but negotiated at the level of the Conceptual Interface.

Finally, although Meir (2001, 2002) provides interesting accounts for the incorporation of classifiers, for the incorporation of noun roots and for locus agreement (on which my own analysis partly relies) her accounts do not provide a uniform analysis of these phenomena. In this respect, my analysis has an advantage over Meir's.

8.3.3 The issue of lexicalization

Many researchers claim that motivated signs are lexicalized signs. I will discuss this claim and argue against it, not only because lexicalization is a non-issue in DM,⁷ but also because it is incorrect *vis-a-vis* standard morphological assumptions. Furthermore, most of the signs assumed in the literature to be the original, productively formed signs are, in my analysis, classifier predicates (VELMs). These are verbs in which the place of articulation (or loci) and hand configurations function as inflectional morphemes, namely agreement markers. Were I to adopt a lexicalization analysis, this would indicate lexicalization of fully inflected signs. This is not in line with what we see in morphology: lexicalization involves a minimum of inflectional morphology (Anderson 1992). In this section, I will criticize some of the assumptions on which the lexicalization analyses are based and discuss the advantages of my analysis over these analyses.

In the standard morphological literature a complex word is understood to be lexicalized if it has idiosyncratic properties that cannot be explained solely by the productive rules of the language. There are two

⁷ Since there is no lexicon in the traditional sense in DM, words and signs cannot 'lexicalize'.

interpretations of lexicalization. One of these is *diachronic* lexicalization, which indicates that a word or sign has historically been formed by productive rules, but synchronically does not have the characteristics it would be expected to have if it were formed by these rules. A source of historical lexicalization can be a change in the language system. The English words *width*, *warmth* and *strength* were historically formed by productive rules. However, synchronically, suffixation with *-th* is not productive in English. This is a reason to say that these words are (currently) lexicalized words. This is the interpretation of lexicalization of signs of Supalla (1980, 1982, 1986) and a number of other researchers.

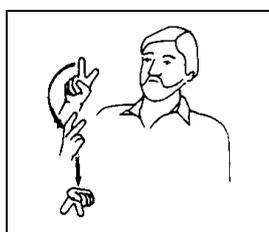
The other interpretation of lexicalization is *synchronic* lexicalization, which follows from the fact that a word or sign *is* made by a productive morphological rule, but its characteristics do not (fully) follow from the predictions of the productive rules and therefore the word or sign has to be stored in the lexicon with (at least and all of) its idiosyncratic characteristics. This notion of lexicalization is the one adopted by Johnston & Schembri (1999).

Without distinguishing between synchronic and diachronic lexicalization, lexicalization can take several forms: words and signs can be lexicalized because of their phonological, morphological or semantic properties, or a combination of these. Following this line of reasoning, motivated signs in various sign languages have been analyzed as lexicalized because i) they have idiosyncratic meanings, different from the meanings that are expected on the basis of the productive word formation processes; ii) they often have different phonological characteristics from productively formed signs; and iii) their

morphosyntactic characteristics differ from those of productively formed signs: first, the hand configuration cannot be varied (anymore) according to the referent involved; second, the argument structure of productively formed signs often differs from that of motivated signs; and third, there is no relation (anymore) between the hand configuration and the arguments of the verbs, as in productive forms.

My first criticism concerns the notion of *productivity*. It is claimed in the sign language literature that motivated signs are or have been originally formed by productive processes. Productive forms are classifier predicates (that is, VELMs). The basic claim is that in productively formed predicates of motion, the hand configuration is variable and can be changed according to the referent involved; this is not possible in motivated signs. This is illustrated by the sign in (16).

(16)



'to fall'

ASL (Supalla 1986:206)

Supalla (1980, 1986) states that the meaningful hand configurations in the ASL sign for 'to fall' has a hand configuration which is a classifier for animate entities with two legs, but that "[...] this handshape is no longer attended to by the present generation of signers." (Supalla 1980:42). The sign is used for any falling entity. Because of this, he claims, signs like that for 'to fall' are not productive (anymore). Supalla

(and other researchers) connect productivity with *specific forms*, where usually in morphological theory this notion is connected with *processes* such as the unproductive process of nominalizing suffixation with *-th* or the productive compounding process(es) in English. A better view concerning the observation that a meaningful morpheme in a particular complex sign is fixed seems to be that this does not necessarily indicate lexicalization or even non-productivity. Similarly, we would not want to claim that a particular compound in English, for instance *book cover*, is not 'productive' (or productively formed) anymore, because we cannot interchange any of the compound parts with another without changing the meaning of the word. The compounding *process* in English is undoubtedly productive: both parts of the compound can be used in the formation of new compounds. As stated above, the processes by which motivated signs are formed are considered to be productive in sign linguistics. The claim that signs such as the one in (16) are unproductive, then, follows from an incorrect interpretation of the notion productivity in morphological theory.

Second, it sometimes seems as if sign language researchers support their ideas about lexicalization or even monomorphemic status by at least implicit appeals to what goes on 'in the mind' of the native signer. Needless to say this is a tricky area, but of course also a far from uninteresting one. Morphological complexity of a sign in the mind of the language users can be tested by psycholinguistic experiments. Little work has been done in this area for sign languages, but the work that has been done does not support, as far as I am aware, far reaching claims about lexicalization or the monomorphemic nature of motivated signs. In fact,

work on DGS lexemes by Grote & Linz (in press) seems to point in the opposite direction. Although these authors refrain from providing explicit morphological structures of the signs they treat, their examples show that morphological complexity may be a persistent property. Their work proves that native signers appear to be sensitive to iconicity of signs. This was tested by showing paired items of DGS signs and pictures to native signers and asking them whether there was a semantic relationship between sign and picture. For instance, in one test situation the DGS sign for ‘eagle’ (see (17)) was shown simultaneously with a picture of either a beak, a talon or a wing of an eagle, a digger, a necklace and a suitcase.



The response times for the pair of the DGS sign for ‘eagle’ and the picture of its beak was significantly faster than those for any of the other pairs. This held for all of the items in which the sign focused on the part of the referent that was shown in the picture. Thus, it seems as if signers are aware of the meaning of the composing morphemes and relate it to the meaning of the whole sign.

Third, the divergences observed in meaning, phonology and morphosyntactic characteristics between ‘productively formed signs’ and motivated signs have been viewed as a reason to consider the latter as lexicalized signs. However, although generally lexicalization is used to

capture idiosyncratic behavior of lexemes, lexicalization of complex words does not necessarily result in large differences between productive and lexicalized forms (Bauer 1983). Consider for example the English word *gospel*. This word was originally a compound, formed from the nouns *god* and *spell*. The original compositional meaning has drifted towards the meaning *religious song*, and the compound has undergone phonological changes: the /d/ has disappeared and the /e/ has reduced to /ə/. This is a good example of a word that has lexicalized, probably even into a monomorphemic word from the current synchronic point of view. However, the word still is a noun, so its grammatical category has not changed, and neither has the position of its main stress.

If we would assume a process of diachronic lexicalization, this must be a rather slow process, especially when the original form is very complex. Many complex words of English that have been attested in sources dating hundreds of years back are not lexicalized (that is, these words do not have idiosyncratic characteristics). In addition to my previous arguments against a lexicalization analysis of ‘motivated’ signs, an analysis of these signs as monomorphemic becomes even more implausible if we take the following facts into account: i) the number of ‘motivated’ signs is very large, even in sign languages that are still young; ii) new ‘motivated’ signs are still coined, as indicated by Brennan (1990), Schembri (1996) and Aronoff *et al.* (2003) and as shown in this thesis; and iii) some of these signs were never intended as VELMs (that is, as verbs in which the hand configuration is linked to a (Theme) argument) by the signers who coined them.

The main assumption in the lexicalization analyses is that motivated forms have been (originally) derived by word formation rules that form VELMs. Motivated signs that do not show the same characteristics as productively formed VELMs are therefore assumed to be lexicalized. Such accounts have little explanatory power. In contrast, I have analysed *both* VELMs and motivated signs as signs that are productively formed. The overall processes by which they are formed are the same, but they can apply at different points in the derivation. As I have shown in sections 8.2.2 and 8.2.3, most of the characteristics that distinguish VELMs from root compounds follow from the syntactic environment in which they are derived.

8.4 Conclusion

In this chapter, I have analysed a group of NGT signs as morphologically complex because they are made up of several meaningful components. I have focused on meaningful hand configurations, but I have shown that meaningful components can also include movements and places of articulation. In a sign all or a subset of the components can carry their own meaning and contribute to the meaning of the whole. I have analysed such signs as root compounds, which may or may not have a semantic head. The compounds represent entities and events in a *pars-pro-toto* way. Many signs do not appear to have a component that functions as the morphological head, either. I have argued that root compounds are similar to VELMs, in the respect that the hand configuration(s), the place(s) of articulation and the movement(s) can contribute to the meaning of the sign.

Nevertheless, the structure of root compounds and VELMs differ. VELMs consist of only one root, namely the movement, and place of articulation and hand configuration function as inflectional (agreement) morphemes. In contrast, root compounds consist of more root material. These roots are spelled out with hand configuration(s), movement(s), and, sometimes, place(s) of articulation. This difference is a result of the different points in the derivation at which the components are merged: in VELMs, the nodes that will be inserted with phonological features for hand configurations and places of articulation are merged *above* the category node (little v), and, thus, function as inflectional elements. In root compounds, the roots that will be spelled out with features for hand configuration and places of articulation are merged *below* the category node and function as lexical elements.⁸ This accounts for compounds without a morphological head: the characteristics of the compound follow from the structure, not from (one of) its roots. The difference in meaning of VELMs and root compounds is captured by the interpretation of the structures at the level of the Conceptual Interface, where (by the use of the Encyclopedia) VELMs are interpreted as verbs expressing a motion, location or existence, while root compounds are interpreted as signs with other meanings. Furthermore, this account captures the fact that every root compound can, in principle, have a homonymous form with a VELM reading.

⁸ In root compounds it is, of course, also possible that the node that will be inserted with phonological features for hand configuration is merged below the category node, and the node that will be spelled out with phonological features for place(s) of articulation above it. In that case, the hand configuration functions as a root, whereas the place(s) of articulation function as agreement morpheme(s).

The present analysis has several advantages over previous analyses of motivated signs. It provides a clear structure and accounts for both verbal and nominal compounds. It does not make predictions that are not borne out by the data. Furthermore, my analysis is preferable over ones in which motivated signs are considered to be lexicalized instances of originally productively formed signs (VELMs). These analyses are based on false assumptions and they cannot explain the characteristics of new formations or existing forms. Because the characteristics of motivated signs differ (sometimes to a great extent) from those of the supposedly original forms, these analyses fall back on 'lexicalization' processes.

My proposals are, however, incomplete. They form only the beginning of more extensive investigation of the structure of motivated signs. Since the present research mainly focuses on the meaning of the hand configuration, I have not investigated the meaningful contribution of the other components as thoroughly as that of the hand configurations. These will need particular attention in future research. Moreover, I have hardly touched on the structure of contour signs, which may be extremely complex. Obviously, deeper investigation of the particular morphemes involved in contour signs, their meanings and their combination possibilities is still necessary.

9.1 Summary of main results

This study of meaningful hand configurations in NGT owes a debt to previous research. This concluding chapter will summarize the main points of this thesis, and clarify how its analysis accepts earlier proposals and results, and how they make an original contribution. First and foremost, this thesis elaborates on early work on classifiers in sign languages by Supalla (1980, 1982, 1986). Recently, many aspects of his analysis have been called into question, even to the extent that some consider the structures in which classifiers occur as linguistically unstructured units, or even more radically, as non-linguistic units. However, this work has shown that many parts of his analysis were fundamentally correct. The current work contributes to a clarification of the structures of verbs of motion, location and existence, in which Supalla proposes sign language classifiers appear, by subdividing these verbs into three different types:

- i) verbs that express the (path) motion, the orientation change, the location and the existence of referents in signing space (which I have called VELMs);
- ii) verbs that express the manner of motion of a referent; and
- iii) predicates that give visio-spatial information about referents by tracing their shape and/or size (contour signs).

This subdivision is based on the particular morphosyntactic behavior of each subtype. Although hand configurations play an important morphological role in all of these verbs, only in VELMs are they linked systematically to the Theme argument of the verb. The morphological structure of manner of motion verbs and contour signs appears to be similar to that of signs that do not express motion or give visio-spatial information, but in which one or more meaningful hand configurations occur. I will return to this below.

I show that Supalla's assumption that the movement of the hand(s) in VELMs is the verb root is correct, since the movement expresses the (motion) event, and it cannot be varied without changing meaning. The classifier element, on the other hand, be interchanged with other classifiers (provided that they are of the same type) without changing the core meaning of the sign. Thus, classifiers show paradigmatic variation. Hence, I concluded that they do not function as roots in VELMs. In line with Supalla, I showed that VELMs can be affixed with several manner morphemes, such as morphemes indicating the manner of motion of the referent, or its orientation with respect to other referents, and morphemes indicating the position of referents in signing space. I adapt Supalla's analysis by understanding these morphemes as having values that are

relative and not absolute. The values of orientation and locus morphemes are connected to the base plane and the loci of other referents in signing space. Furthermore, I analyse the locus morphemes as morphemes that mark agreement with Location, Source and Goal arguments. In this, I follow an earlier analysis by Bos (1990) for NGT and a recent analysis by Meir (2002) for ISL. These authors argue that in principle the loci in VELMs do not linguistically differ from those in agreeing verbs. Supalla proposed morphemes indicating the distance between referents in signing space, in addition to orientation and position morphemes. I argue that VELMs do not have separate ‘distance’ morphemes, but that the distance between referents can be inferred from their positioning in signing space.

My analysis of the hand configurations in VELMs diverges from Supalla’s in two respects. First, I argue that these hand configurations are morphologically simplex (except perhaps for the classifier used for trees), since NGT signers do not construct new hand configurations using morphological possibilities as described by Supalla. Second, I argue that the total set of meaningful hand configurations on VELMs can be categorized in two subsets (following Shepard-Kegl 1985 and McDonald 1982) instead of the four (including several subsets) proposed by Supalla. I argue that the hand configurations in VELMs function as agreement markers, following the preliminary claim of Supalla (and various others, such as Bos and Edmondson 1990), which is made more explicit by Glück & Pfau (1998, 1999). My arguments for this are as follows:

- i) the hand configurations form a relatively small, closed set in NGT (closed is interpreted as not prone to include new hand configurations);
- ii) they occur obligatorily on VELMs;
- iii) they systematically represent an argument of the verb (the Theme argument);
- iv) they show paradigmatic variation; and
- v) they are used to track reference with a noun referent in the sentence and in the discourse (which noun can be left implicit in the clause).

The two types of hand configurations are *entity classifiers* and *handling classifiers* (adopting terminology from Aronoff *et al.* 2003). The set of entity classifiers contains the hand configurations that refer directly to nouns, in that they represent some of the characteristics of the referent (such as animacy, leggedness, or a particular shape). The set of handling classifiers contains the hand configurations that refer indirectly to nouns, indicating that the referent is held or manipulated. Some hand configurations are polysemous in that they can represent either a referent *or* its manipulation (such as the  hand configuration). Entity classifiers occur only on intransitive VELMs, marking the Theme argument or, in grammatical terms, the subject, and thus function as subject agreement markers, whereas handling classifiers occur only on transitive VELMs. They also mark the Theme argument, which, in grammatical terms, is the direct object in these verbs. They never mark indirect objects. Therefore, they function as direct object agreement markers.

I propose sets of features that are spelled out by the classifier agreement markers. Person and number features do not appear to be

involved in the system of classifier agreement, but the semantics of the hand configurations resemble those of noun class or gender systems, though the latter are synchronically less semantically transparent. The proposed features concern animacy, leggedness, and a variety of shape characteristics. Two of the entity classifiers are specifically related to trees and airplanes, respectively. The classifier used for trees is different from the other classifiers in that i) it consists not only of a hand configuration, but the forearm is also part of the classifier; ii) it cannot be moved to indicate the motion of a tree through space (this may be due to articulatory restrictions because of the involvement of the forearm). However, I find no convincing arguments against its status as a classifier.

In contrast to accounts of agreement in spoken languages in the literature, which find infrequent variability in the choice of an agreement marker, there is some ‘free’ variation in the choice of a particular hand configuration in NGT. This variation allows the signer to focus on a particular set of characteristics of the noun referent. In particular, NGT signers switch between the  and  hand configurations in order to focus on the animacy or the leggedness of a referent (for instance a person).

I argue that Supalla’s analysis of the morphological structure of VELMs is more complex than necessary and I make proposals towards simplification. First, I argue that sequentially occurring complex VELMs are not combinations or compounds of verb roots, but of verbs, each of which heads a clause. The fact that there *is* usually no intervening material between two sequential VELMs does not indicate that there *cannot be* intervening material (although this is often dispreferred for reasons that await further investigation). Furthermore, each verb in such a

sequence denotes a different event. Second, I show that structures in which two hand configurations each represent a different referent noun are two separate VELMs, uttered simultaneously.

I compare my analyses of meaningful hand configurations with recent literature on classificatory devices in spoken languages, and show that the hand configurations in NGT have striking similarities with verbal classifiers in spoken languages (Aikhenvald 2000). Specifically, there is a smallish set of classifiers, they appear only on a subset of verbs, they represent an argument of the verb and have a referent-tracking function, they have similar ways of categorizing nouns as other verbal classifier systems, and there is some variability in the choice of a classifier. On the other hand, these hand configurations also share some morphosyntactic characteristics with noun classes: they occur obligatorily on verbs (on the subset of verbs of motion, location and existence), they represent an argument of the verb and have a referent-tracking function, and the set of markers is restricted to a closed set. (Verbal) classifiers in general may pattern more like noun class systems than previously assumed (for instance by Dixon 1982; Corbett 1991). The verbal classifiers of sign languages (particularly in NGT) share even more morphosyntactic characteristics with noun classes than the prototypical verbal classifiers of spoken languages. I draw a parallel with *Miraña*. I therefore consider the claim that these hand configurations function as agreement markers on these verbs as well-founded. I do not consider the fact that the markers in sign languages do not seem to have evolved historically from lexical elements (which are commonly assumed to be the source of classifiers and noun class markers) as a counterargument to this proposal, but rather

the result of the fact that the visual-manual modality of sign languages promotes markers with particular visual characteristics such as shape.

Sign languages thus have two ways to mark agreement: by means of loci in signing space and by means of hand configurations. Based on work by Padden (1988) and Meir (2001), I argue that the presence of locus and classifier agreement is, by and large, predictable from the phonological characteristics of verbs. I show how the appearance of agreement on verbs in NGT (and other sign languages) can be predicted from their morpho-syntactic structure, using the framework of Distributed Morphology. This framework assumes that morphemes do not have phonological features until the derivation is shipped off to PF. Only then will phonological features be inserted in the terminal nodes. In DM, bundles of phonological features (called Vocabulary Items) compete for insertion, and the Vocabulary Item that matches most of the morphosyntactic features contained in a terminal node without resulting in a feature clash wins over the other Vocabulary Items. Since the agreement morphemes connected to classifiers have more morpho-syntactic features than those connected to loci, classifiers will be inserted prior to loci. Insertion starts at the root and works its way towards the periphery. Therefore, insertion of classifiers and loci is only possible in so far as the structure does not already contain phonological specifications for hand configuration and/or place of articulation. Since the Vocabulary Items for VELMs consist of movements only, these are the only verbs in which we will find classifier agreement.

My account of meaningful hand configurations appearing on signs other than VELMs (which I have called ‘motivated signs’ in this thesis)

rests in part on earlier accounts by Brennan (1990) and Meir (2001). I confirm Brennan's proposal that these hand configurations and meaningful movements form a subset of the set of meaningful elements, and that these meaningful elements combine to - productively - form compounds whose parts are articulated simultaneously. It appears that the place of articulation and the orientation of the hands in such compounds can be meaningful as well, and in many cases all of these four components are meaningful. None of the parts can be argued to be affixal in nature. Therefore I consider all parts as *roots*. I have argued that some, though not all, of these compounds are exocentric in nature, although this needs further investigation, preferably by or with much support from native signers. The compound parts contribute to the meaning of the whole sign, although the meaning of the sign is often not fully predictable from the meanings of its parts. Many root compounds refer to a particular aspect of the entity or event they represent.

As for the morphological structure of motivated signs, it appears that none of the parts is systematically the morphological head of the compound. Although some compounds function only as verbs and others only as nouns, many compounds can be used both predicatively and referentially. Although root compounds are often homonymous with VELMs, they differ from VELMs in their phonology and their morphosyntactic and semantic behavior. For this reason, many researchers have claimed that these signs are lexicalized. I do not adopt this view, but again account for these differences in behavior within the framework of Distributed Morphology. My claim is that the morphemes connected to movements, hand configurations and places of articulation

in root compounds are combined much as in VELMs. Both are derived by merger of the meaningful components and by merger of the structure with a category node. However, VELMs are merged with the category node prior to merger with the (agreement) nodes that will be spelled out by hand configurations and loci, whereas in root compounds the category node is merged after merger of the roots that will be spelled out by hand configurations and places of articulation. This explains i) why hand configurations and loci in VELMs and root compounds are meaningful, yet have a different function: they are functional elements in VELMs and lexical elements in root compounds; ii) why the meanings of VELMs and root compounds differ; and iii) why they are homonyms, and for every root compound there may also be a VELM reading available.

My analysis challenges claims in the literature that the forms I analyse as root compounds are lexicalized motion verbs. I show that such claims cannot account for the newly formed signs; they are based on incorrect interpretations of morphological productivity and lexicalization, and on particular assumptions about the structure of motion verbs. I compare the morphological and semantic structures of the root compounds in NGT to those of Mohawk, showing that they are (at least) similar. Furthermore, I have shown that elements with an undeniably classificatory meaning not only function as word formation devices in NGT (and other sign languages), but also in some spoken languages with verbal classifier systems, namely Miraña (and other Amazonian languages, as reported in the literature, for instance Barnes 1990; Aikhenvald 1994; Van der Voort 2000; Seifart 2002, in press).

In conclusion, my proposal for a subdivision of signs in which meaningful hand configurations play a key role appears to be useful and clarifying. Distinguishing VELMs from manner verbs and contour signs underscores the systematicity of the relation of the hand configurations and the arguments of the verbs in VELMs, which has led me to analyse these hand configurations as agreement markers. Furthermore, careful examination of the behavior of VELMs sheds light on their internal structure. The same holds for other signs in which meaningful hand configurations can be discerned. Systematic comparison of existing and newly formed signs shows that these do not necessarily derive historically from VELMs, but are formed according to productive rules. The same rules are used to derive VELMs and root compounds, but their derivation differs in the position where the category node is merged. Because of this, the meaningful hand configurations in root compounds serve a function different from those in VELMs. This has probably not been recognized in earlier research because of their homonymy.

However, another important factor may be involved, especially for those accounts in which root compounds are analysed as monomorphemic signs. Linguistic study of sign languages began about four decades ago, and from the beginning has been hampered by the lack of an accepted consistent and precise method of describing signs. There is no IPA,¹ nor an accepted writing system. This situation has considerably affected the way research tends to be done and reported. The use of a gloss convention has become common practice in the notation of signs

¹ The HamNoSys transcription system developed at the University of Hamburg (Prillwitz *et al.* 1989) might be a candidate.

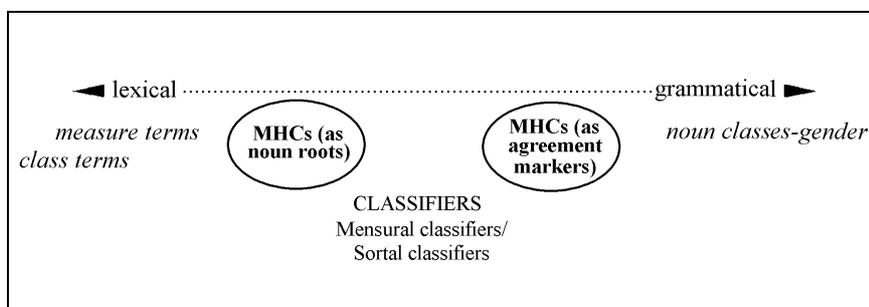
and sign sequences. That is, a sign is presented by means of a ‘label’, which is usually an English word or a word from the spoken language surrounding the investigated sign language. These glosses often represent monomorphemic words (of English, German, Dutch, etc.). I suspect that the use of glosses is partly the reason why many signs are analyzed as monomorphemic, simply because the gloss often represents a monomorphemic word of the spoken language of the environment.

I finally address the recent question in sign linguistics whether meaningful hand configurations are to be considered classifiers or not. As stated above, I have shown that the meaningful hand configurations on VELMs are strikingly similar to (verbal) classifiers in spoken languages. This is in contrast to previous claims (for instance Engberg-Pedersen 1993; Emmorey 2001; Schembri 2001, 2003). An additional argument that is raised against the classifier status of meaningful hand configurations is that classifiers (in spoken languages) are not used in lexicogenesis (Engberg-Pedersen 1993; Schembri 2001). However, recent and extensive research of verbal classifier systems in spoken languages has demonstrated that this is incorrect and that classificatory devices can be used in lexicogenesis (Van der Voort 2000; Seifart 2002, in press). It has also been indicated that noun class markers can be used in derivational processes of spoken languages, too (Horton 1949).

Grinevald (2000), in an overview of the morphosyntactic characteristics of noun classification devices, has made a hierarchy of functions of these devices, ranging from lexical functions on the one extreme, to grammatical functions on the other. Measure terms and class terms occur near the lexical end, since they are full-fledged lexical items;

noun classes have a primary grammatical function as agreement markers (within and outside the NP) and occur therefore near the grammatical end. Grinevald assumes that (all types of) classifiers are intermediate between these extremes, because classifiers are argued to be lexical in origin, evolving into items that need a host and have grammatical functions. I claim that meaningful hand configurations in NGT (and other sign languages) occupy two positions in Grinevald's hierarchy: on the one hand, they range toward the lexical extreme, that is, in their function of lexical elements in root compounds, and on the other hand, they range toward the grammatical extreme, that is, in their function as agreement markers (see Seifart in press, for a similar claim for Miraña). This is illustrated in Figure 1.

Figure 1 The position of meaningful hand configurations (MHCs) on the continuum of classificatory devices (after Grinevald 2000:61, Fig. 2.1)



9.2 Practical implications

The development of materials used for the acquisition of sign languages, whether by children or by adults, is in full swing (in particular for NGT), as is the development of dictionaries. Such material is in dire need as it is becoming rapidly recognized that sign languages are full-fledged

languages and that Deaf people can only thrive if they have fully mastered a sign language (although the official recognition of NGT as the first language of Deaf people in the Netherlands is still pending). Hearing parents of deaf children, family members and friends often want to learn the language in order to be able to communicate with the children and their (Deaf) friends, teachers and other Deaf people. Currently interpreters and teachers are (supplementarily) trained. Even people not involved with Deaf people or their culture are interested in learning NGT, simply because they like to learn a different language and/or because it is an interesting intellectual and cultural activity. Nonetheless, teaching materials are insufficient, both in informational value and in clarity because insight into many aspects of the language is lacking. As I have experienced myself in first interpreting the literature and then in teaching NGT interpreters and teachers, in these materials ‘classifiers’ are addressed as a coherent phenomenon, which I have found to be very confusing for learners. This is understandable in view of my results. It has become clear that ‘classifier’ has been a portmanteau term for a very heterogeneous group of phenomena, such as VELMs, manner verbs and contour signs. Thus, my analyses can also be seen as a contribution towards the development of materials that are much clearer with respect to the nature and function of these forms.

Motivated signs in which meaningful hand configurations occur are in the currently existing teaching materials often presented as if they were monomorphemic elements and no reference at all is made to compositionality of meaningful hand configurations, movements and places of articulations outside of the domain of VELMs, apparently

because of a lack of insight into these matters. It is now possible to start to work these issues out in teaching materials. Rather than presenting a phenomenon as ‘classifiers’ as such, meaningful hand configurations should be categorized in these materials according to their functions as agreement markers and roots.

With respect to dictionaries, in the Netherlands the main focus has been on compiling bilingual lists of Dutch words and NGT signs that can be used as quick references and as a means of extending people’s vocabulary of NGT. They have become significantly more sophisticated over the years, showing movies of the signs, with more extensive search facilities and providing some grammatical and contextual information with regard to the signs. For instance, entries that consist of a sequence of signs are marked as compounds, and it is indicated whether a verb can show locus agreement with one or more arguments. In the future, this can be extended to include information about root compounds and the (classifier) agreement possibilities of motion verbs (as also argued recently by Brennan 2001). A drawback of many current bilingual sign-spoken language dictionaries is that they are primarily based on the direct translations of words (understandable, since the initial aim was to provide non-signers with translations of words that can be used in communication with Deaf people). The sign structures that are connected with these words are the best translations that the Deaf people involved in the dictionary projects could provide. However, the morphological and morphosyntactic structures of signs are not necessarily similar to those of the corresponding words. Some translations of VELMs (for instance *to walk*) are signs that are inflected with a classifier agreement marker (for

instance, agreement with a noun with focus on a legged referent). The production of new dictionaries should take into account that such signs are *inflected* verbs and that the hand configuration is an agreement marker. In cases where there is no accurate translation or where the structure of the translation diverges from that of the corresponding word, this should be mentioned.² Also, the meaningful hand configurations can be included as separate entries, along with information on their semantics and use, as has already been done in dictionaries of some other sign languages, such as TSL and BSL (Suwanarat *et al.* 1990; Brien 1992).

A final point concerns language acquisition, especially that of children, which is a currently an important issue for the Deaf schools in the Netherlands. These schools have recently started to offer bilingual NGT - Dutch instruction to the youngest Deaf pupils. Several tests have been developed and are used to ascertain the progress of the acquisition process of Dutch. The development of such tests for NGT acquisition still lags behind, because of the lack of insight into NGT. Although classifiers are part of such investigations, it is still unclear what is actually being tested. The development of acquisition tests will benefit considerably from the results of research like those presented here, contributing to insight into the structures involved and the function of the hand configurations. Tests could be based on testing materials for languages that have similar structures or, at least, complex agreement systems.

² It is also advisable to incorporate signs from context, for instance stories, interviews, newsletters, etc. that appear in video format in dictionaries.

9.3 Theoretical implications

The first theoretical implication of this work concerns the group of verbs that are called ‘classifier predicates’ in sign linguistics. This group is usually considered and treated as a homogeneous group having the same morphological structure. Thus, contour signs and VELMs are often implicitly treated as the same sign types (for instance Cogill-Koez 2000). Others treat (at least) verbs that express the manner of motion and VELMs as similar (Brentari & Benedicto 1999; Benedicto & Brentari to appear). This research, however, has shown that the group consists of three separate types of predicates on the basis of their diverging morphological and morphosyntactic behavior. Therefore, in investigations of various linguistic research areas, such as phonology, morphology, syntax, psycholinguistics, neurolinguistics, or language acquisition, such predicates should be treated as having a different structure and different characteristics. VELMs are inflected verb roots, whereas (motivated) verbs that express the manner of motion (and other motivated signs) are root compounds. The hand configuration has a different function in both types of verbs: functional in the former, lexical in the latter. The processes involved in the formation of motivated signs and VELMs and the resulting structures are different. Investigations of ‘classifier predicates’ in which this has not been recognized may have yielded partly untrustworthy results.

Another implication of my findings concerns agreement phenomena in general. It appears that in sign languages, in contrast to patterns found in spoken languages, there is a systematic relation between the semantic role of an argument and the agreement marker: the arguments that are

expressed by loci are spatial arguments such as Source, Goal and Location, and can also indicate Agent, Patient and Recipient arguments. The hand configurations are always connected to the Theme argument. (The referent that is linked to the entity classifier can, incidentally, be Agentive as well, for instance when the manner morpheme for ‘in a walking manner’ is attached to the verb root.) Classifier agreement morphemes are never connected to the other spatial arguments. I am not aware of spoken languages in which particular agreement morphemes are systematically connected to particular thematic arguments. Sign languages therefore appear to differ from spoken languages in that the agreement markers in the former are connected to the semantic argument structure rather than to the grammatical argument structure. Therefore, this research broadens our view about the appearance of agreement morphology and its connection to the arguments of the verb.

My work on the morphological structure of ‘classifier predicates’ also has implications for the results of research of (child) language acquisition. Firstly, the investigation of acquisition of VELMs has focused on the complex morphological structure of these predicates and the extent to which children are sensitive to this complexity (Newport 1981, 1982; Supalla 1982; Slobin *et al.* 2003). However, the morphological structure of the adult form of these verbs has not been fully clear, or was assumed to be more complex, than in this analysis. For instance, it was not recognized that the hand configurations in these verbs are functional elements and function as agreement markers; it follows that the acquisition of the hand configuration in these verbs should be investigated on a par with the acquisition of agreement, and in sign

languages, compared with the acquisition of locus agreement. Furthermore, some of the adult forms that have been used to test children's comprehension and production of VELMs appear not to consist of one (complex) verb, as claimed (by Supalla 1982; Newport 1988) but of a sequence of VELMs, and hence a sequence of clauses. The stage in which a child produced the 'adult form' does therefore not necessarily convey the stage at which the child has fully acquired the system. It seems that results of such investigations should be reanalysed in view of the newly proposed structure of 'classifier predicates', distinguishing VELMs, contour signs and verbs expressing manner of motion, and taking into account the different functions of the components of these signs.

Another implication of this work is connected to compounding processes in sign languages. These have been frequently investigated, right from the beginning of sign linguistic research. These investigations concerned sequential compounding above all. Major studies of ASL compounding (Klima & Bellugi 1979; Liddell & Johnson 1986) claim that compounds are formed by two or more root signs. At the same time, most of the compounds investigated in ASL, AUSLAN, BSL, DGS and NZSL are semantically and phonologically lexicalized (Klima & Bellugi 1979; Liddell & Johnson 1986; Brennan 1990; Collins-Ahlgren 1990; Perlmutter 1996; Glück & Pfau 1997; Johnston & Schembri 1999), whereas the characteristics of newly formed non-lexicalized compounds have hardly been a subject of investigation. Therefore, little is known about the morphological structure of non-lexicalized compounds and the phonological processes that play a role in the formation of such

compounds, or about constraints on productive compounding. It has even been claimed that the compounding processes in DGS and NGT (Becker 2000; Bussemaker 2000) are not productive at all, but that many of the forms that are listed as compounds are either direct translations from compounds of the surrounding spoken language or only occur out of context; in context, one of the parts is left unexpressed. Nevertheless, it appears that sign languages (at least, NGT) have productive compounding processes that result in compounds of unexpected form, namely *simultaneous* (root) compounds. It will be interesting to compare the processes of simultaneous compounding to those of sequential compounding (if present) in order to understand the underlying compounding processes and the constraints on compounding.

This research has also some implications for classifiers in spoken languages, in particular verbal classifiers. I have shown that the classifiers appearing on VELMs in NGT fall toward the grammatical extreme on the continuum of classificatory devices. The same is indicated for the spoken language Miraña (Seifart 2002). The function of classifiers in spoken languages has been analysed more subtly in recent accounts (Aikhenvald 2000; Grinevald 2000) than in previous ones (for instance Dixon 1982; Denny 1976) in that not all classifiers have one main function, namely classification, but that different types of classifiers have different functions. This now seems to be supported by the analysis of NGT given in this thesis. It appears that verbal classifiers in general lean even more towards a grammatical function than assumed in recent accounts. Verbal classifiers are not always obligatory present. For NGT, I have argued that there is a (phonological) reason why not all verbs have a

classifier (or, for that matter, locus agreement markers). It will be interesting to investigate whether there are specific reasons for the non-obligatoriness of verbal classifiers in spoken languages. Furthermore, verbal classifiers share most of the characteristics of grammatical elements like noun class markers and therefore could, at least in some languages, be reanalyzed as agreement morphemes.

9.4 Further research

There are several ways in which further research into the field of investigation of this thesis could be directed. With respect to morphology, I have presented a preliminary analysis of root compounds, which needs further elaboration. Furthermore, the processes of sequential compounding still need further and more systematic investigation of the morphological and phonological structure of the resulting signs. Many overviews of morphologically complex signs cover a large number of sign formation processes, such as compounding, the formation of classifier predicates, affixation, number incorporation, the composition of fingerspelled loans (see Brennan 1990; Schembri 1996; Frishberg & Gough 2000). However, these overviews are relatively unspecific and hardly ever focus on the morphological structure of the complex signs. In spoken language accounts of morphology (for instance Marchand 1960; Bauer 1988; Spencer 1991; De Haas & Trommelen 1993), for instance of compounding, we find detailed analyses of several types of compounds, such as endocentric, exocentric and appositional compounds. Overviews are given of the (grammatical categories of the) words that can be used as compound parts and the position which they can occupy in the

compound. Endocentric compounds are analysed as morphologically right-headed or left-headed. Much of this is still absent in accounts of the morphological structure of compound signs and signs that are otherwise complex. Furthermore, the accounts which attempt to give more information about the morphological structure (for instance Svaib 1982; Becker 2000) are hampered by the use of glosses for both the compound parts and the compound, which blurs the possible semantic and morphological structure of these signs. Moreover, the criteria used to distinguish compounds from phrases need to be readjusted. Criteria used by Klima & Bellugi (1979), which have been used in subsequent investigations as well, do not distinguish phrases from *productive* compounds, but from *lexicalized* compounds. However, morphological research investigates productive processes and forms in the first place. Thus, sign language research needs more thorough, systematic investigation of morphological processes such as compounding (and, in fact, many others).

As for agreement it is a well-established fact that many verbs that do not show agreement are body-anchored: they are articulated for instance near the eyes or on the chest (Padden 1988). In some instances such signs can show agreement for the object. It is usually claimed that (subject) agreement in such verbs is impossible because of their specific phonological feature specifications. My research has shown that places of articulation (especially those on the body) are often morphemic. Therefore, the fact that body-anchored signs cannot show agreement could be related to their morphological structure rather than (merely) to their phonological feature specification. The sign language interface

between grammar and PF does not allow a sign to have more than two places of articulation: a beginning and an ending place. It is plausible to assume that a meaningful place of articulation cannot be substituted with another (agreement) morpheme. Thus, a sign that has only one meaningful place of articulation cannot show any (locus) agreement at all, whereas a sign that has two places of articulation, one of which is clearly meaningful, cannot have a (locus) agreement marker in that position. However, the second (non-morphemic) place of articulation may be substituted with an agreement morpheme. This research used only a rather small sample of signs and has not focused specifically on the place of articulation. Future morphological research may systematically investigate the place of articulation in verbs, to see whether there is a relationship between morphemic places of articulation and the locus agreement possibilities of those verbs.

As for phonology, the various components of signs could be investigated in view of the fact that they are often (also) morphemic. It has been claimed in the literature that the phonological characteristics of productive forms are different from those of unproductive forms. However, it would be even more interesting to know to what extent the phonological characteristics of monomorphemic forms are different from those of morphologically complex forms (a first step into this is taken by Van der Kooij 2002 for NGT), since this would teach us more about the nature of both the morphology and the phonology of sign languages. Many phonological accounts of signs have not distinguished monomorphemic from motivated signs on the assumption that the latter

are monomorphemic as well. Some of the results, therefore, may need to be reinterpreted.

Earlier in this chapter, I indicated that the use of glosses may have influenced the analyses of lexemes as monomorphemic. Other researchers (for instance Shepard-Kegl 1985; Brennan 2001; Hoiting & Slobin 2002; Slobin *et al.* 2003) have warned against the use of glosses, because they are already a form of analysis. In the last decade, some publications have made extensive use of pictures, photographs or even movies. New sophisticated transcription methods have been developed, such as the Berkeley Transcription System (BLS) which allows polymorphemic analyses of signs (Slobin *et al.* 2001) and systems in which the transcription is immediately connected to the signed data, such as SignStream™ (Neidle 2001), and MediaTagger (Senghas 2001). However, the historical trend is difficult to reverse and, moreover, use of visual material and extended descriptions are time-consuming and often expensive, one of the major reasons why many signs and sequences are still annotated in gloss format. I whole-heartedly endorse the warnings with respect to representations of signs and sign structures in mere glosses. In future research, this should be avoided as much as possible.

Appendix I

List of sign languages

Abbreviation	Name of sign language
ASL	American Sign Language
AUSLAN	Australian Sign Language
BSL	British Sign Language
CSL	Croatian Sign Language
DGS	German Sign Language (Deutsche Gebärdensprache)
DSL	Danish Sign Language
FSL	Finnish Sign Language
HKSL	Hong Kong Sign Language
ISL	Israeli Sign Language
ISN	Nicaraguan Sign Language (Idioma de Señas de Nicaragua)
LIS	Italian Sign Language (Lingua Italiana dei Segni)
LSC	Catalan Sign Language (Llengua de Signes Catalana)
NGT	Sign Language of the Netherlands (Nederlandse Gebarentaal)
NS	Japanese Sign Language (Nihon Syuwa)
NZSL	New Zealand Sign Language
SASL	South African Sign Language
TID	Sign Language of Turkey (Türk isaret Dili)
SSL	Swedish Sign Language
TSL	Taiwan Sign Language
THAISL	Thai Sign Language

Appendix II

Sign notation and glossary

1.1 Introduction

A common way to give examples in the sign language literature is by providing glosses of the signs and sign sequences. Glossed transcripts of signs and sign sequences are different from those of spoken languages in that, in general, *lexical* information is given in capitals, and most of the *grammatical* information by means of subscripts, superscripts, and so on, but there is no representation of the signs and sign sequences themselves. Although glosses form the quickest and easiest way to present signs, they have serious disadvantages. First, since they lack information on the form of a sign or sign sequence it is very difficult to know what the signs looks like for a reader who does not know the particular sign language reported on.¹ Even if he looks the gloss up in a dictionary, he cannot be sure that the sign he finds is the same sign as the intended one. The interested

¹ In a comparison of signs from different sign languages, the signs are sometimes distinguished by using words from the oral language that is mainly used in the same country where the sign language is used. These glosses are, in turn, translated into English glosses.

reader is burdened with much work, and, even more importantly, falsification on the basis of data is nearly impossible. Second, since a gloss is an interpretation of the sign, it already is an analysis, as has also been indicated by among others Shepard-Kegl (1985) and Slobin *et al.* (2003).

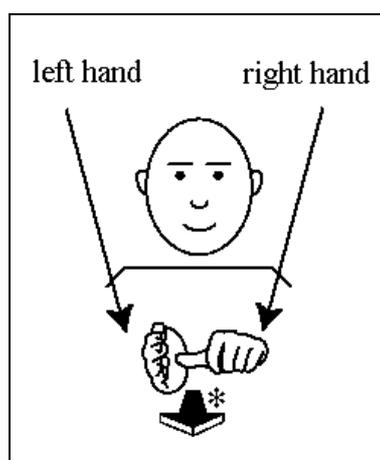
In this thesis I have chosen to represent signs by visual representations wherever possible. Pictures and photographs of the signs are given to provide as much information as possible. Nevertheless, since it was not always possible to find visual representations of the examples quoted from the literature, I have sometimes used the original gloss notation. The NGT data presented in this thesis are (with a few exceptions) made by a special computer programme called SignPS, by permission of the developers (Handicom). Because the program was still in development, I used a demo version (0.83, 1996) and I adapted most signs in a drawing programme. Still, a picture is static, while a sign is dynamic. Therefore the pictures the dynamics of the sign are indicated by symbols, for example, arrows indicating the direction of the movement of the hands. I have also provided the sign pictures with glossed transcripts following common conventions in linguistics, and a prose translation in English. In this appendix, I provide a brief manual for the interpretation of the symbols used in the signs, and the gloss notation.

1.2 Symbols used in the signs

Usually, pictures of signs show a real signer who is facing the reader. The sign illustrations I made for this thesis should *not* be seen as a facing stylized signer, however, but as a mirror view of the reader signing. Thus,

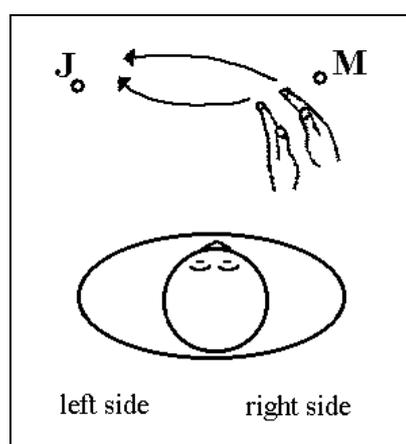
the righthand part of the character in the picture represents its right side, as in Figure 1.

Figure 1 Front view of signer in illustrations



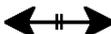
For some signs, I made a picture showing the view from above, to illustrate the use of space. In these illustrations, too, the righthand part of the character represents the right side of the signer, as in Figure 2.

Figure 2 View from above



The following symbols are used in the signs (that are mostly adopted from the KOMVA system used in the Netherlands):²

movements:

	straight movement to the right
	repeated to and fro movement (left and right)
	(rightward) movement ending abruptly
	circular vertical movement
	arc movement towards signer
	straight movement away from signer
	circular vertical movement away from signer
	contact with body part or contact between the hands
	begin contact and downward movement
	end contact after downward movement

² KOMVA is short for 'Verbetering van de KOMmunicatieve Vaardigheden bij dove kinderen en dove volwassenen' (Improvement of the communicative skills of deaf children and deaf adults). (e.g. NSDSK 1989)

movements:

continuous contact during (rightward) movement



alternating motion of hands

hands:

orientation change: the hand printed in bold indicates the final orientation



handshape change: the hand printed in bold/black indicates the final handshape



closing of the hand (used if the use of two handshapes would be unclear)



repeated closing of the hand



finger wiggling

1.3 Sign glossary

In this section, I provide a list of transcription symbols used in the examples from the literature.

Table 1 List of transcription symbols

Symbol	Examples	Explanation
-	CL:F-GIVE	hyphenated morphemes indicate that these morphemes occur within one sign
-	J-O-H-N	hyphenated letters indicate fingerspelling

Symbol	Examples	Explanation
^	SPOON^FEED	words connected with circumflex indicate compounds
_	NOW_I_SEE	words connected with underscore indicate that one sign is glossed by more than one English word
a, 1	INDEX ₂	subscripts indicate the locus of a referent in signing space. 1, 2 and 3 are usually (though not always) connected with first, second and third person
	₁ LOOK_AT ₂	these subscripts indicate agreement with the referents involved in the event expressed by the verb. The subscript at the beginning of the sign usually indicates the subject/Agent, the one at the end of the sign the object/Patient (in this case: <i>I</i> look at <i>you</i>)
INDEX	INDEX ₂	pronoun; the subscript indicates the locus of the referent in signing space (in this case: <i>you</i>)
CL	₂ GO-CL _a	classifier; sometimes a letter indicates the particular hand configuration of the classifier
_____x YYYY		lines above a gloss (sequence) indicate non-manual markings:
_____topic	_____topic	topic marking
_____y/n	BOOK INDEX ₁ _____y/n	yes/no question
_____wh	INDEX ₂ DRINK _____wh	wh question
_____neg	CASE WHERE _____neg	negation
_____aff	WANT INDEX _b _____aff	affirmative
<i>habit</i>	FINE! FEED ^{<i>habit</i>}	superscribed italicized terms aspect: habitual, continual, iterative

1.4 Glossary

This section contains an explanation of the abbreviations used in the glosses in the spoken language examples and the drawn sign language examples.

Table 2 Explanation of gloss abbreviations

Gloss	Explanation
CL	classifier (often followed by the meaning of the classifier)
CONT	continuative
CONTR	contrastive
DUAL	dualic
DUP	duplicative
FACT	factual
FEM	feminine
HAB	habitual
INCR	incremental
INSTR	instrumental
IT	iterative
LOC	locus in signing space
MASC	masculine
MSS	masculine singular subject
NC	noun class (followed by the class number)
NC:1s	noun class I, singular
NC:1PS	noun class I, plural, subject
NE	Mohawk particle, function unclear
NSF	noun suffix

Gloss	Explanation
NSS	neuter singular subject
OPT	optative
PART	particle
PRES	present tense
PUNC	punctual
RECIP	reciprocal
RMP	remote past
STAT	stative
ZSS	zoic (feminine) singular subject
i, j, ... x, y	indexes

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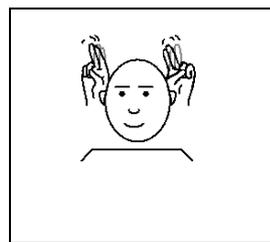
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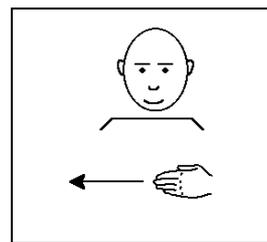
Samenvatting

Woorden in gesproken talen zijn opgebouwd uit kleine elementen: klanken. Gebaren, in gebarentalen, zijn ook opgebouwd uit kleine elementen. Dit zijn geen klanken, maar: handvormen, oriëntaties van de handen, plaatsen waar het gebaar wordt gemaakt en activiteiten. Zulke activiteiten zijn: bewegingen van de handen door de ruimte en veranderingen in de handvorm en/of de oriëntatie van de handen. Zelfs niet-manuele delen (zoals gezichtsuitdrukking) zijn onderdelen van gebaren.

Een groot aantal gebaren in gebarentalen is 'iconisch', d.w.z. dat de vorm van het gebaar is gerelateerd aan de betekenis. Enkele voorbeelden daarvan uit de NGT zijn:



'konijn'



'(fiets) rijdt voorbij'

Het onderzoek in dit proefschrift is gericht op 'iconische' gebaren in de Nederlandse Gebarentaal (NGT) en speciaal op de rol van de handvorm in deze gebaren. De achtergrond hiervan is het feit dat de handvormen in deze gebaren zelf betekenis dragen. De grammaticale functie van die handvormen (die vaak 'classifiers' worden genoemd) was echter onduidelijk. In mijn onderzoek toon ik aan dat dergelijke betekenisvolle

handvormen ten minste twee grammaticale functies hebben: i) zij zijn onderdelen van samenstellingen en ii) zij functioneren als verbuigingen op een groep werkwoorden. Dit zal ik hieronder nader uitleggen.

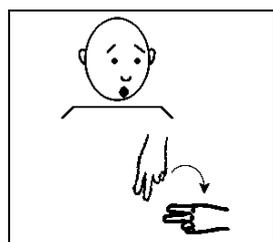
Ten eerste kunnen betekenisvolle handvormen, combineren met andere betekenisvolle onderdelen van een gebaar en zo een geleed gebaar vormen: een samenstelling. De handvormen in het NGT-gebaar voor ‘konijn’ zijn bijvoorbeeld betekenisvol. Zij duiden dingen aan die lang, plat en dun zijn (de oren van een konijn). Naast de handvormen zijn ook de andere onderdelen van het gebaar betekenisvol. De plaatsen waar de handen zich bevinden zijn de zijkanten van het hoofd. De vingers maken een trillende beweging. Letterlijk vertaald betekent het gebaar “twee lange platte dingen trillen aan de zijkanten van het hoofd”. Het Nederlands heeft een ongeleed woord om het dier in kwestie aan te duiden: *konijn*. In de NGT is dat blijkbaar niet zo; deze taal heeft daarvoor een tamelijk complexe samenstelling.

Dit soort samenstellingen in de NGT zit anders in elkaar dan de meeste samenstellingen in het Nederlands. In het Nederlands kun je vaak de betekenis van een samenstelling afleiden uit de betekenissen van haar delen. Zo is een *hoekhuis* een soort huis en een *balpen* een soort pen. Dit blijkt niet op te gaan voor een groot aantal samenstellingen in de NGT. *Twee platte dingen trillen aan de zijkant van het hoofd* zijn geen platte dingen, geen zijkanten en ook geen trillen. Het gebaar duidt een bepaald dier aan (dat zich wel kenmerkt door lange, trillende oren). Hierbij moet worden aangetekend dat het Nederlands heeft wel enkele vergelijkbare samenstelling heeft. Een voorbeeld daarvan is het woord *schreeuwlelijk*. Een *schreeuwlelijk* is geen soort lelijk en ook geen soort schreeuw. De samenstelling duidt een persoon aan (die zich wel kenmerkt door veel of luid te schreeuwen).

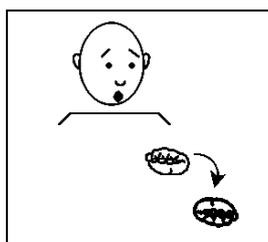
Een ander verschil met Nederlandse samenstellingen is het volgende. De delen van een samenstelling in het Nederlands kunnen zelfstandig voorkomen. De woorden *hoek* en *huis* kunnen gewoon als woorden in een zin worden gebruikt. Maar dat geldt niet voor de delen van zo'n samenstelling in de NGT: de handvorm kan niet zelfstandig als gebaar voorkomen. Dat geldt ook voor de plaats waar het gebaar wordt gemaakt en voor de activiteit in het gebaar.

Sommige gesproken talen hebben wel veel samenstellingen die lijken op die van de NGT, zoals het Mohikaans. Het Mohikaanse woord voor ‘konijn’ is bijvoorbeeld *tahuhtané:kv*. Dit is een samenstelling, die letterlijk betekent: *twee oren naast elkaar*. De onderdelen van zo’n samenstelling kunnen ook niet zomaar als woord voorkomen. *Ahuht* (oor) en *né:kv* (naast elkaar) moeten altijd gecombineerd worden met andere woorden of woorddelen.

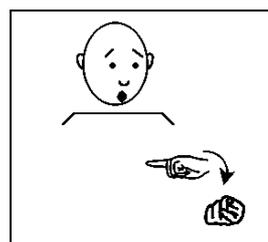
De tweede functie van betekenisvolle handvormen in de NGT verschilt nogal van de eerste. Betekenisvolle handvormen kunnen voorkomen op werkwoorden die een beweging van een mens, dier of ding aanduiden. Dit is te zien in de volgende voorbeelden uit de NGT:



‘(persoon) valt’



‘(boek) valt’



‘(potlood) valt’

Zij kunnen ook voorkomen op werkwoorden die het bestaan van een mens, dier of ding op een bepaalde plaats aangeven. De handvormen duiden aan *wat* het bewegende of bestaande ding is, bijvoorbeeld een persoon, een plat ding of een lang en dun ding. Daarom beschouw ik de handvormen die voorkomen op deze werkwoorden als *vervoegingen*. De meeste talen die wij kennen hebben vervoegingen voor persoon (ik, jij, hij) en getal (enkelvoud en meervoud). Het Nederlands kent ook vervoegingen, maar het aantal uitgangen is erg klein (bv. \emptyset , -t en -en in de tegenwoordige tijd). Daardoor hebben verschillende personen dezelfde uitgang:

ik werk_	wij werken
jij werkt	jullie werken
z/hij werkt	zij werken

De NGT verschilt van het Nederlands omdat het meer uitgangen heeft. De handvormvervoegingen in de NGT verschillen ook op een andere manier van de uitgangen van het Nederlands. Alle mensen (en dieren) kunnen dezelfde handvorm hebben. Er is dus geen verschil tussen een ik-persoon, een jij-persoon of een z/hij-persoon. In plaats daarvan is er een speciale handvorm die gebruikt wordt voor bezielde dingen (mensen en dieren). Er is een handvorm voor dingen met benen. Er zijn ook handvormen die de vorm van een ding aanduiden (zoals lange dunne dingen, ronde dingen en platte dingen). In dit opzicht lijken de vervoegingen in de NGT enigszins op die in Bantutalen: deze talen hebben ook speciale uitgangen voor bijvoorbeeld mensen (mannen en vrouwen), dieren en dingen met een bepaalde vorm. De volgende voorbeelden uit het Luvale illustreren dit:

Va-kweze j-etu **va-mu**-kwacile uze-m-wane wamu-pi
 1mv-jongere 1mv-onze **1ev-1mv**-vangen dat-1ev-kind 1ev-slecht
'Onze jongeren hebben dat stoute kind gevangen.'

Mu-nwe we-nyi u-mwe **u**-najimbi
 2ev-vinger 2ev-zijn 2ev-een **2ev**-gezwollen
'Zijn vinger is opgezet.'

Samenvattend: handvormen in gebarentalen (specifiek de NGT) hebben verschillende functies. Zij vormen 'bouwstenen' van een gebaar, zoals klanken bouwstenen zijn van woorden. In dit onderzoek heb ik aangetoond dat zij ook fungeren als delen van samenstellingen en als vervoegingen op een speciale groep werkwoorden. Zowel de NGT-samenstellingen als de NGT-vervoegingen verschillen sterk van de Nederlandse. Zij lijken op structuren in talen die niet aan het Nederlands verwant zijn, zoals Amerindiaanse talen (bv. het Mohikaans) en Afrikaanse talen (bv. het Bantu).

Curriculum Vitae

Inge Zwitserlood was born on 25 August 1964 in Venray. She obtained her VWO diploma from the Boschveldcollege at Venray in 1984. She qualified as a secretary in 1985, and subsequently worked for several years, including five years as an employee and systems manager at a notary public's office in Horst. After that, she studied at Utrecht University and obtained her Master's degree in Linguistics in 1996 (with a specialization in language and language structure and in sign linguistics). After completing her degree, she worked free-lance on an education method for deaf pupils in cooperation with the ScienceShop of Arts at Utrecht University and the Christelijk Instituut voor Doven "Effatha" (Christian Institute for the Deaf "Effatha"), currently the Effatha Guyot Group. This resulted in a teaching package 'Taal, Kijken en Doen' (Language, Watching and Performing). From 1997 to 2002 she was employed as a PhD student at the Utrecht institute of Linguistics OTS, where she carried out the research resulting in this thesis. Furthermore, she was one of the linguistic advisors for the exhibition on sign language "Kijk!Taal" (Watch!Language) at the University Museum in Utrecht, held in 1998/1999. In 2001-2002, she was also employed as a junior researcher in the project ViSiCAST at the Instituut voor Doven (Institute for the Deaf) in Sint-Michielsgestel, currently called Viataal. In Februari 2003 she started working as a senior researcher in the project eSIGN at Viataal.

