

The Indefinite Object in Mandarin Chinese: its Marking, Interpretation and Acquisition

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The Indefinite Object in Mandarin Chinese: its Marking, Interpretation and Acquisition

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van de Letteren

Proefschrift

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Abbreviations

1, 2, 3	First, second and third person
ANIM	Animate
ADJ	Adjective
ADV	Adverb
AUX	Auxiliary
CL	Classifier
DEF	Definite
DEM	Demonstrative
DOM	Differential object marking
ERG	Ergative
FUT	Futurum
HUM	Human
INAN	Inanimate
IND	Indicative mood
INF	Infinitive
INST	Instrumental
N	Noun
NCL	Nominal numeral classifiers
NEG	Negative
NP	Noun Phrase
NSPEC	Non-specific
NUM	Numeral
OBJ	Object
PERF	Perfective
PL	Plural
POST	Postverbal
PP	Prepositional Phrase
PRED	Predicate
PRON/PN	Pronoun
PRE	Preverbal
PRT	Particle
PROX	Proximitive
Q-NP	Quantified noun phrase
TR	Transitive
SG	Singular
SPEC	Specific

xiv Abbreviations

VCL	Verbal numeral classifiers
VP	Verb Phrase
V	Verb

Abstract

The subject of this dissertation is the indefinite object noun phrase (NP) in Chinese. In order to investigate whether language specific factors can be accounted for by language universal constraints, three aspects of the indefinite object are studied: its marking, its interpretation and its acquisition. I show that the characteristics of indefinite objects in Chinese are the result of a language specific ranking of general and independently motivated constraints of various nature.

In Chapter 3 I examine differential object marking in Chinese and conclude that features of both animacy and specificity influence this phenomenon, as has been argued for other languages (Aissen 2003). Strikingly however, in Chinese not the specific but rather the non-specific objects are obligatorily marked with the object marker *ba*, while *ba* is optional for specific objects. In order to explain this, I argued that in Chinese, apart from animacy and specificity, a third dimension plays a role in differential object marking, namely word order. That is, the preverbal position is associated with specific NPs, independently of whether they are subjects or objects. Thus scrambled objects (irrespective of the reason why they scrambled in the first place) are usually specific objects. Hence non-specific objects in scrambled position are ‘atypical’ and that is why they need to be *ba*-marked in Chinese.

In Chapter 4 I study the interpretation of object NPs in preverbal position in Chinese. Contrary to the traditional claim that only strong (specific) NPs may occur in the preverbal position marked with *ba*, I show that non-specific indefinite NPs in fact do occur in *ba*-constructions as well. I argue that the interpretation of indefinite objects in the *ba*-construction is influenced by the lexical properties of the object, its syntactic position and the type of predicate, and is conceived of as the optimal resolution of the interaction between the relevant universal, but potentially conflicting constraints.

In Chapter 5 I study the acquisition of one type of indefinite object in Chinese, *viz.* *yi-CL N*. Universally, children tend to interpret indefinite NPs with a non-specific reading which can also be described as a narrow-scope reading in case of a scope relation between quantifiers. However, in previous acquisition studies of *yi-CL N*, it has been claimed that Chinese children initially (at least up to the age of 4) have a default non-scopal reading, due to the fact that *yi-CL N* is used both as an indefinite and as a numeral phrase in Chinese and is interpreted with a numeral reading in early stages. The results of two experiments I conducted show that Chinese children initially interpret indefinites with a non-specific reading or a scope dependent reading, just like Dutch and English children. A comparison between the Dutch and Chinese results shows that there are more non-narrow scope readings in Chinese than in Dutch. I therefore argue that language specific factors, in particular word order and the presence or absence of numerals, play a role from early stages on, but that these factors only lead to adult-like patterns of interpretation when the initial preference wanes.

These three aspects of indefinite objects, which at first sight show rather special language specific properties, can nevertheless all be accounted for in terms of the interaction between universal constraints in an Optimality Theoretic analysis. Language specific properties of indefinite objects in Chinese can be captured by a language specific ranking of universal, conflicting constraints.

Chapter 1

Introduction

1.1 Overview

One of the central issues in theoretical linguistics is the question to what extent the properties of individual languages are universal and to what extent they are idiosyncratic. As human languages have a number of properties in common, it is claimed by Chomsky (1981) that a Universal Grammar (UG) – a set of principles and rules that are elements or properties of all human languages – is innate in the mind of every human being as part of our genetic endowment. Rules in UG are principles that cannot be violated and they underlie all natural language grammars. Next to universal principles there are binary parameters, which languages may set independently. Particular language grammars are determined by the setting of these parameters.

An alternative account for language universals and language variation employed in this dissertation is Optimality Theory (OT) developed by Prince & Smolensky (1993/2004). In OT, UG is considered to be a system of interacting principles or constraints. Constraints in OT are universal but not absolute: they are potentially conflicting and may be violated in order to satisfy higher ranked constraints. The ranking of constraints is language specific: language variation is accounted for by different constraint rankings.

The subject of this dissertation is the indefinite object noun phrase (NP) in Chinese. In order to investigate whether language specific factors can be accounted for by language universal constraints, three aspects of the indefinite object are studied in this dissertation: its marking, its interpretation and its acquisition. Before giving an overview of these three main concerns in Section 1.6, I will first provide some background information on the indefinite object in Chinese and I will discuss some basic assumptions in this study about indefinite NPs. There are two interesting aspects of definiteness that will be dealt with in turn in this first chapter: (i) definiteness as a

grammatical category and (ii) definiteness from an interpretational and pragmatic perspective. Traditionally, Chinese is considered to be a language without (in)definite articles, as opposed to a language such as English. However, following Chen (2003), I believe that definiteness as a grammatical category does exist in Chinese. Section 1.2 is devoted to indefinite marking in Chinese. Section 1.3 deals with the distribution of indefinite NPs in Chinese. This section will briefly touch upon the topic of object marking (*ba*-marking) in Chinese. Attention will then shift towards the interpretational and pragmatic understanding of definiteness. In Section 1.4 the focus lies on the specificity of indefinites, a crucial notion in this study. Indefinites do not only display lexical ambiguity between specific and non-specific readings, they exhibit scope ambiguity as well. Section 1.5 introduces the relevant notions concerning the scope of indefinite NPs. The sixth and final section of Chapter 1 gives an overview of the organization of this dissertation and introduces the three main concerns of this study: the marking, interpretation and acquisition of indefinite objects in Chinese.

1.2 Indefinite-marking in Chinese

In English, NPs can be syntactically marked with (in)definite articles. NPs marked with the definite article *the* are called definite NPs. NPs marked with the indefinite article *a* or *an* are called indefinite NPs. Traditionally, Chinese is considered to be an article-less language, which means that there are no overt (in)definite articles. This view has been challenged by recent scholars and now linguists tend to accept that definiteness is overtly marked in some way in Chinese as well. First, let us have a look at NP forms in Chinese as presented in Table 1:

Table 1. *NP forms in Chinese*

NP	Form	Example	English
Demonstratives	Demon.-(CL)	<i>zhe-(ge)</i> , <i>na-(ge)</i>	this, that
Proper Names	Proper Name	<i>Zhang San</i>	Zhang San
Pronouns	Pron Pron.-Plural Marker	<i>wo</i> <i>wo-men</i>	I we
Possessives	N de N	<i>xuesheng de shu</i>	a student's book(s)/students' book(s)
	Pron. de N	<i>wo de shu</i>	my book
Bare nouns	N	<i>shu</i>	book(s)
	N-Plural Marker	<i>gongren- men</i>	workers
Numeral phrases	Number-CL N	<i>yi-ge hezi</i> <i>san-ge hezi</i>	one box three boxes
	(<i>yi</i>)-CL N	<i>na (yi)-ge hezi</i>	take a box
Indefinites	<i>yi</i> -CL N	<i>yi-ge hezi</i>	a box
	(<i>yi</i>)-PluralCL N	<i>na (yi)xie hezi</i>	take some boxes
Quantifiers	<i>yi</i> -PluralCL N	<i>yixie hezi</i>	some boxes
	Quantifier-CL N	<i>mei-ge hezi</i>	every box

In the table above, demonstratives, proper names, pronouns and possessives are considered to be definite. Bare nouns and numeral phrases are underspecified for definiteness. They can receive a definite interpretation or an indefinite interpretation depending on the linguistic and pragmatic context. NPs marked with *yi* get an indefinite interpretation.

It is not clear whether the category of indefinites should be incorporated into the category of numeral phrases in Table 1, because *yi*-CL N is also considered to be a numeral phrase. As the example in (1) shows, *yi* in Mandarin is indeed a numeral, like *one* in English:

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- (1) *Yi jia san dengyu si.*
one plus three equal to four
'One plus three equals four.'

However, I believe that we should make a distinction between the indefinite *yi*-CL N and the numeral *yi*-CL N, because the indefinite *yi*-CL N can show up in positions in which the numeral *yi*-CL N does not occur.

As is well known, Chinese is a language with classifiers. A numeral phrase is an NP in which a numeral is combined with a classifier and a head noun. *Yi*-CL N is called a singular numeral phrase in the literature. However, just as *yi* itself has more meanings than only the numeral, *yi*-CL N is more than just a simple numeral phrase. For instance, *yi*-CL N can occur in the following syntactic positions, whereas other numeral phrases cannot:

- (2) *Haizimen xihuan yi-ge /*san-ge ren sikao.*
children like one-CL/three-CL people think
'The children love to think by themselves.'

The expression *yi-ge ren* in (2) means 'by oneself' and does not serve as a numeral phrase. When *yi*-CL N is an object in a negative context, it occurs before the negated predicate, with the quantifier *ye* inserted. Other numeral phrases cannot occur in that position, as (3) demonstrates:

- (3) *Zhe san-ge haizi yi-ben /*san-ben shu ye meiyou mai.*
these three-CL children one-CL /three-CL book YE
not-have buy
'These three children bought no books at all.'

In (4), *yi*-CL N is used as an indefinite NP with a predicative meaning.

- (4) *Tamen xiang dang yi-ming /*san-ming jiaoshi.*
they want become one-CL /three-CL teacher
'They want to become a teacher.'

In the above examples it is shown that NPs marked with *yi* behave differently in many ways from a normal numeral phrase. In these contexts, *yi* functions as the indefinite article *a/an* in English. This is a function of *yi* that other numeral phrases do not have. An NP of the form of CL N is generally considered to be an indefinite NP (Paris 1981, Cheng & Sybesma 1999, 2000):

- (5) *Gei wo ge hezi.*
 give I CL box
 ‘Give me a box.’/ * ‘Give me three boxes.’

In (5), when the object noun is modified with a bare classifier, it means ‘any box’. CL N is claimed to be a reduction of *yi*-CL N, since it can never mean more than one. Besides, adding *yi* before CL N will not affect the meaning of the sentence, as shown in (6).

- (6) *Gei wo yi-ge hezi.*
 Give I one-CL box
 ‘Give me a box.’

However it has also been argued that CL N should not be considered a phonological reduction of *yi*-CL N (see Cheng & Sybesma 1999 for a detailed discussion).

Notoriously, the indefinite *yi* is also different from the numeral phrase *yi* in terms of its pronunciation. The numeral *yi* in (7) is tonic while the indefinite *yi* in (6) above is unaccented.

- (7) *Gei wo yi-ge hezi jiu gou le.*
 give I one-CL box PRT enoughPRT
 ‘Give me one box and it is enough.’

So far, I have demonstrated my view that indefinites are lexically marked by *yi*-CL or (*yi*)-CL in Chinese. Contrastingly, bare nouns and numeral phrases in Chinese are underspecified for definiteness. The definiteness of these NPs is determined by contextual factors such as word order and pragmatic context.

1.3 Distribution of indefinite NPs

The distribution of definite and indefinite NPs in English is not exactly the same. For instance, not all indefinite NPs can occur in sentence initial topic position, while definite NPs can:

(8) This film, I like it very much.

(9) *A film, I like it very much.

Apart from this difference, indefinite NPs in English do not differ much from definite NPs in terms of syntactic distribution. Indefinite NPs can occur in the subject position, the object position (including the direct and indirect object, or the object of a preposition), and the predicative position of a sentence. For Chinese, however, it has been claimed that indefinite NPs have a more restricted distribution (Li & Thompson 1981) than definite NPs. Indefinite NPs rarely occur in preverbal position. They are more likely to occur in postverbal position, as shown in examples (10)-(12):

(10) *Na-ge ren lai le.*
that-CL man come PRT
'That man came.'

(11) **Yi-ge ren lai le.*
one-CL man come PRT
'A man came.'

(12) *Lai le yi-ge ren.*
come PRT one-CL man
'A man came.'

The above examples show that the indefinite NP *yi-ge ren* 'a man' as a subject cannot occur in the preverbal subject position while a definite NP can. In (12), *yi-ge ren* 'a man' is in postverbal position and the sentence is well-formed. Similarly the indefinite object in (14) cannot

be preposed to the topic position, whereas in (13) the definite object can be preposed. When it stays in postverbal object position in (15), the sentence is well-formed.

- (13) *Zhe-bu dianying wo hen xihuan. Wo kan le*
 this-CL film I very like I watch PRT
san-bian.
 three-time
 ‘This film, I like it very much. I watched it three times.’
- (14) **Yi-bu dianying wo hen xihuan. Wo kan le*
 one-CL film I very like I watch PRT
san-bian.
 three-CL
 *‘A film, I like it very much. I watched it three times.’
- (15) *Wo hen xihuan yi-bu dianying, wo kan le*
 I very like one-CL film I watch PRT
san-bian.
 three-CL
 ‘I like a film very much, I watched it three times.’

A definite object NP can scramble from a postverbal position to a preverbal position, while an indefinite object cannot scramble in this direction, as shown in (16)-(18):

- (16) *Wo zhe-jian yifu xi le.*
 I this-CL dress wash PRT
 ‘I washed this dress.’
- (17) **Wo yi-jian yifu xi le.*
 I one-CL dress wash PRT
 ‘I washed a dress.’
- (18) *Wo xi le yi-jian yifu.*
 I wash PRT one-CL dress
 ‘I washed a dress.’

The above examples support the idea that indefinite NPs have a restricted distribution in Chinese. Indefinite NPs are not allowed in (11), (14) and (17) unless licensed otherwise. The existential predicate *you* ‘have/exist’ can, for instance, license the indefinite NPs to occur preverbally, as in (19)-(21):

- (19) *You yi-ge ren lai le.*
 have one-CL man come PRT
 ‘A man came.’
- (20) *You yi-bu dianying wo hen xihuan. Wo kan le san-bian.*
 have one-CL film I very like I watch PRT
 three-time
 ‘There is a film I like very much, I watched it three times.’
- (21) *Wo you yi-jian yifu xi le.*
 I have one-CL dress wash PRT
 ‘I have a dress washed.’

In Tsai (2001), *you* in (19)-(21) is called ‘presentational *you*’, which is a verbal element (modal or auxiliary), functioning as a sentential operator. Other ways of licensing indefinite subjects include the use of a modal construction as in (22) and a relative clause construction as in (23) (Lee 1986, Yang 2005):

- (22) *Yi-ge xuesheng neng chi liang-ge pingguo.*
 one-CL student can eat two-CL apple
 ‘One student can eat two apples.’
- (23) *Yi-ge ren zhu de sushe bijiao xiao.*
 one-CL person live PRT dorm comparatively small
 ‘The dormitory for one person is smaller.’

A way of licensing a scrambled indefinite object is to mark it with a morpheme *ba*, as shown in (24):

- (24) *Wo ba yi-jian yifu xi le.*
 I BA one-CL dress wash PRT
 ‘I washed a dress.’

It has been claimed that indefinite NPs marked with *ba* such as in (24) get a specific reading, and also that indefinite NPs following *you* such as in (19)-(21) get a specific reading (Tsai 2001) or are ambiguous between a specific and a non-specific reading (Yang 2005). As for the indefinite NPs in (22)-(23), they are believed to get a numeral reading. In the previous section, we mentioned that numeral phrases in Chinese are underspecified for definiteness, just like bare nouns. This is because in Chinese, numeral phrases can get a definite interpretation in some cases, as in (25):

- (25) *San-ge pingguo dou huai le.*
 three-CL apple all go-bad PRT.
 ‘The three apples went bad.’

In many cases, numeral phrases are ambiguous between a specific and a non-specific interpretation. Traditionally, specificity is based on identifiability, a pragmatic notion. The indefinite NP is specific if the speaker can identify the referent(s) denoted by the indefinite NP. However, such a definition has been widely discussed and criticized. In the following section, I will give a general introduction to the notion of *specificity* and I will explain how I am going to use it in this study.

1.4 Specificity of indefinite NPs

As Dekker and Piñón (2001) write in their introduction to a Special issue on Indefinites in the *Journal of Semantics*: “The meaning of indefinite expressions has for long been a controversial issue that has attracted the attention of linguists, philosophers, and logicians” (Dekker and Piñón 2001: 179). Specificity is one of those issues that make the study of indefinites so complex. Usually, a distinction is made between indefinite and definite NPs. It is assumed that definite NPs are more restricted in their meaning than indefinite NPs, i.e., they refer to a specific referent the speaker has in mind, or to put it differently, their reference is uniquely determined (see for example

van der Does and de Hoop 1998). In English, this is illustrated by the difference between (26) and (27) for example.

(26) Peter ate an apple.

(27) Peter ate the apple.

Sentence (26) is assumed to be true if there is an apple, such that Peter ate it, but it does not matter which apple Peter ate. By contrast, sentence (27) presupposes the existence of a particular (unique) apple and the sentence is only true if Peter ate that particular apple. Definite NPs thus seem to be always specific, whereas indefinites are mostly non-specific. However, things are not as clear-cut as the distinction between definite and indefinite NPs would suggest, not even in English. For example, there are also definite NPs that get a non-specific interpretation, such as in (28) and (29) below (cf. van der Does and de Hoop 1998):

(28) I might take the bus.

(29) They took her to the hospital.

Although *the bus* and *the hospital* are definite in form, it is unlikely that the speaker has a specific referent in mind when uttering the sentence. Likewise, an indefinite NP can be used even when the speaker does have a specific referent in mind (cf. de Hoop 1996):

(30) A cousin of mine is pregnant.

Sentence (30) presumably means that there is one particular cousin of the speaker that is pregnant. Despite this specific reading, however, an indefinite NP is used. The reason for the use of an indefinite NP is probably that the speaker has more than one cousin, and this excludes the use of a definite NP here. Thus, it is not the case that a specific indefinite can always be replaced by a definite NP. That is, (30) gets a different reading than (31), as (31) is only felicitous if the speaker has exactly one cousin, who happens to be pregnant, while *a cousin of mine* in (30) leaves open the possibility that the speaker has more cousins, even though only one of them is pregnant:

(31) My cousin is pregnant.

Similarly, sentence (27) above, repeated below as (32) does not have exactly the same interpretation as (33):

(32) Peter ate the apple.

(33) Peter ate a particular apple.

However, in languages that do not have a definite article, such as Chinese, it can be hard to actually make a distinction between a ‘definite reading’ and a ‘specific reading’. Usually, specific indefinites can be translated by definite determiners, and so the translation might already give an indication of whether a specific or a non-specific reading is intended.

Several tests can be applied to find out whether a specific or a non-specific reading is intended for an indefinite NP in general. Although neither of these tests seems to be absolutely waterproof, at least they give an idea of what the difference between specific and non-specific indefinites is all about. I will now discuss four tests that apparently can make a distinction between specific and non-specific readings of indefinite NPs.

1. *Adding ‘particular’/‘certain’ or using a definite instead of an indefinite NP*

When a specific reading is intended, an adjective like *particular* or *certain* can be used, or the indefinite article can be replaced by a definite article. This was already illustrated above, but the examples are repeated once more in (34) and (35):

(34) Non-specific: Peter ate an apple.

(35) Specific: Peter ate a (particular) apple./ Peter ate the apple.

2. *Bare plural test*

A bare plural in English cannot get a specific reading (unless a generic reading is intended, which is sometimes also called a type of ‘specific’ reading). So, make the indefinite NP plural, and if it is naturally replaced by a bare plural, then it apparently has a non-specific reading (while if it cannot be naturally replaced by a bare plural, this indicates that it rather gets a specific reading):

- (36) Non-specific: Peter ate an apple. → Peter ate apples.
 (37) Specific: A cousin of mine is pregnant. → #Cousins of mine are pregnant./ My cousins/Some cousins of mine are pregnant.

Note that in Chinese, where there is no morphological distinction between singulars and plurals, if a translation is possible where a bare noun is translated by a bare plural in English, this indicates that the bare noun in Chinese gets a non-specific reading indeed:

- (38) *Zhang San chi pingguo le.*
 Zhang San eat apple PRT
 ‘Zhang San ate an apple/apples.’

Similarly, in West Greenlandic, a bare noun can be incorporated in the predicate and gets a non-specific reading, either singular or plural (Van Geenhoven 1996):

- (39) *Arnajaraq ipili-tur-p-u-q.*
 Arnajaraq apple-ate-IND-[-TR]-3SG
 ‘Arnajaraq ate an apple/apples.’

Whereas the Greenlandic example clearly shows syntactic incorporation of the indefinite NP into the predicate, Van Geenhoven (1996) assumes that the singular indefinites (in bold) in the following Dutch, German and English examples are also non-specific (predicative) expressions that are semantically incorporated (“absorbed”) into the predicate:

- (40) dat Peter gisteren **een televisie** heeft gekocht.
- (41) daß Peter gestern **einen Fernseher** gekauft hat.
- (42) that Peter bought **a TV** yesterday.

3. *Anaphoric reference*

If an indefinite NP is used for non-specific reference, it is more likely that it will function as the antecedent for an indefinite anaphoric pronoun than for a definite anaphoric pronoun. Thus, we can make a distinction between a non-specific indefinite and a specific definite by using two different types of continuation, as illustrated in (43) and (44) below:

- (43) Non-specific: Peter saw **a girl** and Richard saw **one** too.
- (44) Specific: Peter saw **a girl** and Richard saw **her** too.

Again, this test is not waterproof, since even incorporated nouns in West Greenlandic can antecede a definite pronoun (Sadock 1980, Van Geenhoven 1996):

- (45) *Suulut timmisartu-lior-p-u-q. Suuluusa-qar-p-u-q*
 Søren airplane-made-IND-[-TR]-3SG wing-have-IND-[-TR]-3SG
aquute-qar-llu-ni-lu.
 rudder-have-INF-3SG.PROX-and
 ‘Søren made **an airplane**. **It** has wings and a rudder.’

Thus, although incorporated indefinite NPs as in (45) clearly get a non-specific (non-presuppositional) interpretation, this does not mean that they cannot function as an antecedent for anaphoric reference.

4. *Scope*

Indefinite NPs cannot only vary in their specificity, but also in their scope. Usually, these two dimensions go hand in hand, in that non-specific indefinites have narrow scope, while specific indefinites have wide (or at least, non-narrow) scope. In Van Geenhoven’s (1996)

approach, the verb is responsible for the existential reading of the incorporated indefinite NP and this explains why the indefinite always receives a narrow scope reading when the verb itself is in the scope of an operator, such as negation. Thus, the indefinite object in sentence (46) in West Greenlandic can only get a narrow scope reading (as in (a)), and not a non-narrow scope reading (as in (b)) and this is argued to be a direct consequence of the semantics of the incorporated indefinite (which gets a predicative, property-denoting interpretation) (Van Geenhoven 1996: 192):

- (46) *Arnajaraq aalisaga-si-nngi-l-a-q.*
 Arnajaraq fish-buy-NEG-IND-[-TR]-3SG
 a. 'It is not the case that Arnajaraq bought (a) fish.'
 b. *'There is a fish/are fish that Arnajaraq didn't buy.'

However, as pointed out by Schwabe and von Heusinger (2001), the two dimensions, specificity and scope, do not necessarily coincide. They present (47) as an example of an indefinite object which receives a wide scope but non-specific interpretation, while they give (48) as an example of an indefinite object which receives a narrow scope but specific interpretation:

- (47) Every artist admires **a painting by Picasso**. It must be a famous picture, but I do not know it.
 (48) Every artist admires **a painting by Picasso** – their favourite one. The paintings were painted between 1901 and 1920.

The scope of indefinites will be discussed further in Section 1.5 below.

Above I discussed four tests to distinguish between specific and non-specific readings of indefinite NPs. It was clear that none of these tests is waterproof, thus the notion 'specificity' is still not unequivocal. In formal semantic approaches of indefinites, different analyses have been proposed to analyse different readings of indefinites, in terms of existential quantifiers, novel discourse referents, predicates, or choice functions. In this thesis I will follow Partee (1987), Van Geenhoven (1996), and van der Does and de Hoop (1998) in their claim that the non-specific (predicative) reading is the

default reading of indefinite NPs and that this non-specific reading corresponds to the semantic type $\langle e, t \rangle$. That is, a non-specific indefinite denotes a property, a set of individuals, or a function from individuals (e) to truth values (t). I furthermore assume specific (referential) indefinites to be of type e (referential) or $\langle \langle e, t \rangle, t \rangle$ (quantificational).

So far, I only discussed the non-specific and specific readings of indefinite objects of extensional verbal predicates (such as *ate* and *bought*). Van Geenhoven (1996) shows that an incorporated object of an intensional predicate (such as *look for*) only allows for a non-specific reading (also called a *de dicto* reading in intensional contexts), as illustrated by the following example (Van Geenhoven 1996: 201):

- (49) *Vittu cykili-ssar-siur-p-u-q.*
 Vittu bike-FUT-look-IND-[-TR]-3SG
 a. ‘Vittus is looking for an (arbitrary) bike.’
 b. *‘There is a specific bike that Vittus is looking for.’

Van Geenhoven argues that the property introduced by the noun *bike* is the internal argument of the intensional predicate *look for* in the above example. In her approach “an intensional verb is semantically incorporating par excellence: it absorbs a property as its argument” (Van Geenhoven 1996: 202). Note that this not only holds for lexically intensional verbal predicates such as *look for* but also for predicates that are intensional because they are in the scope of a modal affix. Van Geenhoven claims that in the following sentence the instrumental partitive NP is also interpreted as a property (hence as a non-specific indefinite), even though it is the property of being a member of a familiar (specific) set of students:

- (50) *Atuartu-t ila-an-nik ikiu-i-sariaqar-p-u-nga.*
 Student-ERG.PL PART-3PL.SG-INST.PL help-AP-must-IND-[-TR]-
 1SG
 ‘I must help one of the students (any one will do).’

I follow Van Geenhoven in her claim that the basic denotation of intensional predicates is semantically incorporating, which means that

they preferably combine with a property-denoting, i.e., non-specific, reading of an indefinite object. I assume that this holds both for lexically intensional verbs as for extensional verbs in the scope of a modal auxiliary or other intensional operator. Thus, I would like to claim that the preferred reading of the indefinite NP in the English sentence (51) as well as in its Chinese counterpart (52) is a non-specific reading:

(51) Peter can eat up an apple.

(52) *Peter neng chi-wan yi-ge pingguo.*
 Peter can eat-finish one-CL apple
 ‘Peter can finish an apple.’

Now let us turn to the scope of indefinites, a topic which will become particularly important in Chapter 5 of this thesis.

1.5 The scope of indefinite NPs: an elaboration

The Picasso examples in (47) and (48) in the previous section already showed that indefinite objects can receive a wide scope but non-specific interpretation as well as a narrow scope but specific interpretation (Schwabe and von Heusinger 2001). Yet, in the classical approach to specificity, specificity and scope are assumed to go hand in hand, as illustrated for the indefinite object *a woman* in example (53):

(53) Every man saw a woman.

- (53’) a. For every man, each man saw a woman (more women might have been involved).
 b. There is one particular woman that every man saw.

A woman can both be interpreted as ‘a (non-specific) woman’, as in (53’a), or ‘a particular woman’, as in (53’b). In formal logic, the relation between quantifiers can be represented in terms of scope relations. The two interpretations in (53’) are expressed by the following logical representations or formulas. The universal quantifier

and the existential quantifier are represented with \forall and \exists respectively:

- (54) a. $\forall x (\text{Man}(x) \rightarrow \exists y (\text{Woman}(y) \wedge \text{See}(x, y)))$
 b. $\exists y (\text{Woman}(y) \wedge \forall x (\text{Man}(x) \rightarrow \text{See}(x, y)))$

In a formula that contains multiple quantifiers such as (54a) or (54b), the linear order of the quantifiers determines their relative scope. The one appearing to the left has wide scope, and the one appearing to the right has narrow scope. However, the quantifier structure in natural language cannot be completely described by such linear order principles. A quantifier like the indefinite in (53) can either take wide scope or narrow scope regardless of the linear order of the constituents. Therefore we have two possible interpretations of sentence (53), represented by the two formulas in (54a) and (54b).

Not all ambiguity of indefinites can be explained by different scope relations. For instance, the interpretation in (53'b) can be a *type similarity reading* (Jiang 1998), in which the existential quantifier takes narrow scope under a universal quantifier: for every man, each man saw a woman and it turns out that they coincidentally saw the same person. In this case, (53'b) can represent the interpretation of a narrow scope indefinite and at the same time, the interpretation of a non-narrow scope indefinite. Representation (54b) entails (54a). Jiang (1998) argues that a type similarity reading is not the same as a specific reading of an indefinite. In the former case, the speaker may not be aware of the fact that the selected set is a singleton and therefore has no specific entity in mind. In the latter case, the speaker has a particular entity in mind. However, there is no plausible way to test whether one is dealing with a type similarity reading or a specific reading. In the same vein, when an indefinite interacts with a quantifier of frequency, a type similarity reading can be obtained:

- (55) Donald rolled a ball twice.
- (55') a. Donald rolled two balls. (twice > a ball)
 b. Donald rolled one ball, and rolled it again. (a ball > twice)

Krämer (2000) argues that rolling one ball twice does not necessarily equal a non-narrow scope reading of the indefinite. It is possible for Donald to have rolled two balls, the two balls coincidentally turning out to be the same one. Therefore, we need to be careful in assigning a wide scope reading to a singular indefinite.

In quantifier scope studies in Chinese linguistics, different notions are used for the different interpretations of *yi*-CL N. Lee (1986) argues that there are two readings: referential and non-referential. Fan (2005) claims that *yi*-CL N has the numeral reading meaning ‘exactly one’ when it behaves as a numeral phrase. Li (1996, 1998) classifies numeral expressions into two categories: a category with an individual denoting reading and a category with a quantity denoting reading. Su (2001) claims that in child language *yi*-CL N has a quantity denoting reading. The interpretations of *yi*-CL N are generally described in correspondence to the scopal readings they receive: *yi*-CL N takes a non-narrow scope or is scope-independent when it has a referential reading, a numeral reading, or a quantity denoting reading; it takes narrow scope when it is non-referential. Since these notions are defined differently in the studies discussed above, it is necessary to decide which notions are to be used in the present study.

For instance, both the interpretations in (53’a) and (53’b) are compatible with the numeral reading (‘exactly one’) of *yi*-CL N in Chinese, as given in (56’c):

(56) *Mei-ge haizi dou chi le yi-kuai dangao.*
 every-CL child all eat PRT one-CL cake
 ‘Every child ate a cake.’

- (56’) a. For every child, each ate a cake, hence more than one cake was eaten.
 b. There is a particular cake that every child ate.
 c. There is exactly one cake that every child ate.

When *yi-CL N* is used as a numeral phrase, it is comparable to *one N* in English. It means that the number of objects involved in an event is one. Interpreting sentence (56) as in (56'c), *exactly one cake* can still refer to either 'exactly one' cake for each child, or 'exactly one' cake shared by all children. Therefore, the numeral reading of *yi-CL N* does not equal the specific reading of *yi-CL N*.

Su (2001) considers *yi-CL N* in child language to be a quantity-denoting numeral expression that is scope-independent. She also states that the quantity denoting reading of *yi-CL N* is not necessarily relevant with respect to the specificity of *yi-CL N*. Specificity in her approach is defined according to the speaker's knowledge of the reference. An indefinite is specific if the speaker knows what the indefinite refers to while the hearer may not know. The quantity denoting reading only concerns the quantity denoted by *yi-CL N*, ignoring the speaker's knowledge of the reference. The quantity denoting reading of *yi-CL N*, as a matter of fact, is another version of the numeral reading of *yi-CL N*, both meaning 'one'. In the case of (56), again, both interpretations in (56'a) and (56'b) can be compatible with the quantity denoting reading; the type similarity reading is compatible with the interpretation in (56'b). Therefore, just like the numeral reading of *yi-CL N*, the quantity-denoting reading of *yi-CL N* does not necessarily indicate that *yi-CL N* takes wide scope. In Su's view, the quantity denoting reading is not a wide scope reading, but a *scope-independent* reading.

A scope dependent reading means that the interpretation of a quantifier with a narrower scope depends on the quantifier with the wider scope. As for the scope independent reading, consider example (57) taken from Jiang (1998), which is comparable with the four situations listed in (57')

(57) Two teachers marked six scripts.

- (57')
- a. Each of the two teachers marked six different scripts. So twelve scripts were marked by two teachers in all.
 - b. Two teachers marked six scripts together. e.g. One teacher went through all the scripts. Then the other one went through them again. Or they looked at each page together. Or they were each responsible for certain parts of each script.
 - c. Altogether, six scripts were marked by two teachers. One teacher marked five scripts. The other only marked one.
 - d. Each script was marked by two different teachers. So six scripts were marked by twelve teachers in all.

Scope dependent readings are shown in (57'a) and (57'd). In (57'a), the subject has a distributive reading. In this case, the object takes a narrow scope reading and is dependent on the subject. In (57'd), the object has a distributive reading and the subject is dependent on the object. In (57'b) and (57'c), the interpretation of the object is independent of the subject with a complete group reading in (57'b) and an incomplete group reading in (57'c). Normally, a numeral expression has quantificational force over an individual predicate. For instance, *two teachers worked* is interpreted as 'the number of the teacher who worked is two'. This is termed the "individual-denoting reading" in Li (1996, 1998). When the expression *two teachers* takes a group reading, it means 'one group of two teachers'. In this case, *two teachers marked six scripts* is interpreted as 'there is one group of teachers who marked six scripts, and there are two teachers in this group.' The group readings in (57'b) and (57'c) are scope independent readings. A group reading is sometimes called a "cumulative reading" or a "collective reading", in contrast with a distributive reading. It is dubbed the "quantity denoting reading" in Li (1996) and Su (2001). In the Chinese counterpart of (58), a distributive reading is available for neither subject nor object:

(58) *Liang-ge laoshi gai le liu-fen kaojuan.*
 two-CL teacher mark PRT six-CL scripts
 ‘Two teachers marked six scripts’

- (58’) * a. Each of the two teachers marked six different scripts. So twelve scripts were marked by two teachers in all.
 * b. Each script was marked by two different teachers. So six scripts were marked by twelve teachers in all.

Li claims that the quantifier in the subject position of (58) is a quantity denoting numeral expression and is scope independent: it does not have scope interaction with other quantifiers. Therefore, no distributive readings are available in a sentence like (58) in Chinese.

Although different notions are employed in the previous studies, the scope relations are mainly represented having either wide or narrow scope. But as we have seen, the non-narrow scope reading can actually be a true wide scope reading, a narrow scope reading with type similarity, a scope-independent reading, or a cumulative reading. Therefore I believe that differences in scope cannot account for all ambiguity of indefinites. In this dissertation, I will use the term *narrow scope reading* to refer to the non-specific reading of indefinites and the term *non-narrow scope reading* for the other interpretations. I am fully aware that the non-narrow reading has multiple interpretations, in other words, that it could be a wide scope reading, a narrow scope reading with type similarity, or a cumulative reading.

So far, I have introduced several basic and crucial notions that are used in my dissertation. In the following section, I will describe the three main concerns of my study.

1.6 Main concerns

1.6.1 Ba-marking

The first concern is the marking of the indefinite object in Chinese. Notoriously, SVO word order is the main indicator for the

grammatical functions of the constituents in Mandarin Chinese. Although word order in Chinese is rather strict, the language sometimes allows or even forces direct objects to occur in a preverbal position. As various authors have pointed out (Chao 1968; Huang 1982; Travis 1984; Sybesma 1992) the verb in a Chinese sentence can be followed by one constituent only. This is called the Postverbal Constraint. In the example in (59) below, we see that when the verb *fang* ‘put’ is followed by two constituents the sentence becomes ungrammatical:

- (59) **Wo fang qiu jin lanzi li le.*
 I put ball into basket inside PRT
 ‘I put the ball/the balls into the basket.’

In cases like these, the direct object obligatorily occurs on the left side of the verb, where it is preceded by a morpheme *ba*:

- (60) *Wo ba qiu fang jin lanzi li le.*
 I BA ball put into basket inside PRT
 ‘I put the ball/the balls into the basket.’

In other cases, the object can optionally be scrambled from post- to preverbal position, where it is also preceded by *ba*, like in sentence (61):

- (61) *Ta ba na-ge pingguo chi le.*
 he BA that-CL apple eat PRT
 ‘He ate that apple.’

Ba originally is a lexical verb, meaning ‘to hold, to take’. In the literature, there has been a lot of debate about the current status of *ba*. *Ba* has been treated either as a matrix verb (Hashimoto 1971), a preposition (Chao 1968; Travis 1984; Li 1990) or as a case marker (Huang 1982, 1990; Koopman 1984; Goodall 1987). Li (1990) claims that *ba* not only assigns a case but also assigns a thematic role to the *ba*-NP, the latter resulting in a more ‘affected’ reading of the NP. *Ba* is

treated as a preposition in this approach, and the interpretation of the *ba*-NP is affected by *ba*. However, cases in which *yi*-CL N occurs in the *ba*-construction (henceforth *ba*-NP) do not support this claim. Consider examples (62) and (63) below. When the indefinite object NP *yi-ge pingguo* ‘an apple’ occurs in the preverbal position, *ba* is not optional:

(62) *Ta ba yi-ge pingguo chi le.*
 he BA one-CL apple eat PRT
 ‘He ate an apple.’

(63) **Ta yi-ge pingguo chi le.*
 he one-CL apple eat PRT
 ‘He ate an apple.’

In (63), the indefinite object NP is not allowed to scramble if it is not marked by *ba*. However, the interpretation of the indefinite object is not affected by *ba*. The indefinite object maintains its non-specific reading in (62). If we change the predicate *chi* ‘eat’ into an accomplishment predicate *chi-wan* ‘eat-finish’, or add *dou* ‘all’ to the indefinite object NP, this will yield grammatical sentences:

(64) *Ta (ba) yi-ge pingguo chi-wan le.*
 he BA one-CL apple eat-finish PRT
 ‘He finished a (particular) apple.’

(65) *Ta (ba) yi-ge pingguo dou chi le.*
 he BA one-CL apple all eat PRT
 ‘He ate all of the apple/the whole apple.’

In both (64) and (65), the scrambled indefinite object NP gets a specific reading. However, the specific reading is not triggered by *ba*: in (64) it is the accomplishment predicate that gives rise to a specific reading of the indefinite NP, while in (65) it is the operator *dou* that makes the indefinite NP specific. Note that the *ba*-marking becomes optional when the indefinite has a specific reading. These data are

problematic for the claim that *ba* itself affects the interpretation of the *ba*-NP.

In this dissertation I will follow Huang (1990) and claim that *ba* is a case-marker. An argument against the treatment of *ba* as a case-marker is that *ba* is only inserted before some direct objects in certain contexts and not before all direct objects in all instances. Direct objects in their canonical position are never marked with *ba* in Chinese, whereas in the preverbal position, some objects are obligatorily marked and others are optionally marked. These findings are not problematic for the view of *ba* as a case-marker, however, if we agree that there is differential object marking (DOM). As Aissen (2003) points out, “it is common for languages with overt case-marking of direct objects to mark some objects, but not others, depending on semantic and pragmatic features of the object”. Thus, we can treat *ba*-marking as an instance of DOM. The question then is whether DOM in Chinese can be accounted for by Aissen’s (2003) OT approach. Aissen shows that DOM is cross-linguistically determined by the prominence dimensions definiteness and/or animacy: the higher in prominence a direct object is (either in animacy or definiteness), the more likely it is to be overtly case-marked. For instance, objects that are human are more likely to be case-marked than inanimate objects, and definite objects are more likely to be case-marked than indefinite objects. If both dimensions are involved, they generally go hand in hand: the higher in prominence an object is in animacy and definiteness, the more likely it will be marked with case.

Data from Mandarin Chinese show that animacy as well as definiteness is involved in the DOM-pattern of the language: both dimensions influence Chinese object marking. However, the prominence scales seem to be opposed to each other:

- (66) *Ta* * (*ba*) *laoshi* *zhuangdao* *le*.
 he BA teacher knock-down PRT
 ‘He knocked down the teacher.’

- (67) *Ta * (ba) yi-ge pingguo chi le.*
 he BA one-CL apple eat PRT
 ‘He ate an apple.’

Preverbal objects that are high-prominent in animacy (human and animate objects) are obligatorily case-marked, as illustrated in (66). Here, Aissen’s claim is correct: it is the human and animate scrambled objects that are obligatorily case-marked in Chinese, whereas for inanimate scrambled objects case-marking is optional. However, objects that are low-prominent in definiteness (non-specific indefinite objects) are obligatorily case-marked too, as illustrated in (62) above. This does not fit Aissen’s (2003) cross-linguistic picture.

I will argue that word order is an additional dimension that influences Chinese DOM. The dimension of definiteness in Chinese DOM is not aligned with grammatical function, as it is in the languages that Aissen analyzed, but instead with the dimension of syntactic position. The preverbal position requires the NP that occupies this position to have high-prominent (i.e. subject-like) properties in terms of definiteness. The argument that takes this position in the sentence should fulfil this requirement and therefore be high-prominent, irrespective of its grammatical function. For the preverbal position, high-prominent NPs in terms of definiteness are harmonic (unmarked), whereas low-prominent NPs are less harmonic (marked). When the NP in preverbal position has marked properties in terms of definiteness, this is reflected in its morphological form. For this reason, non-specific indefinite objects are obligatorily case-marked in preverbal position in Chinese.

The analysis of *ba*-marking in this study will show that the relevant language specific data can be accounted for with the help of universal constraints within an OT syntactic framework.

1.6.2 Interpreting indefinites in the *ba*-NP

An object NP in the *ba*-NP is claimed to get a ‘strong’ reading, that is, a definite, generic or specific reading (Lii 1975; Teng 1975; Li & Thompson 1981; Li 1990; Sybesma 1992). In the past two decades,

numerous approaches were invoked to account for the strength of the *ba*-NP, all discussing different aspects of the *ba*-construction, such as the semantic affectedness of the object NPs as a result of the predicate or the marking of *ba* (Wang 1954; Lü 1955; Li 2001), the effect of word order (Li & Thompson 1981), the aspectual properties of the predicate in the *ba*-sentence (Sybesma 1992; Liu 1997b) and so on.

However, counterevidence to this claim that *ba*-NPs necessarily receive a ‘strong’ reading has been offered in a number of empirical studies. For instance, non-specific indefinite *ba*-NPs are found in the irrealis, in habitual contexts or under verbs expressing likes or dislikes (Wang 1985; Yang 2007; Zheng 1999):

(68) *Ta xuhuan ba shu fangzai shujia shang.*
 he like BA book put-on bookshelf top
 ‘He likes to place books/a book on the bookshelf’

(69) *Ni keyi ba shi-ge xuesheng fencheng yizu.*
 you can BA ten-CL student divide-into one-group
 ‘You can have ten students in a group.’

The bare noun object in example (68) has a non-specific reading. Similarly, a cardinal reading of a numeral *ba*-NP is possible in an irrealis context, as shown in (69). More contexts allowing non-specific indefinites in the *ba*-construction are given below:

(70) *Ta ba yixie pingguo xi-le.*
 he BA some apples wash-PRT
 ‘He washed some apples.’

(71) *Ta bu hui ba shui fangzai xinshang.*
 he not will BA who put-on heart
 ‘He won’t keep anyone in his heart.’

A weak quantifier *yixie pingguo* ‘some apples’ appears in the *ba*-construction in (70), and in (71), the *wh*-word *shui* ‘who’ in Mandarin has an existential reading when it is in the scope of negation. It is not

difficult at all to find a weak *yi*-CL N in the *ba*-construction, as shown below:

- (72) *Mei-ge xuesheng dou ba yi-duo hua daizai*
 every-CL student all BA one-CL flower wear
xiongqian.
 chest-front.
 ‘Every student wears a flower on his chest.’

- (73) *Ta neng ba yi-ge qiu tou-jin lanzi li.*
 he can BA one-CL ball throw-into basket inside
 ‘He can throw a ball into the basket.’

The data above show that a *ba*-NP is not necessarily strong. As was discussed in the previous section, *ba* does not influence the interpretation of the *ba*-NP. Therefore, the question is which contexts license weak readings of *ba*-NPs. In previous accounts, the constraints that account for the interpretations of *ba*-NPs were assumed to be specific for Chinese and “hard” or inviolable. However, in Chapter 4 of this thesis I will show that the interpretation of a *ba*-NP can be subject to two or more conflicting constraints.

There are two reasons why *ba*-NPs very often get a strong interpretation. The first reason is that *ba*-NPs are always in preverbal position, which is associated with strong NPs generally (Li and Thompson 1981). This accounts for the fact that a bare NP which is underspecified for definiteness in Chinese, will always get a strong reading in preverbal position. However, whereas bare NPs are underspecified for definiteness, the indefinite NP in (62) repeated in (74) is lexically specified for indefiniteness by the indefinite determiner.

- (74) *Ta ba yi-ge pingguo chi le.*
 he BA one-CL apple eat PRT
 ‘He ate an apple.’

Therefore a lexically indefinite NP in preverbal position is subject to two conflicting constraints. On the one hand its preferred meaning is non-specific, which is the basic meaning of an indefinite NP (cf. Partee 1987; van der Does and de Hoop 1998; de Hoop and Krämer 2006). On the other hand, because the object is in preverbal position, its preferred meaning is specific (Li and Thompson 1981; Yang and van Bergen 2007). Hence, we get a conflict in interpretation: one constraint requires us to interpret the indefinite NP as non-specific (indefinite), while the other constraint requires us to assign a specific reading to this NP because it is in preverbal position.

The second reason that *ba*-NPs usually have a strong interpretation is that they often occur with a bounded, complex event denoting predicate (Sybesma 1992; Rappaport Hovav & Levin 1998, 1999). But although I agree with Sybesma (1992) that predicates which denote bounded events trigger a strong reading of their object, I will argue in Chapter 4 that a predicate such as *chi-le* ‘eat PRT’ in (74) is not bounded and therefore does not trigger a strong reading of its object. Thus, although bounded predicates force a strong reading on their object NPs, not all predicates in the *ba*-construction are bounded. The predicate *chi-le* ‘eat PRT’ is not bounded, for example, unlike *chi-wan le* ‘eat-finish PRT’ in (75). Accordingly, the object in (74) above gets a weak reading while the object of a bounded predicate in (75) below gets a strong reading:

- (75) *Ta ba yi-ge pingguo chi-wan le.*
 he BA one-CL apple eat-finish PRT
 ‘He finished an apple (a particular one).’

But even the *ba*-NP of a bounded predicate can have a non-specific interpretation. The indefinite object in (76) can get both a non-specific and a specific reading in an intensional context:

- (76) *Ta neng ba yi-ge pingguo chi-wan le.*
 he can BA one-CL apple eat-finish PRT
 ‘He can finish an apple.’

Following Zimmermann (1993) and Van Geenhoven (1996), I claim that intensional predicates preferably take weak (property-denoting) objects (see Section 1.4 above). Therefore, indefinite objects under an intensional predicate may get a non-specific reading.

In this dissertation, I argue that the type of NP, the syntactic position and the nature of the predicate all play a role in the interpretation of object NPs in preverbal position in Chinese. I conclude that weak NPs do occur in *ba*-sentences, although many have argued otherwise. In previous accounts, constraints were often assumed to be inviolable or to be specific to the Chinese language. In my Optimality Theoretic semantic account I assume that the constraints are universal yet violable and that their ranking in Chinese explains the optimal interpretations of *ba*-NPs in different contexts.

1.6.3 Acquisition of indefinite objects

Scope ambiguity of indefinites is a cross-linguistic phenomenon, but language specific factors are involved in resolving this scope ambiguity. A question central to the study of language acquisition is to what extent patterns of child language are universal, and to what extent they are determined by the language input the child is exposed to. It has been claimed that children have a universal tendency to assign narrow scope to indefinite objects (Lidz and Musolino 2002; de Hoop and Krämer 2006). There are two hypotheses, offering different explanations for this universal tendency. One hypothesis, that I will call the Semantic Universalist Hypothesis, claims that children disfavour strong interpretations of indefinite objects (de Hoop and Krämer 2006; Krämer 2000; Unsworth 2005), whereas the other hypothesis, that I will call the Syntactic Universalist Hypothesis, based on Lidz and Musolino (2002) claims that for children, c-command determines scope.

Previous acquisition studies of indefinites in Chinese (Lee 1986; Su 2001; Fan 2005) and in Spanish (Miller and Schmitt 2004) support yet another hypothesis, namely the Input Determined Hypothesis. This hypothesis states that the interpretation of indefinites in child language is determined by the input: language specific

properties of indefinites. These studies will be discussed in greater detail in Chapter 5. For now it suffices to say that the claims made in the literature have one thing in common: they all assume a lexical distinction between *yi*-CL in Chinese and *a/an* in English. There are some problems with these accounts. First, children frequently use *yi*-CL N non-referentially in a simple intensional sentence:

- (77) *Wo yao yi-ge pingguo.*
 I want one-CL apple
 ‘I want an apple.’

Indefinites are interpreted as non-specific in an intensional context (Van Geenhoven 1996). According to a longitudinal study of Chinese children’s production of NPs, numeral phrases (including *yi*-CL N) are used initially with a non-specific reading (Min 1994).

The second problem is that contradictory results are found in the previous studies. In Lee (1986), *yi*-CL N is considered a numeral phrase in Chinese. In a sentence with multiple quantified NPs, distributive readings (wide scope reading of a numeral subject over a numeral object) are generally rejected by adults. However, children overwhelmingly preferred this reading. Finally, a great discrepancy is found between Su’s (2001) and Fan’s (2005) results regarding *yi*-CL N under negation.

On the basis of the competing hypotheses, we can make different predictions for the acquisition of *yi*-CL N in Mandarin. The Universalist Hypothesis would predict that Chinese children initially prefer narrow scope while language specific effects emerge only later. Alternatively, on the basis of the Input-determined Hypothesis we would predict the opposite, namely that Chinese children initially prefer non-narrow scope, while narrow readings emerge only later. Two experiments are designed to test the different predictions.

The first experiment examined the interpretations of *yi*-CL N by children as well as adults in two types of sentences and two conditions, as illustrated in (78) and (79):

- (78) a. *Xiaomao neng liangci baoqi yi-ge piqu.*
 little-cat can twice hold-up a/one-CL ball
 ‘The little cat can hold a ball twice.’
- b. *Xiaomao liangci baoqi le yi-ge piqu.*
 little-cat twice hold up PRT a/one-CL ball
 ‘The little cat held a ball twice.’
- (79) a. *Liangzhi xiaomao neng tiaojin yi-ge lanzi.*
 two-CL little-cat can jump-in a/one-CL basket
 ‘Two little cats can jump into a basket.’
- b. *Liangzhi xiaomao tiaojin le yi-ge lanzi.*
 two-CL little-cat jump-in PRT a/one-CL basket
 ‘Two little cats jumped into a basket.’

In (78), the indefinite object interacts with the preceding adverbial quantifier *liangci* ‘twice’. In (79), the numeral expression *liang-CL N* ‘two N’ is located in the subject position and therefore precedes the indefinite object. The test sentences show two conditions: an indefinite object combined with an intensional verb on the one hand and an indefinite object occurring in sentences with a bounded predicate (accomplishment predicates in past tense) on the other.

The results of the experiment show that 4-year old Chinese children accept narrow scope readings more often than adults or older children. Preference for non-narrow readings start from age 6 and increased with age, supporting the Universalist Hypothesis. The next question is whether 4-year olds’ overacceptance of narrow scope readings result from c-command as the Syntactic Universalist Hypothesis would predict? Is there an effect of word order? Is there an effect of the numeral meaning of *yi-CL N*? These questions are not answered by the first experiment since there is no word order variation in the test items.

For this purpose, I conducted a second experiment. This second experiment used an act-out task to compare the adults and children on their interpretation of *yi-CL N* in two positions, to the right

of *liangci* ‘twice’ and to the left of it. All test items were presented in an intensional context.

The results of my second experiment showed again that young Chinese children have more narrow scope readings than older children or adults, which offers additional evidence for the Universalist View. When linear order/c-command excludes narrow readings, 4-year old children still allow them, which the Syntactic Universalist Hypothesis does not predict. The experiment confirms previous Dutch findings (Krämer 2000).

Mandarin children, like Dutch, English and Kannada children, have more narrow scope readings than adults. They even have these readings when the syntactic configuration excludes them for adults. Universally, children start out acquiring scope relations with a tendency toward narrow scope indefinite objects.

The acquisition data can be accounted for within an Optimality Theoretic framework, which assumes that the ranking of constraints in child language is different from that of adults. The development of child language is a process of adjusting the ranking of universal constraints to match the language specific ranking which they are learning.

By investigating the marking, interpretation and acquisition of indefinite objects in Chinese I show that an OT approach is well suited to explain the Chinese data. The specific patterns in Chinese can be embedded in a cross-linguistic typology of universal constraints ranked differently for different languages.

1.7 Organization of the dissertation

This dissertation consists of six chapters. In the second chapter I will introduce the theoretical background of this study (Optimality Theoretic syntax and semantics and stochastic Optimality Theory). In Chapter 3 I will investigate Differential Object Marking in Chinese and present an OT syntactic analysis of the data. The interpretation of indefinite objects in the *ba*-construction is accounted for in an OT semantic framework in Chapter 4. In Chapter 5 I will discuss the

acquisition of indefinite objects. The final chapter contains the conclusion of the thesis.

Chapter 2

Optimality Theory

2.1 Introduction

In this chapter I will present Optimality Theory (OT), the theoretical framework used in this dissertation. OT is a general theory of grammar. Its main idea is that grammar consists of a set of universal and violable constraints. OT was first developed in the domain of phonology in the nineties, starting with a manuscript by Alan Prince and Paul Smolensky (1993/2004). After its successful application in phonology, OT has played a role in many other domains of grammar.

In this chapter I will first introduce the general idea of OT. I will discuss the main claims, the nature of constraints, the architecture and the ideas about language variation. I will introduce OT syntax in Section 2.3. In Section 2.4, I will show how OT accounts for language variation. In Section 2.5, OT semantics will be discussed. I will introduce the operations Harmonic alignment and Local conjunction in Section 2.6. Before I end with a short summary, I will discuss the OT approach to language acquisition in Section 2.7.

2.2 Introduction to OT

Language users understand each other because they share the rules of their language. A grammar tries to give a systematic description of these rules. As human languages often have a number of properties in common, there is claimed to be something like a Universal Grammar (UG). UG is a set of rules active in all human languages. In Chomsky (1981), UG was thought of as being innate in every human being and part of our genetic endowment. Since human beings are capable of uttering a sentence they have never heard before, UG should be able to generate an infinite number of well-formed expressions; at the same time, the number of rules should be finite. According to Chomsky (1981), rules in UG, distinguished between *principles* and *parameters*,

cannot be violated. Principles are linguistic universals, i.e. rules that hold for every language. In Chomsky's point of views, parameters are binary options, which each language may set differently, leading to language variation. For instance, in UG the *Extended Projection Principle* (EPP) requires every clause to have a subject. In addition to this principle, there is a binary parameter that determines whether the subject of a sentence is overtly pronounced or not. Depending on their parameter setting, languages either have sentences with an overt or a covert subject.

The assumption that these rules are inviolable is challenged with numerous counterexamples. Legendre (2001) argues, for example, that the presence of a particular syntactic pattern within a given language does not hold across the board. She illustrates her claim with the expletive subject *es* in German impersonal passives:

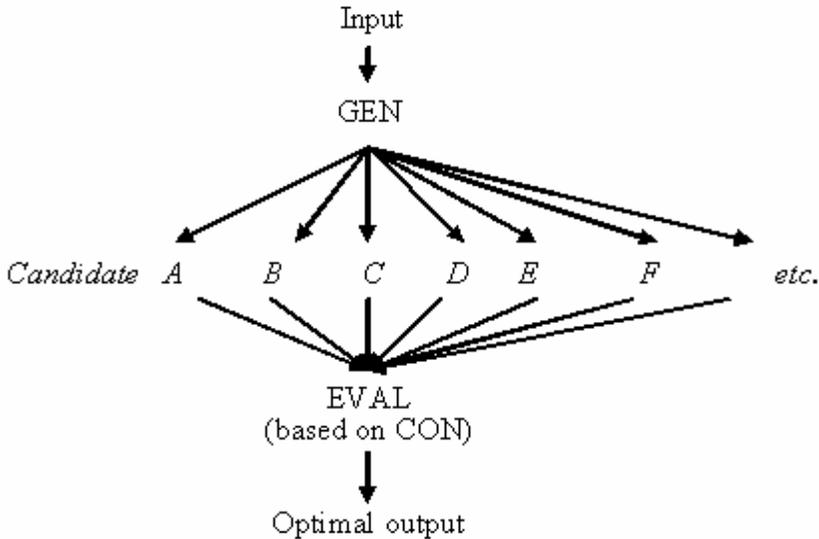
- (1) a. *Es wurde schön getanzt.*
 it was beautifully danced.
 'The dancing was beautiful.'
- b. *Schön wurde getanzt.*

Following from (1a), one could say that the relevant parameter in German is set such that it expresses subjects overtly. But this setting seems to be the opposite in (1b), in which the subject is covert. As a binary parameter in UG cannot have two settings, rules in UG apparently are violated.

Such a violation of grammar rules is not a problem for OT, as in OT constraints are universal, but never absolute. Constraints are potentially conflicting and violable, and ranked according to their strength. In the classical view (Prince & Smolensky 1997), a constraint is more important than all the constraints lower-ranked in the hierarchy. Constraint violation is kept at a minimum in the sense that a constraint is violated only for the purpose of satisfying a higher ranked constraint. In language production or perception *input candidates* are in competition with each other and the one that best satisfies the full set of ranked constraints is called *optimal*.

OT grammar has an input-output mapping architecture, as illustrated in Figure 1, adapted from Blutner et al. (2006).

Figure 1. *OT basic architecture*



In principle, the input of the generator is made up of an infinite set of linguistic elements. Inputs in syntax consist of a predicate-argument structure, functional features and lexical items; inputs in semantics consist of surface forms. For any given input, the Generator (*GEN*) generates an infinite number of possible output structures or interpretations. This candidate set is evaluated in the Evaluator (*EVAL*). The candidates are judged on the violation pattern they yield in the language particular ranking of the constraints (*CON*). The candidate that best satisfies the language-specific constraint ranking is the optimal output.

Constraints in OT are potentially in conflict. Two principles borrowed from the Principles and Parameters framework are Full Interpretation and the Extended Projection Principle. The first dictates that every element in the output must make some meaning contribution, the latter that every clause needs to have a subject. For

some verbs, however, the meaning does not require a subject. Blutner et al. (2006) illustrate this with the verb *to rain*, which does not select for a thematic argument. According to the principle of Full Interpretation (FULL-INT, in its violable OT version), there is no need to have a subject here; according to the EPP (SUBJECT), every sentence must have a subject, be it interpretable or not. These two principles can be captured in the following two constraints:

- (2) FULL-INT: Every element in the sentence must contribute to the meaning
- (3) SUBJECT: Every sentence must have a subject

Depending on their ranking, in some languages SUBJECT is violated in favour of FULL-INT, in others it is the other way around. In English, for example, SUBJECT is ranked above FULL-INT, leading to the output form *it is raining*, and the ungrammaticality of the form *raining*.

The process of optimization is represented in so-called constraint tableaux. The input is placed in the top left cell. The relevant competing output candidates, which were generated by GEN are listed vertically in the left column. The relevant constraints are ranked by strength from left to right in the top row. For each candidate, the violation pattern is determined. The symbol “*” indicates that the candidate violates the constraint of that column. If this violation is fatal, meaning that it causes the candidate to be out of competition, an exclamation mark “!” is added. A blank cell indicates that an output candidate satisfies a constraint. If satisfaction of a constraint is no longer relevant to the evaluation, because the candidate violated some higher ranked constraint already, the corresponding cell is shaded. This leads to the following tableau for subject marking in English:

Tableau 1. *Subjects in English*

Input: 'It rains'	SUBJECT	FULL-INT
☞ It is raining		*
Is raining	*!	

The candidate output *is raining* violates the higher ranked constraint SUBJECT and is therefore judged ungrammatical. The candidate *it is raining* is the winner, as it satisfies the highest ranked constraint and only violates the lower ranked FULL-INT. But, for example, in Italian the constraints are ranked the other way around, FULL-INT overruling SUBJECT, yielding *piove* without an expletive the grammatical form to express 'it rains'.¹ This is illustrated in Tableau 2.

Tableau 2. *Subjects in Italian*

Input: 'It rains'	FULL-INT	SUBJECT
EXPL piove	*	
☞ Piove		*!

As will be further illustrated in more detail in Section 2.4, language particular ranking of universal constraints thus accounts for cross-linguistic variation.

¹ Although Italian does not have expletives, the assumption is that some lexical element would have been recruited to fulfill this task if the constraints were ranked differently.

2.3 OT Syntax

OT syntax is about determining the optimal output form for some input meaning. For instance, the basic or canonical word order in English is SVO, where the subject (S) is located in front of the verb (V), and the object (O) follows the verb, as shown in (4):

(4) John has seen a dog.

There is a general constraint requiring a basic word order in languages, formulated by Grimshaw (1997) as follows:

(5) STAY: Do not move.

The constraint in (5) forbids changes in word order, so-called *movement*. If STAY was the strongest constraint in English, a sentence structure with SVO word order would always be favoured over an OVS or OSV order. In an interrogative sentence like (6a), however, the object *what* has to be in sentence initial position. Otherwise, the sentence would be ungrammatical, as shown in (6b):²

- (6) a. What has John seen?
 b. * John has seen what?

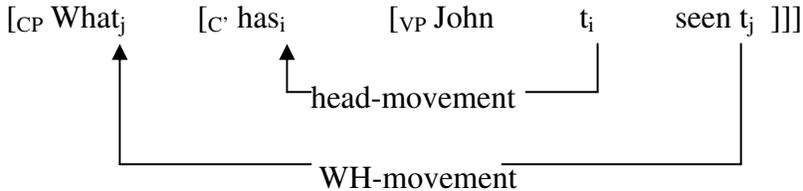
Question words, such as *what*, *who*, *which*, *where*, are also called *WH-expressions*. There are two general constraints mentioned in Ackema and Neeleman (1998) requiring WH-expressions to be placed in the initial position of sentences and, therefore, to move from their base position:

(7) Q-SCOPE: A WH-expression must take scope over its clause.

² Sentence (6b) is grammatical under a so-called *echo reading*, in which *what* needs extra stress.

(8) Q-MARKING: A question must be Q-marked

Q-SCOPE requires WH-expressions to overtly appear in a position that c-commands the clause, i.e., the specifier position of CP. The second constraint Q-MARKING requires a question to carry a feature that marks it for its questionhood. As features are transferred from a head to its complement, this constraint requires a clause to be the complement of a [+Q] marked head. WH-expressions have the lexical property of carrying the feature [+Q]. When they are in specifier position, the WH-expression transfers this feature to the head via Spec-Head agreement. The finite verb has to be moved from the VP to the head of the CP, in order to transfer the feature [+Q] to the rest of the clause. In other words, while Q-SCOPE requires the WH-expression to move to the specifier position of the CP, Q-MARKING has the effect that the finite verb moves to the head position of the CP. This is illustrated in the following figure:

Figure 2. *Movement in questions*

If Q-SCOPE was to force the WH-expression to move without Q-MARKING taking place, the property [+Q] could not be transferred to the head and the rest of the proposition.

Again however, the two constraints cannot be absolute in view of a sentence like (9). Sentence (9) is a question that contains two WH-expressions, but only one of them raises, the other remains in its base position. Clearly, not all WH-expressions take scope over their clause. Q-SCOPE is violated here in order to satisfy the higher ranked constraint Stay. The highest ranked Q-MARKING is satisfied by moving the first WH-expression.

(9) Who has seen what?

Now, consider Tableau 3, in which the three constraints are ranked.

Tableau 3. *Simple questions in English*

Input: {See (x , y), tense = perfect, x = John, y = what}	Q- MARKING	STAY	Q-SCOPE
☞ What _{i} has _{i} [John t_i seen t_i]?		*****	
[John has seen what?]	*!		*
What _{i} [John has seen t_i] ?	*!	***	
Has _{i} [John t_i seen what] ?	*!	**	*

The input in Tableau 3 is an argument structure *See* (x , y), a tense feature *perfect*, and the lexical specification of the arguments x and y . Infinitely many candidates are generated by GEN, of which four relevant ones are listed in the left column. Following Ackema and Neeleman (1998), the constraints, for English, are ranked as Q-MARKING >> STAY >> Q-SCOPE. As we shall see in the next section, this ranking differs for other languages, resulting in different optimal outputs. The number of violations of STAY is motivated by the number of nodes in a syntactic tree some moved element passes when raised to its new position. For the first candidate, *has* raises two nodes which yields two violations, and *what* raises three. Together, this yields five violations. As can be deduced from the tableau, the violations of the constraints STAY and Q-SCOPE are of no importance, because Q-MARKING already determines the optimal candidate. All candidates but the first violate this most important constraint, and, therefore, they lose the competition. Again, a crucial assumption is that constraints are ordered by strict domination. Each constraint is strictly more important than all lower-ranked constraints in the hierarchy (Prince & Smolensky 1997). A violation of a high ranked constraint is always worse than violations of lower ranked ones, regardless of the number of violations of the latter.

Now let's consider Ackema and Neeleman's (1998) analysis of the multi-WH-expression sentence *who has seen what*:

Tableau 4. *Multi-WH-expressions in English*

Input: { see(x,y), x = who, y = what, tense = perfect }	Q- MARKING	STAY	Q- SCOPE
Who _i what _k has _j [t _i t _j seen t _k]		****!***	
☞ Who _i has _j [t _i t _j seen what]		***	*
Who _i what _k [t _i has seen t _k]	*!	****	
What _k has _j [who t _j seen t _k]		****!*	*
Who _i [t _i has seen what]	*!	*	*
Has _j [who t _j seen what]	*!	**	**
What _k [who has seen t _k]	*!	***	*
[Who has seen what]	*!		**

This time, Q-MARKING is satisfied by three candidates. Hence, the next constraint STAY becomes of importance. The number of violations of this constraint differs for the candidates that are still in competition. As the second candidate causes only three violations, but the two other candidates four, the second candidate comes out as the winner.

As said above, constraints in OT are universal, and language variation arises by language-particular ranking of the constraints. In the next section we will see how the very same constraints used for question formation in English can account for question formation in Chinese as well.

2.4 Language variation

Language variation is explained in OT by a difference in constraint ranking between languages. In the previous section, I showed how Ackema and Neeleman (1998) account for English interrogative sentences by assuming the following constraint ranking for English:

- (10) Q-MARKING >> STAY >> Q-SCOPE

Recall that Q-MARKING requires movement of WH-expressions to the sentence initial position. In English, this constraint outranks STAY, which penalizes movement. This ranking does not fit the data of other languages, as is illustrated by the following sentences from Chinese:

- (11) a. *Zhangsan kanjian le yi-tiao gou.*
 Zhangsan see PRT one-CL dog
 ‘Zhangsan saw a dog.’
 b. *Zhangsan kanjian le shenme?*
 Zhangsan see PRT what
 ‘What did Zhangsan see?’

Re-ranking of (a certain set of) universal constraints is necessary to account for different findings in different languages. In sentence (11b), the WH-expression clearly does not move to the sentence-initial position in an interrogative sentence. Therefore, STAY must outrank Q-MARKING in Chinese (Ackema and Neeleman 1998), as illustrated in the next tableau:

Tableau 5. *Simple questions in Chinese*

Input: {See (x, y), tense = perfect, x = Zhangsan, y = what}	STAY	Q-MARKING	Q-SCOPE
What _j Zhangsan saw t _i ?	*!		*
☞ Zhangsan saw what?		*	*

As constraints are said to be mostly universal, proposing a new constraint to account for the data in one language would not only affect the grammar of that particular language, but the grammars of all languages.

2.5 OT semantics

Whereas OT syntax departs from the perspective of the speaker, OT semantics focuses on the perspective of the hearer. In OT semantics the optimal interpretation for a well-formed syntactic structure has to

be determined. Just as with OT syntax the generator generates an, in principle, infinite number of candidate outputs for a given input. This time however, the input is a syntactic form, and the output is a possible interpretation. The view on interpretation as the generation of a number of candidates, rather than some immediate combination of a form with one particular interpretation, is called the *Free Interpretation Hypothesis* (Hendriks and de Hoop 2001). Again, the candidate that satisfies the constraints best comes out as optimal. It is important to note that constraints in OT are not restricted to any module of grammar. In OT semantics the same constraint ranking as in OT syntax determines the optimal candidate, and pragmatic constraints are activated simultaneously with syntactic and semantic constraints. The difference lies in the nature of the input and output only: a meaning input leading to a syntactic output for OT syntax, and a syntactic input leading to an interpretation as output for OT semantics. I will illustrate OT semantics with the interpretation of anaphors.

A constraint that plays an important role in interpretation that was originally formulated by Williams (1997) and adopted by Hendriks and de Hoop (2001) goes as follows:

- (12) DOAP: Don't Overlook Anaphoric Possibilities. Opportunities to anaphorize text must be seized.

This constraint favours linguistic elements to be interpreted as anaphors, meaning that an element should relate to an antecedent in the preceding discourse. As frequently observed, however, DOAP can easily be overruled. For example, Krahmer and van Deemter (1997) note that the definite NP *the doctor* is not anaphoric to the preceding NP *a doctor* in (13):

- (13) Often when I talk to a doctor, the doctor agrees with him.

The anaphoric interpretation is said to be ruled out here because of the implausibility of the resulting reading, in which the doctor would disagree with himself. The definite NP *the doctor* can be anaphoric to

the preceding *a doctor*, however, when it is explicitly stated, as in (14):

(14) Often when I talk to a doctor, the doctor agrees with himself.

Apparently, the pragmatic constraint DOAP is overruled by another constraint on interpretation. Blutner et al. (2006) propose that PRINCIPLE B is this conflicting constraint:

(15) PRINCIPLE B: If two arguments of the same semantic relation are not marked as being identical, interpret them as being distinct.

The constraint PRINCIPLE B is, in fact, the violable counterpart of the well-known PRINCIPLE B of the Binding Theory (cf. Reinhart & Reuland 1993). Whereas DOAP and PRINCIPLE B can both be satisfied in (13), DOAP is violated in (14) in order to satisfy PRINCIPLE B. Hence, PRINCIPLE B must be ranked higher than DOAP. The interaction between DOAP and PRINCIPLE B in the interpretation of (13) and (14) is illustrated in the Tableaux 6 and 7. In Tableau 6, the input is the sentence in (13). The candidate outputs are possible interpretations for the NPs *a doctor*, *the doctor* and *him*. Note that by focusing on the interpretations of these NPs only we abstract away from other interpretational issues and the constraints pertaining to these issues.

Tableau 6. *NP interpretation*

Input: Sentence (13)	PRINCIPLE B	DOAP
☞ a doctor ₁ – the doctor ₁ – him ₂		*
☞ a doctor ₁ – the doctor ₂ – him ₁		*
a doctor ₁ – the doctor ₁ – him ₁	*!	
a doctor ₁ – the doctor ₂ – him ₂	*!	*
a doctor ₁ – the doctor ₂ – him ₃		**!

In Tableau 7, the input is the sentence in (11). The candidate outputs are possible interpretations for the NPs *a doctor*, *the doctor* and *himself*.

Tableau 7. *NP interpretation*

Input: Sentence (14)	PRINCIPLE B	DOAP
a doctor ₁ – the doctor ₁ – himself ₂		*!
a doctor ₁ – the doctor ₂ – himself ₁		*!
 a doctor ₁ – the doctor ₁ – himself ₁		
a doctor ₁ – the doctor ₂ – himself ₂		*!
a doctor ₁ – the doctor ₂ – himself ₃		*!*

As we see in Tableau 6, two optimal interpretations are obtained for (13). These two interpretations satisfy the stronger PRINCIPLE B while violating the weaker DOAP only once. Thus, either *the doctor* or *him* is co-referential with *a doctor*. For (14), we obtain only one optimal interpretation, as can be seen in Tableau 7. Here, the optimal candidate satisfies both PRINCIPLE B and DOAP. In this interpretation, *a doctor*, *the doctor* and *himself* all refer to the same discourse entity.

This example illustrates how OT can be applied to the domain of interpretation. The interpretation of NPs seems to depend on the interaction of violable constraints. In the next section, I will discuss the OT operations Harmonic alignment and Local conjunction. These operations can be used both in OT syntax and OT semantics, and are used in Chapter 3 to account for differential object marking in Chinese.

2.6 Harmonic Alignment and Local Conjunction

Often, (linguistic) elements can be ordered on a scale or in a hierarchy. For example, the animacy hierarchy is often said to consist minimally of the set of humans that outranks other animates, which on their turn outrank inanimate entities. Harmonic alignment is an operation of alignment of two such scales. Prince and Smolensky (1993/2004) formulate it as follows:

Suppose given a binary dimension D1 with a scale $X > Y$ on its elements $\{X, Y\}$, and another dimension D2 with a scale $a > b > \dots > z$ on its elements $\{a, b, \dots, z\}$. The harmonic alignment of D1 and D2 is the pair of harmony scales H_X, H_Y :

$$H_X: X/a > X/b > \dots > X/z$$

$$H_Y: Y/z > \dots > Y/b > Y/a$$

The connective “>” in these harmonic scales should be read as “more harmonic than”. The most harmonic combinations are presented on the leftmost side. The harmony scale H_X states that it is most harmonic for an X to be associated with an a , and least harmonic for an X to be associated with a z ; and H_Y implies that a Y is ideally associated with a z , and the worst case is for Y to be associated with an a . For example, we can align the animacy hierarchy with the binary dimension of grammatical roles in which subjects outrank objects. The resulting scales show a preference of human subjects over other animate and inanimate subjects, and a preference of inanimate objects over animate objects. These scales will be dealt with in detail in the discussion of Aissen’s (2003) work on differential object marking in Chapter 3.

Harmonic alignment thus connects the high-ranked values on the binary scale with the values on another scale from left to right which results in a harmonic scale H_X . In the same way, the low-ranked value on the binary scale is associated with the values on the other scale from right to left. Thus, two harmonic scales are obtained, on which the leftmost element is the most harmonic combination. Inverting the order of the harmonic scales results in two constraint hierarchies. These hierarchies represent what input combination should be avoided. The constraint hierarchies for the harmonic scales above are as follows:

- (16) $C_X: *X/z > \dots > *X/b > *X/a$
 $C_Y: *Y/a > *Y/b > \dots > *Y/z$

The constraints in C_X and C_Y are formulated as AVOID constraints. They are derived by inverting the rankings in H_X and H_Y and by prefixing the AVOID operator “*”. The constraint hierarchy C_X states that avoiding the X/z configuration (inanimate subjects, in our example) is more important than avoiding the next combination in the hierarchy (animate, but not human subjects). All the way down, avoiding X/b is more important than avoiding X/a (human subjects). It is important to note that these constraint hierarchies are universal: they hold for all languages. What does differ from language to language is the point at which some other constraint intervenes in the hierarchy. I will leave the further introduction of this operation to Chapter 3.

In the formal operation called *Local conjunction*, simple constraints can be conjoined to form a complex constraint (Smolensky 1995): Constraint C_1 and C_2 can be conjoined to form the local conjunction $C_1 \& C_2$. This constraint $C_1 \& C_2$ is violated when there is some domain in which both C_1 and C_2 are violated. Local conjunction is used in situations where violations of C_1 or C_2 alone do not rule out a candidate, but violations of both constraints do. A constraint can also be conjoined with a constraint sub-hierarchy, as proposed in Aissen (2001): The local conjunction of C_1 with sub-hierarchy [$C_2 > C_3 > \dots > C_n$] yields the sub-hierarchy [$C_1 \& C_2 > C_1 \& C_3 > \dots > C_1 \& C_n$]. Thus, the constraint C_1 is conjoined with the constraint hierarchy from left to right, resulting in a hierarchy of complex constraints following the same ranking. This operation too will be used in Chapter 3, in which I discuss the work of Aissen (2001, 2003).

2.7 Language acquisition in OT

In generative grammar, universal principles are assumed to be innate, and language-specific parameters are set up or acquired by certain triggers in the learning data. Since children only receive positive evidence, the learning data is believed to be impoverished and for this reason, the space of grammars is restricted and the parameters are finite. In OT a different view is proposed with regard to language acquisition and language learning. In this section, I will introduce the

Constraint Demotion Algorithm (Tesar & Smolensky 1998) and the Gradual Learning Algorithm (Boersma 1997; Boersma & Hayes 2001), the latter will be the basis of my OT analysis of Chinese acquisition data in Chapter 5.

As has been mentioned above, children are only exposed to positive evidence. Children encounter this positive evidence in overt grammatical sentences. In OT overt sentences are the optimal outputs corresponding to certain inputs: the outputs are optimal in comparison with competing candidates. In other words, grammatical outputs are less offending than all competing candidates. ‘Each grammatical output, thus, brings with it a body of implicit negative evidence in the form of these suboptimal competitors’ (Blutner et al. 2006). This is the basic idea behind Tesar and Smolensky’s (1998) Constraint Demotion Algorithm (CDA). Suppose we have four conflicting constraints C1, C2, C3 and C4, in a particular adult grammar ranked as in (17a):

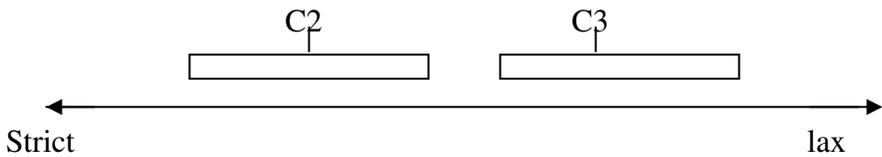
- (17) a. C1 >> C2 >> C3 >> C4
 b. C1 >> C3 >> C2 >> C4

If a child assumes the ranking in (14b), how does he decide that it should re-rank the constraints in order to acquire the adult grammar? When the child observes any mismatch between the optimal output that would be produced by his own ranking and a sentence he actually hears being produced by another speaker, the child would have to decide to re-rank the constraints. His own output becomes the loser and the adult output becomes the winner. Constraints that are violated by the winner must be placed lower than constraints violated by the loser. In this way, the ranking of constraints can be adjusted accordingly. The constraint demotion continues until the adult ranking of constraints is attained. Just like in the original version of OT, the CDA assumes a strict ranking of the constraints, one constraint always being either higher or lower in the hierarchy than the other.

Different from this view, the Gradual Learning Algorithm (GLA) assumes so-called *Continuous ranking scales*. In these scales higher values correspond to higher-ranked constraints. A value is added to each constraint in order to measure the distance between

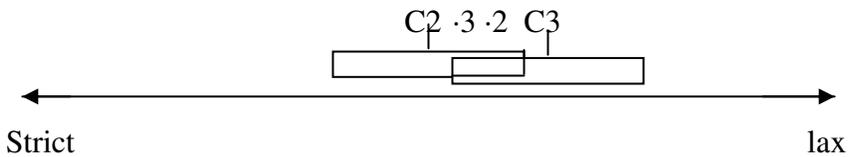
them. In this way, the constraints are associated with ranges of values. The values used at the time of evaluation are called selection points. The the centre of the range is called the ranking value. There are two possibilities. If the ranges covered by the selection points do not overlap, the ranking scale merely presents ordinary categorical ranking:

Figure 3. *Categorical ranking with ranges*



If the ranges overlap, however, their ranking may vary. It is possible to choose the selection points anywhere within the ranges of the two constraints. For most selection points, C2 will outrank C3. But if the selection points are taken from the upper part of C3's range and the lower part of C2's, then C3 would outrank C2 (.2 and .3 indicate the selection points for C2 and C3 respectively):

Figure 4. *A rare result: C3 >> C2*

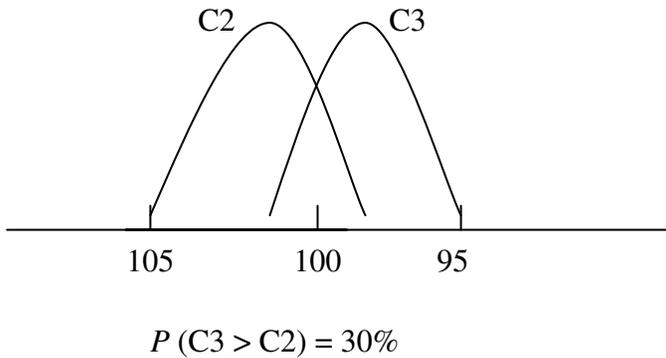


Overlapping constraints as in Figure 4 can account for instances of free variation. In these cases, the same input value can result in multiple outputs.

The constraint ranges are interpreted as probability distributions in Stochastic OT. Stochastic OT assumes that selection points for natural language constraints have a normal distribution, with the mean of the distribution occurring at the ranking value. A normal distribution has a single peak in the centre, which means that

values around the centre are most probable and become less probable the farther they are removed from the centre. The normal distributions are assumed to have the same standard deviation (evaluation noise) for every constraint. If two constraints have distributions that are far apart from each other, the odds of a free ranking are almost zero. If two constraint ranges overlap, however, both rankings are possible ($C2 \gg C3$ and $C3 \gg C2$). This is illustrated in Figure 5, in which C3 in a considerable portion (viz. 30%) of the cases overrules C2:

Figure 5. *Probability distribution of constraints*



The Gradual Learning Algorithm tries to locate an empirically appropriate ranking value for every constraint with the following procedure (Boersma & Hayes 2001). In the *initial state* every constraint starts at the same value. In step 1, *the datum*, the algorithm is presented with a learning datum, that is, an adult surface form that the language learner hears and assumes to be correct. Then in *Generation*, for each constraint, a noise value is taken at random from the normal probability distribution and is added to the constraint's current ranking value to obtain the selection point. Once a selection point has been chosen for every constraint, generation proceeds by sorting the constraints in descending order of their selection points. This yields a strict constraint ranking. The remainder of the generation process follows the standard mechanisms of OT. Step 3 is the *Comparison*. If the form just generated by the grammar is identical to the learning datum, nothing further has to be done. But if there is a

mismatch, the algorithm takes this mismatch as a signal to alter the grammar. In step 4, the *Adjustment*, the values of those constraints that favoured the learning datum to become optimal are increased; simultaneously, the values of those constraints that promoted the wrongly predicted optimal output are decreased. With further exposure to learning data, the algorithm cycles repeatedly through steps 1 to 4. For the non-simplified version of the latter two steps I refer to Boersma & Hayes (2001).

A great advantage of GLA is that it can handle optionality. As we shall see, this is needed in order to analyze the acquisition data in Chapter 5.

2.8 Summary

In this chapter, I introduced Optimality Theory as the theoretical background of my dissertation. OT can be applied in syntax, semantics and in language acquisition studies in addition to its original domain, (morpho)phonology. Constraints in OT are universal and violable. Language variation arises from different rankings of these constraints. Constraint evaluation can be stochastic, in which case the strict constraint ranking is a special phenomenon. In the next three chapters, I will discuss problems concerning Chinese indefinite objects and analyse them within the framework of OT.

Chapter 3

Differential Object Marking in Chinese³

3.1 Introduction

This chapter examines object marking of the indefinite object classifier Noun (henceforth *yi*-CL N) in Chinese. When *yi*-CL N is used as an object, it occurs either in a postverbal or in a preverbal position. In the latter case, a morpheme *ba* is obligatorily inserted before *yi*-CL N, as illustrated by (1) and (2):

(1) *Ta chi le yi-ge pingguo.*
he eat PRT one-CL apple
'He ate an apple.'

(2) *Ta ba yi-ge pingguo chi le.*
he BA one-CL apple eat PRT
'He ate an apple.'

Direct objects can be marked with *ba* when they occur in the preverbal position, *yi*-CL N being only one type. In some cases, direct objects obligatorily occur in preverbal position. In the example in (3) below, we see that when the verb *fang* 'put' is followed by two constituents, the sentence becomes ungrammatical:

(3) **Wo fang qiu jin lanzi li le.*
I put ball into basket inside PRT
'I put the ball/the balls into the basket.'

³ This chapter is based on joint work with Geertje van Bergen on Differential Object Marking in Chinese (Yang & van Bergen 2007).

In cases like these, the direct object has to occur on the left side of the verb, where it is preceded by *ba*, as shown in (4):

- (4) *Wo ba qiu fang jin lanzi li le.*
 I BA ball put into basket inside PRT
 'I put the ball/the balls into the basket.'

In (2) and (4), *ba*-marking is obligatory. As a matter of fact, objects in the preverbal position are obligatorily marked with *ba* in most cases. Sometimes, however, *ba* is optional, as shown in (5) and (6):

- (5) *Ta (ba) na-ge pingguo chi le.*
 he BA that-CL apple eat PRT
 'He ate that apple.'
- (6) *Ta (ba) shubao diu le.*
 he BA schoolbag lose PRT
 'He lost the schoolbag.'

A sentence containing *ba* is called a *ba*-sentence or a *ba*-construction. The object NPs marked by *ba* are called *ba*-NPs. There is a lot of debate on the status of *ba* and the effect of *ba* on the interpretation of *ba*-NPs. In this chapter, I argue that the *ba*-marking is an instance of case-marking, following Huang (1982, 1990). It is an object marker in a broad sense. In this dissertation the discussion of *ba* is restricted to its role as a direct object marker. Since the *ba*-marking is sometimes obligatory and sometimes optional, as we saw above, it is an instance of Differential Object Marking (DOM), a phenomenon found in many languages (Bossong 1985; Aissen 2003; de Swart 2007). The question is whether case-marking in Chinese can be captured within a cross-linguistic account such as the OT approach of Aissen (2003).

In the next section, I will introduce the general background of *ba* and argue that *ba* mainly plays a syntactic role: marking preverbal objects. It has no semantic effect on *ba*-NPs. In Section 3.3, I will present the cross-linguistic pattern of Differential Object Marking as illustrated in Aissen's approach (2003). The DOM-pattern in Chinese

is described in Section 3.4. In Section 3.5, an OT syntactic account is presented to capture the Chinese data. In the last section, I will discuss the limitations of Aissen's approach in accounting for the Chinese DOM-pattern. I claim that besides the dimensions of animacy and definiteness, the dimension of syntactic position is necessary to explain DOM in Chinese.

3.2 Status of *ba*

Historically *ba* was a lexical verb, meaning 'to take, to hold'. *Ba* in Modern Chinese is grammaticalized and does not have this lexical meaning anymore in most cases. In the literature there has been a lot of debate on the status of *ba* in the *ba*-construction. *Ba* has been treated either as a lexical verb (Hashimoto 1971), a preposition (Chao 1968; Travis 1984; Li 1990), a case assigner (Huang 1982; Koopman 1984; Goodall 1987), or as a case marker (Huang 1990). In this section, I show that *ba* is different from a normal lexical verb (even from a co-verb, i.e., a causative verb) and a preposition and that it can be treated as an object marker in a broad sense. I argue that *ba* as an object marker only plays a syntactic role and does not affect the semantics of the *ba*-NP.

3.2.1 Grammaticalization process of *ba*

In general, a *ba*-sentence has the following structure:

(7) NP₁ + *ba* + NP₂ + VP

Whether NP₂ is base-generated or moved from post- to preverbal position and whether *ba* is base-generated or inserted to mark the preverbal object is still topic of discussion. For the claim that *ba* is base-generated, evidence is obtained from the grammaticalization process of *ba*. It is assumed that there are three main stages in the grammaticalization process of *ba* (Feng 2002). Originally *ba* was used as a normal lexical verb meaning 'to take, to hold' in the following construction:

- (8) NP₁+ *ba*+ NP₂

An example is given in Feng (2002) from *Zhanguo Ce*, a collection of historical records from 460 BC to 220 BC:

- (9) *Chen zuo shou ba qi xiu.*
 I left hand hold his sleeve
 ‘I (will) hold his sleeve with my left hand.’

The use of *ba* as a lexical verb is still available in the following cases in modern Chinese:

- (10) *Ba-jin fangxianpan, bie wang zuo zhuan.*
 hold-tight wheel not go left turn
 ‘Hold the wheel and don’t turn left.’
- (11) *Ta bu neng bang ni na dongxi, yinwei ta ba zhe*
 he not can help you take things because he hold PRT
cheba ne.
 bike-handle PRT
 ‘He cannot help you take the things because he is holding the handles.’

As a lexical verb, *ba* can form a verbal compound like *ba-jin* ‘hold-tight’ in (10) and it can be followed by an aspect marker as in *ba zhe* ‘hold PRT’ in (11). Note that this use is very restricted. In most cases, *ba* is grammaticalized and does not have these properties. In (12) and (13) a comparison is made between *ba* and a normal lexical verb *na* ‘take’:

- (12) a. *Ta na-zou le yi-ge beizi.*
 he take-leave PRT one-CL cup
 ‘He took away a cup.’

- b. **Ta ba-zou le yi-ge beizi.*
 he BA-leave PRT one-CL cup
 ‘He took away a cup.’
- (13) a. *Ta na le yi-ge pingguo.*
 he take PRTone-CL apple
 ‘He took an apple.’
- b. **Ta ba le yi-ge pingguo.*
 he BA PRTone-CL apple
 ‘He took an apple.’

In (12) and (13), the verb *na* can form a verbal compound *na-zou* ‘take-away’ and can be followed by the aspect marker *le*, whereas *ba* cannot.

In a later stage, *ba* behaves like a co-verb or a light verb, meaning ‘to take’. This change took place in the Tang Dynasty, around the 7th century. It was used in a serial verb construction as an adjunct clause, as represented in (14), expressing the manner in which the action as expressed by the main verb is performed. Sentence (15) is from a poem called *Tianjia Zaxing Bashou* written by Chu, Guangxi (707-about 760), a poet in the Tang Dynasty:

- (14) a. NP₁+ *ba*+ NP₂+V + NP₃
 b. NP₁+ *ba*+ NP₂+ V + (NP₃)
- (15) *Zhizi zhao wei fan, ba gan zhu niaoque.*
 child morning not eat, hold rod drive-away bird
 ‘Before having his breakfast, the child drove away birds (from the fields) with a rod.’

The serial verb construction is very common in Modern Chinese. It contains “two or more verb phrases or clauses juxtaposed together without any marker indicating what the relationship is between them” (Li and Thompson 1981: 594):

- (16) *Wo men kai hui taolun nei-ge wen ti.*
 we open meeting discuss that-CL problem
 ‘We discussed that problem in the meeting.’
- (17) **Wo men kai hui le taolun nei-ge wen ti.*
 we open meeting PRT discuss that-CL problem
 ‘We discussed that problem in the meeting.’

Sentence (16) is a serial verb construction: it contains two verbal phrases. When an aspect marker *le* is inserted between the two verbal phrases, the sentence becomes ungrammatical, as shown in (17). The serial verb construction differs from the *ba*-construction in Modern Chinese in that the first and the second verb normally do not have the same object. In (16), *hui* ‘meeting’ is the object of *kai* ‘open’, whereas the object of the second verb *taolun* ‘discuss’ is *nei-ge wenti* ‘that problem’. Also consider the following sentence:

- (18) *Ta naqi beizi he (shui).*
 he take-up cup drink water
 ‘He took a cup and drank (water).’

In (18), *beizi* ‘cup’ is the object of the first verb *naqi* ‘take up’ and *shui* ‘water’ functions as the object of the second verb *he* ‘drink’. In this sentence, the object of the second verb is not necessarily expressed.

In the third stage of grammaticalization, *ba* shares its object with the main verb. Now we get the construction in (20). An example is given in (21) from a poem called *Ji Dushiyi* by Ren Hua, another famous poet in the Tang Dynasty:

- (20) NP₁+ *ba* + NP₂+ V + e₂

- (21) *Xian chang ba qin nong, men ji xie zun*
 free often hold zither play boring then take wine-cup
qi.
 up
 ‘When free, he would hold play a zither and when feeling
 bored, he would have a cup of wine.’

Ba in (20) can still be understood as a verb, meaning ‘to hold, to take’. The object is in between the two verbs and functions as an object to both of these verbs, as shown in (21). The construction in (20) is claimed to be the source of the contemporary *ba*-construction. In the original *ba*-construction, the main verb had to be a bare verb. Today, complex predicates can also be part of the *ba*-construction, as in (23):

- (22) *Ta ba pingguo chi le.*
 he BA apple eat PRT
 ‘He ate the apple.’
- (23) *Ta ba pingguo chi-wan le.*
 he BA apple eat-finish PRT
 ‘He ate up the apple.’

One requirement for a well-formed *ba*-sentence today is that the verb is followed by a constituent. This postverbal constituent can be an aspect marker or a complement. Liu (1997b) lists the following types of constituents that can follow the main verb in the *ba*-construction:

- (24) a. V+ resultative verb complement
 b. V+ *de* (resultative)
 c. V+ retained object
 d. V+ perfective marker *-le*
 e. V+PP (dative or locative)
 f. V+ quantified phrase
 g. V+ *yi*+ V (the tentative construction)
 h. V+ durative marker *-zhe*
 i. Adv+ V

Ba-sentences in which the main verb is not followed by any of the constituents in (24) are ungrammatical in Modern Chinese. We can only find examples of *ba*-sentences without a postverbal constituent in poems or songs nowadays:

- (25) *Baba na jingzi ba ta zhao, ta bishang yanjing*
 father take mirror BA him look, he close eye
gegexiao.
 chuckle
 ‘Father took a mirror and let him look, he closed his eyes and chuckled.’
- (26) *Tiantian wanshang ba ge chang, zhi wei zhengde*
 everydayevening BA song sing only for gain
Wuyuehua.
 Wuyuehua
 ‘Sing every evening just for the Wuyuehua Award.’

What has motivated the change from a bare verb to a verbal compound in the *ba*-construction? Wang (1980) claims that, in the grammaticalization process of *ba*, there is a stress shift from the object NP to the verbal phrases. Feng (2002) assumes that this change was effected in prose, by following the special prosodic rules required in this style. This would explain why in poems or songs the two forms (the *ba*-sentence with a bare verb and the *ba*-sentence with a verbal compound) have existed next to each other until this day. However, the fusion of these two constructions did take place. The result of the fusion is a *ba*-construction with a complex predicate, in which *ba* and the main verb share the same object. At this stage, *ba* has lost its semantic content and functions only as an object marker. Feng (2002) thinks that *ba* should be analyzed as a base-generated light verb and the *ba*-NP does not move from post- to pre-verbal position, but rather is base-generated, too.

Ba has been subject to a process of grammaticalization. It used to be a verb, but it has lost its verbal properties. I think we have to

evaluate it according to its behaviour in Modern Chinese. The reason *ba* cannot be treated as a normal verb is because it does not behave like other verbs in Chinese anymore. As was mentioned above, the grammaticalized morpheme *ba* cannot form a verbal compound and it cannot be followed by an aspect marker. Furthermore, *ba* cannot form a V-not-V question or serve as an answer to a question, like normal verbs in Chinese. This is shown in the following examples:

- (27) Q: *Ni he bu he cha?*
 you drink not drink tea
 ‘Will you drink tea?’
 A: *He.*
 drink
 ‘Yes.’
- (28) Q: **Ni ba bu ba pingguo chiwan?*
 you BA not BA apple eat-finish
 ‘Will you finish the apple?’
 A: **Ba*
 BA
 ‘Yes.’

A normal verb like *he* ‘drink’ in (27) can both form a V-not-V question and behave as an independent answer to a question, whereas *ba* cannot. However, one might argue that in modern Chinese there is a series of verbs that cannot be used in these ways: verbs such as *shi* ‘make’ or *rang* ‘let’ cannot form V-not-V questions either, nor can they be used as an independent answer. These verbs are called co-verbs or light verbs, or causative verbs, since they have the meaning ‘to cause’.

3.2.2 *Ba*: a causative co-verb?

Unlike normal lexical verbs, co-verbs cannot be followed by an aspect marker, or form a V-not-V question, or behave as an independent answer, as shown in (29) and (31):

- (29) *Zhege xiaoxi rang(shi)(*le) ta hen zhaoji.*
 this news cause PRT he very anxious
 ‘This news made him very anxious.’
- (30) *Ta shi wo touteng.*
 he cause me headache
 ‘He troubled me a lot.’
- (31) --**Ta shi mei shi ni touteng*
 he cause not cause you headache
 ‘Did he bother you?’
 --* *shi.*
 cause
 ‘Yes, he did.’

If we insert an aspect marker *le* between the co-verb *rang* ‘let’ and its object in (29), the sentence is ungrammatical. We cannot reformulate the sentence in (30) into a V-not-V question, and the causative verb can neither be used as an independent answer, as shown in (31). Is the fact that co-verbs do not behave like other lexical verbs enough reason to treat *ba* as a co-verb as well?

There are two types of *ba*-sentences: the canonical *ba*-sentence and the causative *ba*-sentence (Sybesma 1992). In the causative *ba*-sentence in (32), NP₁ *zhege xiaoxi* ‘this news’ is the causer and NP₂ *ta* ‘he’ is the affected object, while VP *qi-shi le* ‘irritate-to death PRT’ is a resultative predicate:

- (32) *Zhege xiaoxi ba ta qi-si le.*
 this news BA he irritate-to death PRT
 ‘This news irritated him to death.’

Traditionally, sentences like (32) are called causative sentences because *ba* is treated as having the meaning ‘to cause’. However, *ba* is different from causative verbs such as *rang* ‘let’ or *shi* ‘make’:

- (33) *Zhege xiaoxi rang(shi) ta hen zhaoji.*
 this news cause he very anxious
 ‘This news made him very anxious.’
- (34) **Zhege xiaoxi ba ta hen zhaoji.*
 this news BA he very anxious
 ‘This news made him very anxious.’
- (35) *Zhege xiaoxi rang(shi) ta xuexi fenxin.*
 this news cause he study distract
 ‘This news distracted him from his studies.’
- (36) **Zhege xiaoxi ba ta xuexi fenxin.*
 this news BA he study distract
 ‘This news distracted him from his studies.’

The *ba*-construction cannot be used in (34) and (36), whereas the causative verbs *rang* ‘let’ and *shi* ‘make’ are allowed in these contexts. In my opinion, this is because in a *ba*-sentence, NP₂ has to be the object of the verb, as shown in (32), while NP₂ in (33) and (35) cannot be considered the object of *rang* ‘let’ or *shi* ‘make’. In (34) and (36), the insertion of *ba* is ruled out as NP₂ cannot be the object of the predicate. If this observation is correct, the causative effect of the causative *ba*-construction does not come from *ba*, but is rather an effect derived from the predicate. The causative effect is much less obvious or even disappears in a canonical *ba*-sentence, where NP₂ is either the inner or the outer argument of the predicate (Li 2001):

- (37) *Ta ba zhejian shi wang le.*
 he BA this matter forget PRT
 ‘He forgot this matter.’

Example (37) cannot be translated as ‘he caused this matter to be forgotten’ and therefore should not be treated as a causative sentence. Since a co-verb always appears with its object before the main verb, while the NP following *ba* is the object of the main verb, the post-

verbal object position of the main verb in a *ba*-sentence must be empty and “cannot be occupied by a pronoun or a reflexive coreferential with the *ba* NP” (Li 2001). This is in contrast with the co-verb *rang* ‘let’ or *shi* ‘make’ in this case, as illustrated by examples (38) and (39) (Li 2001):

(38) **Ta ba Zhangsan ; hai-le ziji/taziji ;*
 he BA Zhangsan hurt-PRT self/himself
 ‘He made Zhangsan hurt himself.’

(39) *Ta shi Zhangsan ; hai-le ziji/taziji ;*
 he make Zhangsan hurt-PRT self/himself
 ‘He made Zhangsan hurt himself.’

The above discussion shows that *ba* cannot be treated as a normal causative verb. It does not behave as a lexical verb at all.

In Mandarin prepositions, just like verbs, can form A-not A questions⁴ and can serve as independent answers, whereas *ba* cannot. Therefore, *ba* cannot be a preposition:

(40) ---*Ta zai bu zai jia?*
 he in not in home
 ‘Is he in or not?’
 ---*bu zai*
 not in
 ‘He is not in.’

(41) ---* *Ta ba bu ba fan chi le?*
 he BA not BA meal eat PRT
 ----**bu ba.*
 not BA

⁴ In an A-not-A question, the element A is a label for several predicative categories such as verb, adjective, preposition, adverb, modal and others (Gasde 2004). A typical A-not-A question contains two identical elements on both sides of the negator.

Zai ‘in’ is a preposition in Chinese and can be used to form an A-not-A question. It can also serve as an independent answer (*bu zai*), as shown in (40). However, in (41), it is ungrammatical to form an A-not-A question with *ba* and it is ungrammatical to answer that question with *ba*. This indicates that *ba* cannot be a preposition. Also, as pointed out in Sybesma (1992), *ba* does not have a thematic relation with the *ba*-NP, which again shows that *ba* should not be treated as a preposition. Following Huang, I treat *ba* as a case marker inserted for a syntactic purpose: when objects move from the post-verbal position to a preverbal position, they get marked with *ba*.

In the next section, I will argue that *ba* can be treated as an object marker in a broad sense.

3.2.3 *Ba*: an object marker?

An NP marked by *ba* is a direct object in most cases. However, a *ba*-NP can also be an indirect object, an instrumental or a locative NP as shown below:

(42) *Wo ba ta tuidao le.*
 I BA him push-downPRT
 ‘I pushed him down.’

(43) *Jingcha ba ta fa le henduo qian.*
 police BA him fine PRT much money
 ‘The police man fined him a lot of money.’

The *ba*-NP in (42) is a direct object, while in (43) the *ba*-NP is an indirect object. In (44) and (45) *ba* marks a locative NP and an instrumental NP respectively:

(44) *Ta ba lian (shang) tu-man le hui.*
 he BA face on cover-full PRT ash
 ‘He covered his face with ash.’

- (45) *Ta ba shou wu zai erduo-shang.*
 he BA hand cover at ear-on
 ‘He covered his ear with his hand.’

Li (2001) considers instrumental and locative *ba*-NPs to be direct objects of the verb. We can illustrate this more clearly by placing the objects postverbally:

- (46) *Ta tu hui tu-man le lian.*
 he cover ash cover-full PRT face
 ‘He covered his face with ash.’

- (47) *Ta wu shou wu zai erduo-shang.*
 he cover hand cover at ear-on
 ‘He covered his ear with his hand.’

The locative NP *lian* ‘face’ functions as the object NP of the verb *tu-man* ‘cover-full’ in (44) just like the instrument NP *shou* ‘hand’ is the object of the verb *wu* ‘cover’ in (47).

There are some cases in which the *ba*-NP is neither a direct nor an indirect object, but in which it can be the possessor of the object NP or be in a part-whole relationship with it:

- (48) *Tufei ba ta duan le tui.*
 bandit BA him break PRT leg
 ‘The bandit broke his leg.’

- (49) *Ta ba xiangjiao bao le pi.*
 he BA banana peel PRT skin
 ‘He peeled the banana.’

The *ba*-NP can also be the subject of a clause expressing the result of an action, as shown in (50):

- (50) *Ta ba women ku de dou fan-si le.*
 he BA we cry PRT all annoy-dead PRT
 ‘He cried so much that we were all extremely annoyed.’

Following Goodall (1987), Sybesma (1999) claims that the *ba*-NP is always the subject of a result clause. However, Li (2001) shows that the *ba*-NP in a sentence like (51) must be interpreted as the object of the result clause:

- (51) *Na-ge nuhai ba shoupa ku de meiren gan*
 that-CL girl BA handkerchief cry PRT nobody dare
mo.
 touch
 ‘That girl cried so that nobody dared touch the handkerchief.’

Li (2001) claims that the *ba*-NP corresponds to either a V-object (inner object) or a V'-object (outer object). In the first case, the *ba*-NP can be a direct or indirect object, or an instrumental or locative NP that functions as the object of the verb. In the second case, the *ba*-NP is treated as the object of a complex predicate consisting of a verb and its complement. An outer object (V'-object) receives the role of patient (Huang 1982, 1987, 1990). In (48), *ta* ‘him’ is the affected object of the predicate ‘leg-breaking’ and in (49), *xiangjiao* ‘banana’ is the affected object of the predicate ‘skin-peeling’. Similarly, *women* ‘we’ is affected by the crying to the extent of being extremely annoyed in (50), and *shoupa* ‘the handkerchief’ in (51) is affected by the crying to the extent that nobody dared to touch it.

The difference between sentences in which the *ba*-NP is an inner object and those in which the *ba*-NP is an outer object can be illustrated by their non-*ba* counterpart sentences. Consider the examples in (52) – (55), where an outer object is turned into an inner object by a change of the predicate:

- (52) *Na-ge nuhai ku de shoupa hen shi.*
 that-CL girl cry PRT handkerchief very wet.
 ‘That girl cried and got the handkerchief very wet.’

- (53) *Na-ge nuhai ba shoupa ku de hen shi.*
 that-CL girl BA handkerchief cry PRT very wet.
 ‘That girl cried and got the handkerchief very wet.’
- (54) *Na-ge nuhai ku-shi le shoupa.*
 that-CL girl cry-wet PRT handkerchief.
 ‘That girl cried the handkerchief wet.’
- (55) *Na-ge nuhai ba shoupa ku-shi le.*
 that-CL girl BA handkerchief cry-wet PRT.
 ‘That girl cried the handkerchief wet.’

When the complex predicate *ku de hen shi* ‘cry-very-wet’ is changed into the verbal compound *ku-shi le* ‘cry-wet PRT’, the position of the object NP *shoupa* ‘handkerchief’ changes. In (52), *shoupa* is the outer object located between the verb plus particle *ku de* ‘cry PRT’ and its complement *hen shi* ‘very wet’; in (54) *shoupa* ‘handkerchief’ is the inner object following the whole predicate *ku-shi le* ‘cry-very-wet’.

In the remainder of this dissertation I will only take into account examples in which the *ba*-NP functions as a direct object, since this is its most typical function and the data suffice for the purpose of my present research.

3.2.4 Marking scrambled objects with case

The relation between case-marking and syntactic position is not a unique feature of Mandarin Chinese. It is also found, for instance, in Zhuang, a Tai SVO language spoken in Southern China. In Zhuang, when a direct object moves from the canonical postverbal to the preverbal position, it is preceded by *dawz*:

- (56) *Dawz mbaw bauqcej nem okbae.* [Zhuang]
 DAWZ CL newspaper post out
 ‘Post up a (specific) newspaper.’

- (57) *Dawz saw cuengq youq gwnz daiz.* [Zhuang]
 DAWZ book place PRT on table
 ‘Place the book on the table.’

This marker has exactly the same function as *ba* in Chinese (Zhang & Qin 1993), as shown in (56) and (57). Something similar happens in Jingpho, another Sino-Tibetan language spoken in Southern China. In this language, which has SOV order, object clauses are not marked in their canonical position. However, when an object clause precedes the subject, a marker *hpe* obligatorily follows the object, as shown in the examples in (58) and (59) (adopted from Dai & Xu 1992):

- (58) *Nang shi tsun ai mythkrum nga nni?* [Jingpho]
 you he say AUX agree AUX PRT
 ‘Do you agree with what he said?’
- (59) *Shi tsun ai hpe nang mythkrum nga nni?* [Jingpho]
 he say AUX HPE you agree AUX PRT
 ‘Do you agree with what he said?’

The examples in Zhuang and Jingpo show the relevance between object marker and syntactic position. In isolating languages (like Mandarin, Jingpho and Zhuang) SVO is said to be the most economic word order, since grammatical functions are determined only by the placement of the verb and independently from the presence of the other argument (Sinnemäki 2006). Contrastingly, in SOV word order correct identification of the role of S requires correct identification of O as well. If the canonical word order in an isolating language were to change from SVO into SOV, it is to be expected that the language develops either case marking or agreement. This is indeed attested in Kamti Tai, an isolating language spoken in Myanmar, which changed its word order from SVO to SOV (probably due to language contact). As a consequence, the definite marking particles changed into object marking particles (Khanittanan 1986). It is natural to assume that *ba* plays a syntactic role, which marks an object in the preverbal

position. However, it is claimed in the literature that *ba* may have an effect on the interpretation of the *ba*-NP

3.2.5 *Ba*: affecting the *ba*-NP?

In the literature that claims that the *ba*-NP is strong, one of the earliest and most influential theories is the approach in which the *ba*-construction is treated as a ‘disposal construction’ (Wang 1954; Lü 1955; Li & Thompson 1981). A disposal construction is used to describe how an entity denoted by the object is affected by the subject (Wang 1954). Therefore, the object “generally should exist before an event occurs in order to be affected (existence condition), it generally cannot be non-specific (specificity condition), and it generally must be something/someone that can be affected by the event (affectedness condition)” (Li 2001). The *ba*-NP is analyzed as being semantically affected, in other words, “the verb has to be linked to the *ba*-NP in the sense that the verb takes the *ba*-NP as the semantic object.” (Li 2001). A thematic relation must exist between the verb and the *ba*-NP. Even if the verb is not necessarily a “real” transitive, it can neither be a “real” intransitive, since these cannot take any type of object. This claim can explain the minimal contrast of grammaticality in the following examples:

- (60) *Ta ba wo da le.*
 he BA I hit PRT
 ‘He hit me.’
- (61) **Ta ba wo kan le.*
 He BA I look PRT
 ‘He looked me.’
- (62) *Ta ba wo kan le yi-yan*
 he BA I look PRT one-eye
 ‘He threw a glance at me.’

- (63) **Ta ba wo baifang le.*
 he BA I arrive PRT
 ‘He visited me.’
- (64) **Ta ba wo baifang le yi-ci.*
 he BA I arrive PRT one-time
 ‘He visited me once.’

According to Li, the grammaticality contrast between (60) and (61) shows that a transitive verb *is* allowed in a *ba*-sentence, whereas an intransitive verb *is not*. *Da* ‘hit’ is a highly transitive verb, whereas *kan* ‘look’ is not. If *kan* is combined with a quantifier such as *yi-yan* ‘a glance’, it is allowed in a *ba*-sentence. The situation, Li says, is different for the verb *baifang* ‘arrive’ in (63-64). Here a frequency quantifier is the complement of the verb, yet the sentence is ill-formed. This shows that *baifang* ‘arrive’ is a “real” intransitive and *kan* ‘look’ is a “quasi” transitive, in the sense that the latter can take an implicit object in a complex predicate form.

The problem of this approach lies in the vague definition of “affectedness”. It is hard to tell which objects can and which objects cannot be considered as being affected. It is difficult to systematically evaluate the thematic relation between a verb and the *ba*-NP. An even more puzzling fact is that there are also *ba*-sentences with predicates such as *wang le* ‘forgot’ and *diu le* ‘lost’. It is hard to claim that the objects of these predicates in these cases are ‘affected’ at all.

Another question arises when considering the dependence of the semantic types of object NPs and the transitivity of the predicate. A “real” transitive verb does not always require a specific object NP:

- (65) *Ta baoqi le piqu.*
 he hold-up PRT ball
 ‘He lifted the ball.’
- (66) *Ta neng baoqi piqu.*
 he can hold-up ball
 ‘He can lift a ball/the ball.’

The predicate *baoqi* ‘hold-up’ is a real transitive predicate. Although the object NP in (65) requires a definite reading, in an intensional context as in (66), it is ambiguous between a non-referential and a referential reading. The difference between (65) and (66) shows that the semantic features of the *ba*-NP cannot simply be derived from the transitivity of the predicate. Yet, the transitivity of verbs is relevant for the possibility of scrambling post-verbal objects to the preverbal position, as will be discussed in Section 3.3.

Besides, the following example shows that the “existence condition” is not necessarily fulfilled:

- (67) *Mingnian, ta zhunbei ba shigexuesheng tuijian gei zhejia gongsi.*
 next-year he plan BA ten student recommend to
 this company
 ‘He plans to recommend ten students to this company next year.’

In (67) *ta* ‘he’ plans to recommend ten students to a company in the future. In this sentence, *shi-ge xuesheng* ‘ten students’ does not refer to ten students in particular: nor the speaker, nor the *ta* ‘he’, need to have ten particular students in mind at the moment of the utterance. The fact that the *ba*-NPs in (66) and (67) are non-specific indefinite NPs cannot be explained in the disposal approach.

In some other studies, the affectedness of the *ba*-NP is claimed to be the consequence of the fact that *ba* used to be a lexical verb in the past and has been grammaticalized in modern Chinese (Wang, 1954). In the next section, I will explore whether *ba* has any effect on the interpretation of the *ba*-NP.

3.2.6 Summary

In this section, I have shown that *ba* behaves as a grammatical marker which does not have any lexical meaning. As was mentioned in the introduction section, *ba* is obligatory in some cases and optional in

some other cases. It can be considered an instance of differential object marking (DOM). The data of DOM in Chinese will be described in the next section.

3.3 DOM in Chinese

As is well known, the SVO word order in Mandarin Chinese is the main indicator for the grammatical functions of the constituents:

- (68) *Ta chi le na-ge pingguo.*
 he eat PRT that-CL apple
 ‘He ate that apple.’

The subject *ta* ‘he’ is located on the left side of the verb *chi le* ‘ate’ and the object *na-ge pingguo* ‘that apple’ is placed on the right side. Although word order in Chinese is rather strict, the language sometimes allows or even requires direct objects to move to a preverbal position. For instance, it is well-known in the literature that the verb in a Chinese sentence can be followed by only one constituent, which is called the Postverbal Constraint (Chao 1968, Huang 1982, Travis 1984, Sybesma 1992). In the example in (69) below, we see that when the verb *fang* ‘put’ is followed by two constituents, the sentence becomes ungrammatical:

- (69) **Wo fang qiu jin lanzi li le.*
 I put ball into basket inside PRT
 ‘I put the ball/the balls into the basket.’

In cases like these, the direct object obligatorily moves to the left side of the verb, where it is preceded by *ba*, as shown in (70):

- (70) *Wo ba qiu fang jin lanzi li le.*
 I BA ball put into basket inside PRT
 ‘I put the ball/the balls into the basket.’

In some cases, the object is optionally scrambled from post- to preverbal position, where it is also preceded by *ba*, like in the sentences in (71) – (73) below:

(71) *Ta ba na-ge pingguo chi le.*
 he BA that-CL apple eat PRT
 ‘He ate that apple.’

(72) *Ta ba wo da le.*
 he BA I hit PRT
 ‘He hit me.’

(73) *Ta ba yi-ge pingguo chi le.*
 he BA one-CL apple eat PRT
 ‘He ate an apple.’

Case-marking of direct objects in Chinese is limited to objects in preverbal position. Direct objects in their canonical, postverbal position are never case-marked.

In most cases, scrambled object-marking is obligatory. Sometimes, however, the case-marker can be omitted. Compare the sentence in (71) above with the sentence in (74):

(74) *Ta na-ge pingguo chi le.*
 he that-CL apple eat PRT
 ‘He ate that apple.’

Both the sentences in (71) and (74) are a grammatical way of expressing the intended meaning ‘he ate that apple’. Omitting the case-marker is impossible for the sentences in (72) and (73), as shown in (75) and (76) below:

(75) **Ta wo da le.*
 he I hit PRT
 ‘He hit me.’

- (76) **Ta yi-ge pingguo chi le.*
 he one-CL apple eat PRT
 ‘He ate an apple.’

Note however, that when pronouns occur in preverbal position without case-marking, they will be interpreted as the subject of the sentence. This is illustrated by the following example:

- (77) *Laohu wo chi le.*
 tiger I eat PRT
 ‘I ate the tiger.’

In (77), the NP *laohu* ‘tiger’ preceding the subject *wo* ‘I’ is in the topic-position of the sentence. If we compare the sentence in (77) with the sentence in (78), we see that topic, subject and scrambled object (the anaphor *ta* ‘it’, referring to the antecedent *laohu* ‘tiger’) can all precede the verb:

- (78) *Laohu_i wo ba ta_i chi le.*
 tiger I BA it eat PRT
 ‘The tiger, I ate it.’

The examples above illustrate that case-marking of objects in Chinese is sometimes obligatory, sometimes optional and sometimes prohibited. This is in accordance with the general characteristics of differential object marking (DOM). Data from Chinese show that animacy as well as definiteness are involved in the DOM-system: both dimensions seem to influence Chinese object marking. Let us review Aissen’s (2003) approach to cross-linguistic DOM in the next section.

3.4 Cross-linguistic DOM

Aissen (2003) gives an account of Differential Object Marking (DOM) in a great number of languages. She shows that differential object marking is cross-linguistically determined by the prominence dimensions of definiteness and/or animacy: the higher in prominence a

direct object is in terms of animacy or definiteness, the more likely it is to be overtly case-marked (Aissen 2003). For instance, objects that are human are more likely to be case-marked than inanimate objects, and definite objects are more likely to be case-marked than indefinite objects. If in a language both dimensions are involved, they generally go hand in hand: the higher in prominence an object is in terms of animacy and definiteness, the more likely it will be marked with case.⁵

The dimension of definiteness refers to the grammatical properties of a noun phrase, while the animacy dimension directly reflects properties of the individual referred to by the noun, regardless of its linguistic form. Below, both dimensions are represented in the form of universal prominence scales (Aissen 2003), derived from typological literature (Silverstein 1976, Comrie 1989):

(79) *Definiteness scale*

Pronoun > Proper Noun > Definite NP > Indefinite Specific NP > Indefinite Non-specific NP

(80) *Animacy scale*

Human > Animate > Inanimate

According to Aissen, the prominence scales in (79) and (80) must be understood in connection with the prominence scale of grammatical function or the *relational scale* in (81) (cf. Aissen, 2003):

(81) *Relational scale*

Subject > Object

DOM can be explained in terms of markedness. Markedness is a relative notion: which elements are marked and which are unmarked can only be determined in comparison with other elements. When we consider the properties of definiteness and animacy in combination

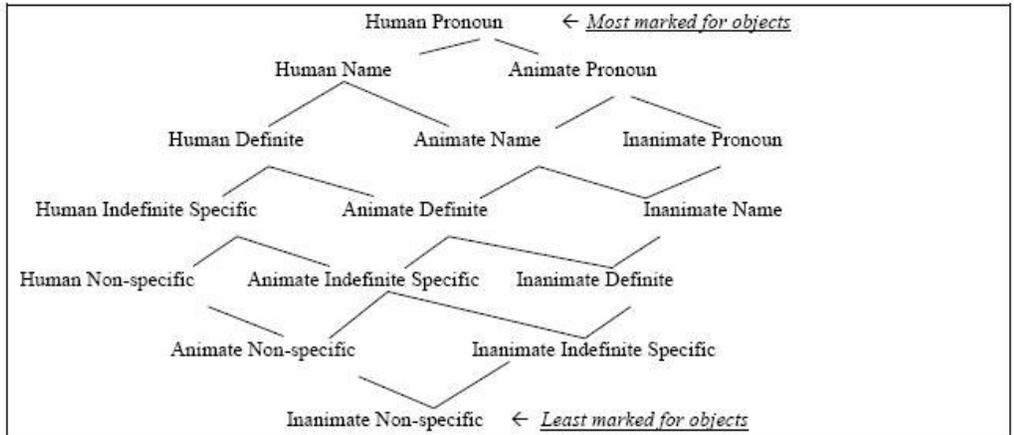
⁵ Aissen (2003) argues that person is also a relevant dimension. The distinction between the local persons (1st and 2nd) and the 3rd can be placed at the top end of the definiteness scale in (79).

with the scale of grammatical function, we find that marked properties of objects are unmarked properties of subjects and vice versa. This is an example of what has been called *markedness reversal* (Battistella 1990, 1996; Croft 1990).

Because of the association of subjects with agenthood and topicality, NPs that are in the upper end of (79) and (80) are more natural, or unmarked subjects (Keenan and Comrie 1977), whereas NPs that are on the lower end are more natural or unmarked objects.

When we take a look at languages that have differential object marking, we see that generally, those direct objects which have the most marked properties, and therefore mostly resemble subjects, get overtly case marked. The most marked objects may otherwise not be distinguishable from subjects. By adding a case-marker to the direct object, this distinguishability problem is solved. When objects have typically object-like, or unmarked, properties in terms of definiteness or animacy, there is less need to distinguish them from subjects by means of a case-marker, since the prominence dimensions already help to determine their grammatical function.

Aissen (2003) finds that DOM can be determined by either animacy or definiteness alone, or by both dimensions, which she calls two-dimensional DOM. Cross-linguistically, the more prominent objects are in definiteness and/or in animacy, the more susceptible they are to case marking: the dimensions of animacy and definiteness seem to go hand in hand. This is illustrated in Figure 1:

Figure 1. *Two-dimensional DOM (Aissen 2003)*

According to Aissen, “intuitively, DOM should flow from the top of this structure down. Human pronouns outrank all other elements and should be the most susceptible, cross-linguistically, to DOM; inanimate non-specifics are outranked by all other elements, and should be least susceptible” (Aissen 2003: 452). The cut-off point on the dimensions between overt case-marking and no marking may vary per language. Nevertheless, when languages make a split in this figure, it is always the higher prominent objects in terms of definiteness and/or animacy that will get case-marked, and the lower prominent ones which will lack a case-marker. Furthermore, languages with two-dimensional DOM generally categorize three sets of objects: objects for which case marking is obligatory, objects for which it is optional, and objects for which case-marking is prohibited.

Strikingly, however, the prominence scales seem to be opposed to each other in Chinese. Objects that are high-prominent in terms of animacy (human and animate objects) are obligatorily case-marked. At the same time, low-prominent objects in terms of definiteness (non-specific indefinite objects) are obligatorily case-marked. For a small class of objects in between, the case-marker can optionally be omitted. These data cannot be accounted for within Aissen’s approach: the dimension of definiteness seems to inversely influence Chinese differential object marking in comparison with the

way in which this dimension influences other DOM-patterns cross-linguistically. I will take a closer look at the role of the dimension of animacy and the dimension of definiteness in Chinese DOM in order to capture the difference and solve the problem.

3.5 Chinese DOM: Animacy and definiteness

3.5.1 Animacy and grammatical function

Aissen (2003) claims that, cross-linguistically, those direct objects which have the most marked properties in terms of animacy and therefore mostly resemble subjects get overtly case marked. In Chinese, we find a similar influence of animacy on the DOM-pattern: human and animate (high-prominent or marked) scrambled objects are obligatorily marked, as shown in (82)-(83):

(82) *Ta *(ba)laoshi tuidao le.*
 he BA teacher push-over PRT
 ‘He pushed over the teacher.’

(83) *Ta *(ba)she dasi le.*
 he BA snake hit.dead PRT
 ‘He killed the snake.’

For inanimate (low-prominent or unmarked) scrambled objects, case-marking is optional, as shown in (84):

(84) *Ta (ba) pingguo chi le.*
 he BA apple eat PRT
 ‘He ate the apple/the apples.’

Note that there is an exception to the obligatory marking of animate object nouns. Consider the following example:

- (85) *Ta (ba) ji chi le.*
 he BA chicken eat PRT
 'He ate (the) chicken.'

For the scrambled animate object *ji* 'chicken', case-marking is optional in the sentence in (85). However, the animate noun in this case is considered a meal and therefore inanimate.

The Chinese data seem to fit the cross-linguistic DOM-pattern as presented by Aissen (2003): high prominent objects in terms of animacy (animate and human objects) are obligatorily marked with *ba* when scrambled, whereas for low prominent scrambled objects, the case-marker is optionally omitted. This instantiation of markedness reversal will be explained in OT-terms in the following subsection.

3.5.2 Constraints

The Chinese DOM-behaviour can be analysed in OT by using a formal operation in OT known as Harmonic alignment, as discussed in Chapter 2, Section 2.6 (Prince & Smolensky 1993/2004). Harmonic Alignment is an operation of Optimality Theory that operates on pairs of scales, connecting the high-ranked element on a binary scale X to the elements on another scale Y from left to right. In the same way, the low-ranked component on the binary scale is connected to the components on the other scale from right to left. This generates two harmony scales which express the relative markedness of each such association. I will apply Harmonic Alignment to the prominence scale of animacy on the one hand, and the binary scale of grammatical function on the other, following Aissen (2003). This yields the harmony scales in (86a) and (86b). The scale in (86b) expresses the relative markedness of objects in terms of animacy. The most harmonic or least marked combination is presented on the leftmost side of the scale:

- (86) a. Subj/Hum > Subj/Anim > Subj/Inan
 b. Obj/Inan > Obj/Anim > Obj/Hum

The harmony scale in (86b) expresses that inanimate objects are less marked than animate objects, which on their turn are less marked than human ones. A constraint hierarchy can be derived from this harmony scale by inverting the ranking in (86b) and by prefixing the AVOID operator ‘*’:

(87) *OBJ/HUM >> *OBJ/ANIM >> *OBJ/INAN

This constraint hierarchy qualifies human objects as the most marked ones; they are to be avoided more than animate and inanimate objects respectively. However, in languages that have DOM, the most marked objects are *not* avoided. Rather, the marked class of objects is overtly marked with case whereas the unmarked class does not receive any morphological marking (Bossong 1985). In order to express this overt marking of marked objects in constraints, another formal OT technique is used. This technique is called Local Conjunction. Local Conjunction is an operation that is based on the idea that, as a result of the fact that constraint interactions can be stronger locally than non-locally, two constraint violations are worse when they occur in the same location. It ties together two separate constraints, or a constraint and a constraint subhierarchy, in this way creating a new constraint. We could locally conjoin the two separate constraints C1 and C2, forming a new constraint C1&C2. This new constraint is violated if in some domain *both* C1 and C2 are violated. The local conjunction of C1 & C2 is universally ranked above the two separate constraints C1 and C2.

I will apply Local Conjunction to the subhierarchy in (87) on the one hand and the iconicity constraint ‘Star Zero’ in (88) on the other, following Aissen (2003):

(88) * \emptyset_c : penalize the absence of case (morphology)

According to Aissen, the prototypical morphology of DOM consists of an opposition between zero and audible expression. By conjoining this constraint to the elements on the subhierarchy of relative markedness in (87), we can compel case marking most forcefully on the most

marked objects. This local conjunction yields the following subhierarchy of complex constraints:

$$(89) \quad *OBJ/HUM \ \& \ * \emptyset_c \gg *OBJ/ANIM \ \& \ * \emptyset_c \gg *OBJ/INAN \ \& \ * \emptyset_c$$

The hierarchy in (89) expresses that it is worse not to case mark human objects than not to case mark animate and inanimate objects. In Chinese, the cut-off point between optional and obligatory case-marking lies between animate and inanimate objects: animate and human objects are obligatorily marked with *ba* when placed in preverbal position, while for scrambled inanimate objects, case-marking is optional.

In order to account for optional case-marking in Chinese, I introduce the constraint *STRUC_C, following Aissen (2003), which penalizes the specification of morphological marking:

$$(90) \quad *STRUC_C: \text{penalize a value for the morphological category CASE.}$$

This structural economy constraint is based on the economic motivation that morphological marking is costly.

Since human and animate (the most marked) objects are obligatorily case marked in Chinese, the constraints *OBJ/HUM & * \emptyset_c and *OBJ/ANIM & * \emptyset_c must outrank *STRUC_C. For clarification, I merge the conjoined constraints *OBJ/HUM & * \emptyset_c and *OBJ/ANIM & * \emptyset_c of the hierarchy in (89) into one, which results in the simplified hierarchy in (91):

$$(91) \quad *OBJ/[HUM/ ANIM] \ \& \ * \emptyset_c \gg *OBJ/INAN \ \& \ * \emptyset_c$$

The higher ranked constraint *OBJ/[HUM/ ANIM] & * \emptyset_c in the hierarchy in (94) outranks *STRUC_C in Chinese: human and animate objects are obligatorily marked with case. On the other hand, inanimate (the least marked) objects are optionally case marked, which means that there is no difference in strength between *OBJ/INAN & * \emptyset_c and *STRUC_C.

The influence of animacy on Chinese DOM seems to correspond to the cross-linguistic pattern as presented by Aissen (2003). However, there is an additional factor that plays a role in Chinese DOM: the influence of animacy on Chinese DOM is restricted to scrambled objects. Objects in their canonical, postverbal position never receive a morphological marker. In order to account for this extra factor in OT-terms, I subdivide the general constraint *STRUC_C into the subconstraints *STRUC_C /UNSCR and *STRUC_C /SCRAM, the former being ranked higher than the latter:

(92) *STRUC_C /UNSCR >> *STRUC_C /SCRAM

In SVO-languages like Chinese, the postverbal position is the unmarked position of the object. Economy principles want to minimize the effort of the speaker: not only is it costly to use morphological marking, it is also costly to not use the basic word order of the sentence. Furthermore, in terms of iconicity, the markedness of a syntactic position (a non-canonical position) should be reflected by a marked morphological form. These principles of economy and iconicity underlie the constraint hierarchy in (92): if a word is in its canonical, unscrambled position, it is worse to morphologically mark it than when the word is in a marked, scrambled position. *STRUC_C /UNSCR outranks all constraints we discussed above, by which an OT evaluation will never yield case-marked unscrambled objects as optimal candidates.

I will show the interaction of the constraints in the OT Tableaux below. The constraint interaction for a human scrambled object is illustrated in Tableau 1, for an animate scrambled object in Tableau 2 and for an inanimate scrambled object in Tableau 3.⁶ To be noted, an abstract structure containing a scrambled object with certain semantic properties (animacy and definiteness) is used to represent the input in the tableaux of this OT syntax chapter. In this chapter, I am

⁶ For the sake of simplicity, I left out the higher ranked constraint *STRUC_C /UNSCR from the Tableaux, as it is not violated by any of the relevant candidates. Furthermore, note that the number of possible candidates is in principle infinite, but I only listed the most relevant candidates for the expression of the intended meaning.

not concerned with explaining object scrambling. I am just focusing on examples where it happens. Therefore, I only list the candidates where the object has scrambled (for whatever reason) and compare two structures, one with and one without case marking.

Tableau 1. *A human scrambled object*

Input: SUBJ + OBJ _{HUMAN} +PRED	*OBJ/[HUM/ ANIM] & *Ø _C	*STRUC _C /SCRAM	*OBJ/INAN & *Ø _C
<i>Ta laoshi da le.</i> He teacher hit PRT	*!		
☞ <i>Ta ba laoshi da le.</i> He BA teacher hit PRT		*	

Tableau 2. *An animate scrambled object*

Input: SUBJ + OBJ _{ANIM} +PRED	*OBJ/[HUM/ ANIM]& *Ø _C	*STRUC _C /SCRAM	*OBJ/INAN & *Ø _C
<i>Ta she dasi le.</i> He snake hit.dead PRT	*!		
☞ <i>Ta ba she dasi le.</i> He BA snake hit.dead PRT		*	

In Tableaux 1 and 2 we see that both candidates violate one constraint. The constraint *STRUC_C/SCRAM that is violated by the candidates that have case marking (the marked human and animate scrambled objects) is ranked lower than *OBJ/[HUM/ANIM] & *Ø_C, which is violated by their competitors without case marking. Because of the difference in strength of the violated constraints, the first candidates (the unmarked human and animate scrambled objects) lose the competition. This yields the second candidates (the case-marked human and animate scrambled objects) as the optimal expressions of the intended meanings.

Tableau 3. *An inanimate scrambled object*

Input: SUBJ+OBJ _{INANIM} +PRED	*OBJ/[HUM/ ANIM]& *Ø _C	*STRUC _C / SCRAM	*OBJ/INAN & *Ø _C
☞ <i>Ta pingguo chi le.</i> He apple eat PRT			*
☞ <i>Ta ba pingguo chi le.</i> He BA apple eat PRT		*	

In Tableau 3, again both candidates violate one constraint. However, there is no difference in strength between *OBJ/INAN & *Ø_C and *STRUC_C /SCRAM. For that reason, both the case-marked and the unmarked inanimate scrambled object are evaluated as optimal syntactic representations of the input meaning ‘he ate the apple’.

In this section, I have accounted for the influence of Animacy on the Chinese DOM-pattern. I have shown that high-prominent (marked) scrambled objects in terms of animacy are obligatorily marked with case, whereas low-prominent (unmarked) scrambled objects are optionally case-marked. However, for some inanimate scrambled objects, case-marking is not optional, but obligatory. Consider the following example:

- (93) *Ta *(ba)yi-ge pingguo chi le.*
he BA one-CL apple eat PRT
‘He ate an apple.’

Even though the object in (93) is inanimate, *ba* cannot be omitted in this sentence. Apparently, the dimension of definiteness also plays a role in Chinese DOM. In the next section, I will examine the influence of definiteness on the DOM-pattern in Chinese.

3.5.3 Chinese DOM: definiteness and syntactic position

With (93) I showed that the case-marker cannot be omitted when the scrambled object is indefinite. However, if we change the predicate

chi ‘eat’ into an accomplishment predicate *chi-wan* ‘eat-finish’, or add *dou*⁷ ‘all’ to the indefinite object NP, the case-marker becomes optional again:

(94) *Ta (ba) yi-ge pingguo chi-wan le.*
 he BA one-CL apple eat-finish PRT
 ‘He finished an apple.’

(95) *Ta (ba) yi-ge pingguo dou chi le.*
 he BA one-CL apple all eat PRT
 ‘He ate all of the apple/a whole apple.’

In both (94) and (95), *yi-ge pingguo* ‘an apple’ gets a specific, or strong, reading by which it can occur in preverbal position without a case-marker. In the same way, case-marking of definite objects in preverbal position is optional, as shown in (96) and (97):

(96) *Ta (ba) na-ge pingguo chi le.*
 he BA that-CL apple eat PRT
 ‘He ate that apple.’

(97) *Wo (ba) na-ge qiu fang jin lanzi li le.*
 I BA that-CL ball put into basket inside PRT
 ‘I put that ball into the basket.’

Apparently, the dimension of definiteness influences the Chinese DOM system as well: it determines the obligatory case-marking of certain direct objects, and the optional case-marking of others. However, the Chinese data do not correspond to Aissen’s picture with respect to definiteness: it is not the *most* marked (i.e. specific or definite), but the *least* marked (i.e. non-specific indefinite) objects that

⁷ Although there is a lot of discussion on the exact function of *dou*, there is fairly good agreement on the fact that NPs that are followed by *dou* get a specific or definite reading (e.g. Lee 1986; Liu 1997).

are obligatorily case-marked in Chinese. The dimension of definiteness seems to inversely influence the Chinese DOM-pattern.

In order to explain this unexpected influence of definiteness on the Chinese DOM system, we have to take the influence of word order into consideration again. Word order in Chinese plays a very important role in determining the grammatical functions of the constituents, as I mentioned before. In a canonical SVO-sentence, it is the (prototypically high-prominent) subject that precedes the verb, and the (prototypically low-prominent) object that follows the verb. As a result of this, preverbal positions are prototypically associated with high prominence (subject-like) properties, whereas postverbal positions are generally linked to low prominence (object-like) ones. Consider the following examples (adopted from Li & Thompson 1981: 20):

(98) *Ren lai le.*
 person come PRT
 ‘The person(s) came.’

(99) *Lai le ren le.*
 come PRT person PRT
 ‘A person/some persons came.’

In the sentence in (98), we see that the preverbal subject *ren* ‘person’ is interpreted as definite. When the subject is in postverbal position, as in (99), it gets an indefinite reading.

Word order can be considered a dimension of prominence as well. I will present the dimension of word order, or syntactic position, as a binary scale:

(100) *Syntactic position scale*: Preverbal > Postverbal

In terms of markedness, we can say that for the preverbal position, specific and definite NPs are harmonic (unmarked), whereas non-specific NPs are less harmonic (marked). Arguments in preverbal position are therefore required to have a specific or definite reading,

even when they are not the (typically high-prominent) subject of the proposition.

When an object is scrambled, both subject and object are in preverbal, high-prominent syntactic positions. If the scrambled object is specific or definite, it meets the requirements of the preverbal position. In preverbal position, a definite or specific object NP can be considered harmonic or unmarked, as a result of which the case marker becomes optional. However, if the scrambled object NP is non-specific, it no longer is unmarked, by which *ba* is obligatory.

This relation between definiteness and syntactic position and their influence on DOM can be captured by applying the operations of Harmonic Alignment and Local Conjunction again.

3.5.4 Constraints

If we apply Harmonic Alignment to the scales of definiteness and syntactic position, we will get the Harmony scales in (101), which in turn result in the universal constraint hierarchy in (102):

- (101) a. Pre/Pn > /Noun > Pre/Def > Pre/Spec > Pre/NSpec
 b. Post/NSpec > Post/Spec > Post/Def > Post/Noun > Post/Pn
- (102) a. *PRE/NSPEC >> *PRE/SPEC >> *PRE/DEF >> *PRE/NOUN >>
 *PRE/PN
 b. *POST/PN >> *POST/NOUN >> *POST/DEF >> *POST/SPEC
 >> *POST/NSPEC

The harmony scale in (101a) expresses that pronouns in preverbal position are less marked than preverbal proper nouns, which on their turn are less marked than respectively definite, specific indefinite and non-specific indefinite NPs in preverbal position. The constraint hierarchy in (102a) is to be read as follows: non-specific indefinite NPs in preverbal position are the most marked combinations; they are preferably avoided above respectively specific indefinite NPs, definite NPs, proper nouns and pronouns in preverbal position.

But again, in fact the most marked combinations are not avoided; they receive a case-marker instead. This can again be captured by applying Local Conjunction (cf. Chapter 2 and the sections above) to the subhierarchy in (102a) on the one hand and the iconicity constraint $*\emptyset_C$ on the other. This results in the following subhierarchy of complex constraints:

- (103) $*\text{PRE/NSPEC} \ \& \ *\emptyset_C \gg * \text{PRE/SPEC} \ \& \ *\emptyset_C \gg * \text{PRE/DEF} \ \& \ *\emptyset_C$
 $\gg * \text{PRE/NOUN} \ \& \ *\emptyset_C \gg * \text{PRE/PN} \ \& \ *\emptyset_C$

This subhierarchy expresses that it is worse to leave unmarked non-specific NPs in preverbal position than it is not to mark specific NPs, definite NPs, proper nouns and pronouns in preverbal position. We saw that in Chinese, the cut-off point between obligatory and optional case-marking lies between non-specific and specific indefinite objects in preverbal position: scrambled non-specific indefinite preverbal objects are obligatorily case-marked, while specific indefinite and definite objects can occur in preverbal position without *ba*. Hence, we can conclude that the economy constraint $*\text{STRUC}_C / \text{SCRAM}$ intervenes between the first and the second element in the hierarchy. $*\text{PRE/NSPEC} \ \& \ *\emptyset_C$ outranks $*\text{STRUC}_C / \text{SCRAM}$, since non-specific indefinite objects in preverbal position are obligatorily marked. The other types of objects in preverbal position are all optionally marked with *ba*, which means that $*\text{STRUC}_C / \text{SCRAM}$ and the remaining constraint conjunctions of the hierarchy in (97) are equally strong in Chinese. For the sake of clarity, I have merged these remaining conjoint constraints into one constraint, which triggers case-marking of pronouns, proper nouns, definite and specific indefinite objects in preverbal position. The result is the following, simplified constraint hierarchy.

- (104) $*\text{PRE/NSPEC} \ \& \ *\emptyset_C \gg * \text{PRE}[\text{SPEC/DEF/NOUN/PN}] \ \& \ *\emptyset_C$

Let us now look at the interaction among the constraints in (104) and $*\text{STRUC}_C / \text{SCRAM}$. The evaluation of possible expressions of the

intended meaning ‘he ate an apple’ is schematically represented in Tableau 4:

Tableau 4. *A scrambled non-specific indefinite object*

Input: SUBJ + OBJ _{NONSPEC} +PRED	*PRE/NSPEC & *Ø _C	*STRUC _C /SCRAM	*PRE/[SPEC/ DEF/NOUN/PN] & *Ø _C
<i>Ta yi- ge pingguo chi le.</i> He one-CL apple eat PRT	*!		
☞ <i>Ta ba yi- ge pingguo chi le.</i> He BA one-CL apple eat PRT		*	

Tableau 4 shows that the first candidate crucially violates the higher ranked constraint *PRE/NSPEC & *Ø_C, which yields the second candidate (the marked non-specific indefinite object) as the optimal one. In Tableau 5, the evaluation of possible expressions of the intended meaning ‘he ate that apple’ is illustrated.

Tableau 5. *A scrambled definite object*

Input: SUBJ + OBJ _{DEF} +PRED	*PRE/NSPEC & *Ø _C	*STRUC _C /SCRAM	*PRE/[SPEC/ DEF/NOUN/PN] & *Ø _C
☞ <i>Ta na- ge pingguo chi-le.</i> He that-CL apple eat-PRT		*	
☞ <i>Ta ba na- ge pingguo chi-le.</i> He BA that-CL apple eat-PRT			*

In Tableau 5, both candidates violate one of the equally strong constraints *PRE/[SPEC/DEF/NOUN/PN] & *Ø_C and *STRUC_C/SCRAM. Therefore, both the case-marked and the unmarked inanimate scrambled object are optimal expressions of the intended meaning ‘he ate the apple’.

In this section, I have shown that definiteness plays a role in Chinese DOM, but not in the way Aissen predicted in her approach. I aligned the prominence scale of definiteness with the prominence

scale of syntactic position instead of the relational scale. In order to give a full account for the case-marking of scrambled objects, the constraints presented in this section and the previous one should interact. In the next section, I will give an overall picture of Chinese DOM by combining the two analyses.

3.6 Chinese DOM: a full account

We have seen that in Chinese, the dimensions of both definiteness and animacy influence the optional omission of case marking from scrambled objects. The two OT-analyses given in Sections 3.5.2 and 3.5.4 each account for the influence of one of these dimensions. However, for certain scrambled objects, both dimensions are of influence at the same time. Consider the following example:

- (105) *Ta *(ba)zhe-tiao she dasi le.*
 he BA this-CL snake hit.dead PRT
 ‘He killed this snake.’

Even though the scrambled object is high-prominent in terms of definiteness, by which it obeys the requirements of the preverbal position and the case-marker should be optional, case-marking of *zhe-tiao she* ‘this snake’ is obligatory, as shown in (105), because the object is animate. Prominence in terms of animacy outranks prominence in terms of definiteness in cases like this. Therefore, the only scrambled objects for which the omission of the case-marker is allowed are both inanimate and specific or definite.

We have seen in the example above that animacy is decisive when the definiteness constraints allow for optional case marking: the definiteness constraints are only applicable to inanimate objects. For that reason, I will take the lowest element in the subhierarchy in (90), repeated in (106) for convenience, and I will locally conjoin this constraint with the elements in the subhierarchy in (104), repeated in (107). This results in the subhierarchy in (108):

- (106) *OBJ/[HUM/ ANIM] & *Ø_c >> * OBJ/INAN & *Ø_c

(107) *PRE/NSPEC & *Ø_C >> *PRE[SPEC/DEF/NOUN/PN] & *Ø_C

(108) *PRE/NSPEC & *OBJ/INAN & *Ø_C >>
 *PRE[SPEC/DEF/NOUN/PN] & *OBJ/INAN & *Ø_C

This complex hierarchy is to be interpreted as follows: case marking of non-specific inanimate objects in preverbal position outranks case marking of specific, definite, proper noun and pronoun inanimate objects in preverbal position. Since pronouns and proper nouns are used to indicate human or animate patients, I will remove PN and NOUN from the latter constraint for the sake of clarity⁸:

(109) *PRE/NSPEC & *OBJ/INAN & *Ø_C >>
 *PRE/[SPEC/DEF] & *OBJ/INAN & *Ø_C

The first constraint of this hierarchy outranks *STRUC_C, which is ranked equally high as the second constraint of the hierarchy in (109). The constraint *OBJ/[HUM/ ANIM] & *Ø_C is also ranked higher than *STRUC_C /SCRAM. The mutual ranking of the two highest ranked constraints is irrelevant. Tableaux 6 to 11 below illustrate that the interaction of these four constraints will yield the correct optimal outputs for every type of scrambled object.

⁸ Since there is no phonetic distinction between the human (male and female singular) and inanimate (singular) pronoun /ta/, the pronoun does not clearly indicate whether the object is animate or inanimate. For this reason, the inanimate pronoun will be treated in the same way as its human variants.

Tableau 6. *An inanimate, non-specific indefinite scrambled object*

Input: SUBJ + OBJ _{INANIM-NONSPEC} +PRED	*OBJ/ [HUM/ANIM] & *Ø _C	*PRE/NSPEC & *OBJ/INAN & *Ø _C	*STRUC _C / SCRAM	*PRE/ [SPEC/DEF] & *OBJ/ INAN & *Ø _C
<i>Ta yi- ge pingguo</i> He one-CL apple <i>chi le.</i> eat PRT		*!		
☞ <i>Ta ba yi- ge</i> He BA one-CL <i>pingguo chi le.</i> apple eat PRT			*	

In Tableau 6, it is the first candidate that crucially violates the complex constraint *PRE/NSPEC & *OBJ/INAN & *Ø_C, as the unmarked object is non-specific as well as inanimate. The second candidate only violates the lower ranked constraint *STRUC_C/SCRAM, by which the case-marked scrambled object is the optimal outcome of the evaluation.

Tableau 7. *An inanimate, specific indefinite scrambled object*

Input: SUBJ + OBJ _{INANIM-SPEC} +PRED	*OBJ/ [HUM/ ANIM] & *Ø _C	*PRE/ NSPEC & *OBJ/ INAN & *Ø _C	*STRUC _C /SCRAM	*PRE/ [SPEC/DEF] & *OBJ/ INAN & *Ø _C
☞ <i>Ta yi- ge pingguo chi-wan</i> He one-CL apple eat-finish <i>le.</i> PRT				*
☞ <i>Ta ba yi-ge pingguo chi-wan le</i> He BA one-CL apple eat-finish PRT			*	

Tableau 8. *An inanimate, definite scrambled object*

Input: SUBJ + OBJ _{INANIM-DEF} + PRED	*OBJ/ [HUM/ ANIM] & *Ø _C	*PRE/NSPEC & *OBJ/INAN & *Ø _C	*STRUC _C / SCRAM	*PRE/ [SPEC/DEF] & *OBJ/ INAN & *Ø _C
<i>Ta zhe- ge pingguo chi</i> He this- CL apple eat <i>le.</i> PRT				*
<i>Ta ba zhe- ge pingguo chi</i> He BA this-CL apple eat <i>le.</i> PRT			*	

Tableaux 7 and 8 show that only for inanimate definite and specific indefinite objects in preverbal position, the case-marker can be omitted. Both the case-marked and the unmarked object come out as optimal syntactic representations of the intended meaning.

In Tableaux 9 – 11 below, each time there is only one candidate that best satisfies the constraints: the remaining types of objects are all obligatorily marked with *ba* when they are scrambled. The interaction of the four constraints results in the correct representation of the Chinese DOM-pattern.

Tableau 9. *An animate definite scrambled object*

Input: SUBJ + OBJ _{ANIM-DEF} + PRED	*OBJ/ [HUM/ ANIM] & *Ø _C	*PRE/NSPEC & *OBJ/INAN & *Ø _C	*STRU _C / SCRAM	*PRE/ [SPEC/DEF] & *OBJ/ INAN & *Ø _C
<i>Ta zhe- tiao she dasi</i> He this- CL snake hit.dead <i>le.</i> PRT	*!			
<i>Ta ba zhe- tiao she dasi</i> He BA this- CL snake hit.dead <i>le.</i> PRT			*	

Tableau 10. *A human definite scrambled object*

Input: SUBJ + OBJ _{HUMAN-DEF} + PRED	*OBJ/ [HUM/ANI M] & *Ø _C	*PRE/NSPEC & *OBJ/INAN & *Ø _C	*STRU _C / SCR AM	*PRE/ [SPEC/DEF] & *OBJ/INA N & *Ø _C
<i>Ta zhe- ge laoshi da le.</i> He this- CL teacher hit PRT	*!			
<i>Ta ba zhe- ge laoshi da le.</i> He BA this- CL teacher hit PRT			*	

Tableau 11. *A scrambled human pronoun object*

Input: SUBJ + OBJ _{INANIM-PRON} +PRED	*OBJ/ [HUM/ANIM] & *Ø _C	*PRE/NSPEC & *OBJ/INAN & *Ø _C	*STRUC _C /SCRAM	*PRE/ [SPEC/DEF] & *OBJ/ INAN & *Ø _C
<i>Ta wo da le.</i> He I hit PRT	*!			
<i>Ta ba wo da le.</i> He BA wo hit PRT			*	

In this section, I presented an OT syntactic analysis for differential object marking in Chinese, using the hierarchies of definiteness, animacy, grammatical function, and syntactic position.

Scrambled object NPs in Chinese are usually marked with *ba*. In some cases, however, case-marking is not obligatory. That is, the omission of the case-marker is only allowed when the object is distinct from the subject in terms of animacy: only for inanimate (contrary to animate and human) object NPs in preverbal position, *ba* is optional. At the same time, omitting *ba* is only possible if the object in preverbal position is high in prominence in terms of definiteness: it should be specific or definite in order to fulfil the requirements of the preverbal position.

3.7 Conclusion

The Chinese DOM-pattern conflicts with Aissen's (2003) claim that highly prominent direct objects are most likely to be overtly case marked. As for animacy, we can conclude that Aissen's claim is correct: human and animate scrambled objects are obligatorily case marked in Chinese, whereas for inanimate scrambled objects case marking is optional. However, her claim does not hold for the influence of definiteness: non-specific indefinite scrambled objects, with low prominence, are obligatorily case-marked, whereas specific and definite scrambled objects are not.

I have shown in this chapter that Chinese DOM does not fit the cross-linguistic two-dimensional DOM-pattern of Aissen (2003). The dimension of definiteness in Chinese DOM should not be aligned with the scale of grammatical function, but rather with the dimension of syntactic position. When the prominence scale of definiteness is aligned with the scale of syntactic position instead of that of grammatical function, again the most marked objects are obligatorily case-marked. The least marked objects are optionally case-marked. Scrambled objects in Chinese must be specific or definite in order to be harmonic (unmarked), considering their syntactic position. At the same time, scrambled objects should be inanimate in order to be harmonic (unmarked), considering their grammatical function. There are only a few types of objects that have properties of both: the set of inanimate specific indefinite and definite objects, for which the case-marker is optionally omitted. When objects are either high-prominent or low-prominent in both animacy and definiteness, they are obligatorily case-marked.

Thus, the most marked objects in Chinese are not the high-prominent ones, as predicted by Aissen, because we are dealing with the extra dimension of syntactic position. Aissen (2003) does not take into consideration this dimension of syntactic position, and she only examines languages with differential marking of object NPs in their unmarked position. In this chapter, I have shown that the dimension of syntactic position is necessary in giving a full cross-linguistic account of Differential Object Marking.

The proposed analysis of differential object marking by *ba* in Chinese crucially treats the case-marker *ba* as a syntactic tool that does not affect the interpretation of the object. The interpretation of *ba*-NPs will be discussed in the next chapter.

Chapter 4

The Interpretation of Indefinite Objects

4.1 Introduction

In the previous chapter, I gave an OT syntactic analysis of the differential object marking pattern in Chinese. We saw that non-specific indefinite object NPs can only occur in preverbal position when they are marked with the morpheme *ba*, as illustrated in (1):

- (1) *Ta *(ba) yi-ge pingguo chi le.*
he BA one-CL apple eat PRT
'He ate an apple.'

As was pointed out in Chapter 3, the presence or absence of *ba* itself does not influence the interpretation of the preverbal object NP, and *ba* is optional when the preverbal object is specific or definite, as in (2):

- (2) *Ta (ba) zhe-ge pingguo xi le.*
he BA this-CL apple wash PRT
'He washed this apple.'

In the case of a non-specific indefinite object as in (1), *ba* licenses the non-specific indefinite NP in preverbal position, but it does not affect its interpretation. The *ba*-NP in (1) maintains its non-specific indefinite interpretation.

I argued that in Chinese the lexical meaning of an NP interacts with the interpretive characteristics of its word order position. The preverbal position is typically associated with the high prominence or 'strength' of the NP in this position. An indefinite NP in preverbal position as in (1) is always subject to two conflicting constraints,

therefore. On the one hand, because it is an indefinite NP, its preferred meaning is indefinite or non-specific, which is the basic meaning of an indefinite NP (Partee 1987 van der Does and de Hoop 1998; de Hoop and Krämer 2006; *inter alia*). On the other hand, because the object is in a scrambled (in this case, preverbal) position, its preferred meaning is definite or specific (cf. de Hoop and Krämer 2006). Hence, we get a conflict in interpretation: one constraint requires us to interpret the indefinite NP as non-specific, while the other constraint requires us to assign a specific reading to this NP because it is in preverbal position. The resolution of this conflict leads to the optimal interpretation of the indefinite object NP in preverbal position. In (1) we see that the former constraint outranks the latter, since we obtain a non-specific interpretation for the indefinite object in preverbal position. The question is which additional constraints may play a role in the determination of the optimal interpretation of an indefinite NP in Chinese. In this chapter, I will argue that the constraints that play a role may be various in nature, involving lexical properties of the NP, its syntactic position, and the type of predicate, but that they are all independently motivated, and cross-linguistically valid, albeit violable, in the spirit of Optimality Theory (Prince and Smolensky 1993/2004; Blutner et al. 2006).

I will present some relevant data and discuss a number of previous analyses of the interpretation of indefinite objects in Chinese in Sections 4.2 and 4.3, in particular with respect to the relation between the syntactic position of an NP and its interpretation (cf. Li and Thompson 1981) and the dependency between the type of predicate and the interpretation of the object NP (cf. Sybesma 1992; Liu 1997b). An OT semantic analysis will be presented in Section 4.4 and conclusions in Section 4.5.

4.2 Weak NPs in the *ba*-construction

As was pointed out in Chapter 3, the semantic-pragmatic characteristics of an NP interact with its syntactic position. Although the distribution of definite and indefinite NPs differs widely in various constructions across languages, independently of any theoretical

characterization of the notion of (in)definiteness, we say that the linguistic environments in which either a definite (strong) or an indefinite (weak) NP is exclusively acceptable exhibit a definiteness effect (cf. Reuland and ter Meulen 1987). The best studied construction that exhibits a definiteness effect is the existential construction. According to Milsark (1974), only ‘weak’ NPs are allowed in existential sentences in English, while ‘strong’ NPs lead to ungrammaticality in this context. Weak NPs include bare NPs, indefinite NPs, and cardinal NPs, as illustrated in (3). Strong NPs include definite NPs, demonstrative NPs, proper nouns, pronouns, universally quantified NPs and NPs with strong determiners such as *most*, as shown in (4).

- (3) a. There are cats in the garden.
 b. There is a cat in the garden.
 c. There are three cats in the garden.
- (4) a. *There are the/those/all/most cats in the garden
 b. *There is she/her/Lisa in the garden.

This distribution of types of NPs also holds in certain types of Chinese existential sentences, such as the so-called *you*-sentences (cf. Huang 1987).

- (5) a. *You yi-ben shu zai zhuo-shang.*
 have one-CL book at table-top
 ‘There is a book on the table.’
- b. **You nei-ben shu zai zhuo-shang.*
 have that-CL book at table-top
 ‘*There is that book on the table.’

- c. **You Lisi/ta/meige ren/daduoshu-de ren zai wuzi-li.*
 have Lisi/he/every man/most man at room-in
 ‘*There is/are Lisi/him/everybody/most people in the
 room.’

Also, with verbs of appearance/disappearance, we find a clear definiteness effect in Chinese, like in English (Huang 1987):

- (6) *Lai-le liangge ren/*Lisi/*ta/*meige ren/*meige ren*
 come-PERF two man/Lisi/he/that man/every man
le.
 PRT
 ‘There came two men/*Lisi/*him/*that man/*everybody.’

Note that demonstratives, proper names and pronouns behave as strong or definite NPs, while bare nouns and cardinal NPs can be characterized as weak or indefinite NPs, as they can appear in existential constructions, as shown above. This is exactly like in English. Also like in English, some types of weak or indefinite NPs can get strong or definite readings (cf. de Hoop 1996). NPs such as *yixie*-N ‘some N’ are weak NPs, which normally get a non-specific reading. They can, however, get a strong (partitive) reading in certain contexts, like in the sentence below:

- (7) *Tamen qi-zhong de yixie ren laizi Beijing.*
 They it-in PRT some person comefrom Beijing
 ‘Some of them come from Beijing.’

Bare NPs in Chinese can get either a strong (definite) or a weak (indefinite) interpretation, as illustrated in (8). Bare NPs can also get a generic reading, which is another type of strong reading, but I will leave that reading out of the discussion here.

- (8) *Wo mai-le shu le.*
 I buy-PERF book PRT
 ‘I bought a book/(some) books/the book(s).’

In other words, unlike in English, bare NPs are underspecified for definiteness (and number) in Chinese. According to Li & Thompson (1981), the semantic properties of the constituents in a Chinese sentence may determine their word order. For example, the preverbal position is associated with definiteness; this holds for subjects, as shown in (9), and for objects, as shown in (10):

- (9) a. *Ren lai le.*
 person comePRT
 ‘The person(s) has/have come.’
- b. *Lai le ren le.*
 comePRT person PRT
 ‘Some person(s) has/have come.’

The bare noun *ren* ‘person’ is the subject of the sentence in (9). It gets a definite reading when it is in preverbal position, as in (9a), and an indefinite reading when it is in postverbal position, as shown in (9b). The same holds for bare noun objects, as shown in (10), taken from Li & Thomspon (1981):

- (10) *Wo (ba) shu mai le.*
 I BA book buy PRT
 ‘I bought the book.’

The bare object *shu* ‘book’ in (10) gets a definite reading when it is placed in preverbal position.

Strikingly, the indefinite object *yi*-CL-N, which is a lexically marked indefinite NP, is prohibited in preverbal position, as illustrated in (11). The same holds for weak NPs like *yixie* N ‘some N’, witness (12):

- (11) **Ta yi-ge pingguo xi le.*
 he one-CL apple wash PRT
 ‘He washed an apple.’
- (12) **Ta yixie pingguo xi le.*
 he some apple wash PRT
 ‘He washed some apples.’

Li and Thompson (1981) claim that the preverbal position can only be occupied by definite and specific NPs. However, I have already shown that non-specific NPs can also occur in preverbal position as long as they are marked with *ba*:

- (15) *Ta ba yi-ge pingguo xi le.*
 he BA one-CL apple wash PRT
 ‘He washed an apple.’
- (16) *Ta ba yixie pingguo xi le.*
 he BA some apple wash PRT
 ‘He washed some apples.’
- (17) *Ta ba shi-ge pingguo xi le.*
 he BA ten-CL apple wash PRT
 ‘He washed ten apples.’

In my view, the presence of *ba* does not require the indefinite object to get a specific reading. If any strong NP should be able to scramble to the preverbal position, whereas any weak NP should be excluded from this position, then *ba*-marking should be optional for all objects in preverbal position. To put it differently, if the object in (15) could get a strong (specific) reading in preverbal position, then it should also be possible for this object to be in preverbal position without *ba*, just like other strong object NPs. However, *ba*-marking is obligatory for non-specific indefinites in preverbal position, which suggests that *yi*-CL N does not get a strong (specific) reading here.

The difference between a lexically weak NP such as *yixie* N ‘some N’ and a bare NP, is that the former is ‘specified’ for an indefinite reading by its weak determiner, while the latter is underspecified for definiteness. This becomes clear in the following scenario. Recall that there are situations in which an object NP obligatorily scrambles for syntactic reasons, as discussed in Chapter 3. The so-called POSTVERBAL CONSTRAINT prohibits a verb to be followed by more than one constituent (Chao 1968; Huang 1982; Sybesma 1992; Li 2001; Feng 2004):

- (18) **Wo fang le yixie shu jin shubao li.*
 I put PRT some book into schoolbag inside
 ‘I put some books into the schoolbag.’
- (19) **Wo fang le shu jin shubao li.*
 I put PRT book into schoolbag inside
 ‘I put (the) book(s) into the schoolbag.’

In (18), the object is a weak (indefinite) NP and in (19), the object is a bare NP. Since an object cannot follow the predicate *fang...jin...li* ‘put into schoolbag inside’, it must scramble to the preverbal position. However, the scrambled object is obligatorily *ba*-marked if it is an indefinite NP, whereas *ba*-marking is optional for bare NP objects:

- (20) *Wo *(ba)yixie shu fang jin shubao li le.*
 I BA some book put into schoolbag inside PRT
 ‘I put some books into the schoolbag.’
- (21) *Wo (ba) shu fang jin shubao li le.*
 I BA book put into schoolbag inside PRT
 ‘I put the book(s) into the schoolbag.’

The bare NP object in (21) is underspecified for definiteness, but because the preverbal position is associated with definiteness, the preverbal bare NP gets a definite (specific) reading in preverbal position. That explains why *ba* is optional in this case, as I have

argued in Chapter 3. The weak (indefinite) object NP in (20), on the other hand, is lexically specified for indefiniteness (non-specificity). This is in conflict with the fact that it is in preverbal position, a position associated with definiteness. Therefore, two conflicting constraints are involved in the interpretation of the weak (indefinite) object in preverbal position. I claim that the winning candidate is the non-specific reading in sentences (15)-(17) and (20) above. In this case, *ba* is obligatory to license a non-specific reading of an indefinite object in preverbal position. This function of *ba* was accounted for in the OT syntactic approach presented in Chapter 3.

It is not the case that lexically marked weak NPs can never get a strong (specific) reading, however. Recall that a weak object NP is normally prohibited in preverbal position, as shown again in (22):

- (22) **Ta shi-ge pingguo xi le.*
 he ten-CL apple wash PRT
 ‘He washed ten apples.’

However, if we add *dou* ‘all’, the weak (cardinal) NP can be in preverbal position, as shown in (23):

- (23) *Ta shi-ge pingguo dou xi le.*
 he ten-CL apple all wash PRT
 ‘He washed all of the ten apples.’

In this case, the object behaves as a strong (definite or universally quantified) NP with a concomitant strong reading, and then it does not need *ba* anymore to be licensed in preverbal position. Indeed, strong NPs can easily occur in a *ba*-construction. This is illustrated once more below for a universal NP and an NP with the strong determiner ‘most’ (Liu 1997b):

- (24) *Wo ba mei-fen baogao dou kan le.*
 I BA every-CL paper all read PRT
 ‘I read every paper.’

- (25) *Wo ba dabufen de xuesheng liu zai jiaoshi.*
 I BA most PRT student keep at classroom
 ‘I kept most of the students in the classroom.’

Liu (1997b) notes that, besides the strong NPs as mentioned above, weak NPs with the determiners ‘many’ and ‘certain’ are also allowed in the *ba*-construction:

- (26) *Wo ba henduo dongxi fangdao cangku qu le.*
 I BA many things put.to storage go PRT
 ‘I have put many things into the storage.’
- (27) *Tingshuo xuexiao ba mouxie xuesheng kaichu le.*
 hear.say school BA certain.PL student expel PRT
 ‘I heard that the school expelled certain students.’

Liu lists two sets of NPs, the *Generalized-specific* NPs which can occur as *ba*-NPs and the *non-G-specific* NPs which cannot occur in a *ba*-construction. According to Liu, the G-specific NPs have two features in common: all of them can be scope-independent in object-position, and all of them can be quantified by *dou* ‘all’.

However, there are many examples of Liu’s (1997a, 1997b) non-G-specific NPs that can actually occur in a *ba*-construction, as for example shown in (28)-(29):

- (28) *Anzhao guiding ni zhi neng ba budao baifenzhiyi*
 according rule you only can BA less.than one.percent-
de yingyu na-lai gei yuangong fen hong.
 PRT profit take-come to employee distribute bonus
 ‘According to the rules, you can only take less than 1% of the
 profit to distribute to the employees as bonus.’

- (29) *Wo zuiduo zhi neng ba san-dao-wu-pian xiugaigao-de*
 I most only can BA three-to-five-CL corrected- PRT
wenzhang na-chulai gei ni kan.
 article take-out for you read
 ‘I can only bring at most three to five corrected articles for you to read.’

In addition, the weak NP *yixie* N ‘some N’ cannot be quantified by *dou* ‘all’ but it can be used in a *ba*-sentence, as shown in (30):

- (30) *Ta ba yixie pingguo (*dou) xi-le.*
 he BA some apples all wash-PRT
 ‘He washed (*all of) some apples.’

Similarly, in certain contexts, other weak NPs can occur in the *ba*-construction, although they cannot be quantified by *dou* ‘all’:

- (31) *Ni keyi ba shi-ge xuesheng (*dou) fencheng yizu.*
 you can BA ten-CL student all divide.into one.group
 ‘You can have (*all of) ten students in a group.’
- (32) *Ni keyi fencheng shi-ge xuesheng (*dou) yizu.*
 you can divide.into ten-CL student all one.group
 ‘You can have (*all of) ten students in a group.’

These sentences show that with a modal verb, the weak NP can only get a weak (cardinal) interpretation, both in (31) and (32), even though it is in preverbal position and preceded by *ba* in (31). But neither can be marked with *dou*. No meaning difference is observed between the two sentences. Hence, there are NPs that cannot be quantified by *dou* but that can function as *ba*-NPs (*contra* Liu 1997b).

I conclude that weak NPs do occur in *ba*-sentences, although many have argued otherwise. Does this imply that the constraints formulated in previous approaches were not correct? Not necessarily. In previous accounts, constraints were often assumed to be inviolable. In Chapter 3 I showed that differential object marking with *ba* can be

accounted for with a Chinese-specific ranking of a number of universal yet violable constraints. In the same spirit, I will formulate universal violable constraints and give an OT semantic analysis of the different interpretations of NPs in the *ba*-construction in Chinese in Section 4.4.

But first, let us see in the next section how the type of predicate influences the interpretation of an object NP in the *ba*-construction.

4.3 The type of predicate and the interpretation of *ba*-NPs

4.3.1 Sybesma (1992)

In the previous section we observed that in Mandarin *ba* is obligatory for non-specific weak NPs in the preverbal position, while *ba*-marking is optional for specific and definite objects, as was also discussed in Chapter 3. Recall the following examples:

(33) *Ta zhe-ge pingguo xi-le.*
 he this-CL apple wash-PRT
 ‘He washed this apple.’

(34) **Ta yixie pingguo xi-le.*
 he some apples wash-PRT
 ‘He washed some apples.’

The difference in grammaticality between (33) and (34) shows that strong NPs can occur in preverbal position without *ba*-marking, while weak NPs cannot. I argued that *ba*-marking itself does not influence the strength (definiteness, specificity) of a weak NP. The type of predicate does influence the definiteness or specificity of a weak NP, however. This is shown in the pair of sentences below:

(35) **Ta yi-ge pingguo chi-le.*
 he one-CL apple eat-PRT
 ‘He ate an apple.’

- (36) *Ta yi-ge pingguo chi-wan le*
 he one-CL apple eat-finish PRT
 ‘He finished an apple.’

The predicate *chi-le* ‘eat-PRT’ cannot license a weak object NP in preverbal position (if *ba* is absent), but apparently, the predicate *chi-wan le* ‘eat-finish PRT’ can. The question is how we can explain the relation between the type of predicate and the occurrence of a weak object NP in preverbal position without *ba*-marking. Is it the case that the predicate in (36) triggers a definite or specific reading of the weak object? In other words, should we translate (36) as ‘He finished a particular/the apple’? Sybesma (1992) claims that this is indeed the case and a certain type of predicate triggers a strong reading on its object.

Sybesma (1992) notes that *ba*-NPs are generally strong, but they are strong for reasons independent of *ba*. Consider also the following sentence:

- (37) *Ta shi-ge pingguo xi-wan le.*
 he ten-CL apple wash-finish PRT
 ‘He finished washing the ten apples.’

The predicate licenses a weak NP in preverbal position without *ba*-marking in (37). However, the lexically weak NP gets a strong interpretation, translated in English as ‘the ten apples’. According to Sybesma (1992), this is due to the type of predicate. He subsequently argues that the *ba*-construction may only occur with this type of predicate.

Sybesma uses the distinction between perfective and imperfective aspect as a starting point for his analysis. He assumes that a predicate is perfective if it has a built-in moment of completion, in other words, if the event described is bounded. An event can be inherently bounded (as represented for instance by the English verb *finish*) or it can be bounded by explicitly specifying the result state of the event (represented by an English particle verb such as *eat up*). A

predicate also counts as bounded if it has a specified quantity object (Verkuyl 1972, Krifka 1989, 1992). At this point, Sybesma puts forward the claim that a predicate which is bounded *for reasons independent of the object* can only co-occur with a strong object. Hence, he predicts that perfective aspect is compatible only with strong (interpretations of) objects.

Sybesma claims that a perfective (bounded) predicate forces a bare NP to get a strong reading in Chinese, independent of its position, and independent of *ba*-marking:

- (38) a. *Wo he-guang le tang.*
 I drink-up PRT soup
 'I finished the/*some soup.'
- b. *Wo mai-zhao le shu.*
 I buy-get PRT book
 'I managed to buy the/*some books.'

Both sentences in (38) contain a perfective predicate and the postverbal object NPs obligatorily get a definite reading. Note that these examples are in conflict with the claim of Li and Thompson (1981) that bare NPs should get an indefinite reading in postverbal position. Thus, according to Sybesma, the reason why generally the *ba*-NP cannot be weak is because the predicate in *ba*-sentences is invariably perfective and denotes a bounded event. This is illustrated by the following sentences:

- (39) *Ta nongzang le yifu.*
 he make.dirty PRT clothes
 'He made the clothes dirty.'
- (40) *Ta ba yifu nongzhang le.*
 he BA clothes make.dirty PRT
 'He made the clothes dirty.'

A bare NP such as *yifu* ‘clothes’ is underspecified for definiteness: it can get either a definite or an indefinite reading. However, in both (39) and (40) *yifu* ‘clothes’ gets a strong (definite) interpretation, not only when it is preverbal and preceded by *ba* in (40), but also in postverbal position in (39) (*contra* Li and Thompson, 1981). This is due to the resultative complex predicate ‘make dirty’, which denotes a bounded event, according to Sybesma (1992).

Although I agree with Sybesma’s claim that *ba* itself does not affect the interpretation of NPs, I think it is problematic to claim that predicates in the *ba*-construction always denote bounded events. Consider sentence (41):

- (41) *Ta ba liang-ge pingguo chi-le.*
 he BA two-CL apple eat-PRT
 ‘He ate (the) two apples.’

If the perfective predicate *chi-le* ‘eat-PRT’ were a bounded predicate, then this would cause a definite (specific) reading on the weak object, according to Sybesma (1992). But then we would expect the object to get a strong reading in postverbal position as well, just as was the case in the pair of sentences in (39)-(40) above. This is, however, not the case:

- (42) *Ta chi-le liang-ge pingguo.*
 he eat-PRT two-CL apple
 ‘He ate two apples.’

The fact that *chi-le* ‘eat-PRT’ does not trigger a strong reading on its object, at least not when the object is in postverbal position as in (42), shows that Sybesma’s claim cannot be correct. That is, although in (41) the preverbal object is marked with *ba*, it does not necessarily get a strong reading due to the perfective predicate *chi-le* ‘eat-PRT’. The question is what part of Sybesma’s (1992) hypothesis is falsified by this example. Does the object of an independently bounded predicate not have to get a strong reading, or is the predicate *chi-le* not a bounded predicate after all? I claim that the latter is indeed the case.

Note that if we change *chi le* to *chi-wan le* ‘finish-eating’, we get different results:

- (43) *Ta chi-wan le liang-ge pingguo.*
 he eat-finish PRT two-CL apple
 ‘He finished (the) two apples.’

The predicate used in (43) definitely denotes a bounded event, yet its object can get both a weak (cardinal) reading and a strong (definite) reading in postverbal position. If we place the NP in preverbal position, a strong (definite) reading is obtained, however. Now we can see the difference between the two types of predicates more clearly:

- (44) **Ta liang-ge pingguo chi-le.*
 he two-CL apple eat-PRT
 ‘He ate two apples.’
- (45) *Ta liang-ge pingguo chi-wan le.*
 he two-CL apple eat-finish PRT
 ‘He finished the two apples.’

When the object NP is moved to preverbal position, the sentence with the predicate *chi le* is ungrammatical, but the sentence is fine with the predicate *chi-wan le*. This would be in accordance with Li & Thompson’s (1981) claim that only definite and specific NPs can occur in preverbal position. The ungrammaticality of (44) can be ascribed to the fact that the object is a weak NP. In (45), on the other hand, the weak object gets a strong (definite) reading, due to the boundedness of the predicate. Therefore, it can occur in preverbal position.

To sum up the discussion so far, although bounded predicates may force a strong reading on their object NPs, not all predicates in the *ba*-construction are bounded. The predicate *chi-le* ‘eat-Prt’ is not bounded, for example, unlike *chi-wan le* ‘eat-finish Prt’. Still, sentence (41), repeated below, is perfectly grammatical, despite the use of the predicate *chi-le* in a *ba*-sentence:

- (41) *Ta ba liang-ge pingguo chi-le.*
 he BA two-CL apple eat-PRT
 ‘He ate (the) two apples.’

So, although I agree with Sybesma (1992) that predicates that are bounded independently of their object, trigger a strong reading on their object, a predicate such as *chi-le* is not bounded in this sense and therefore does not necessarily trigger a strong reading on its object. The problem is that *chi-le* is perfective, however, and that perfectivity is often assumed to entail the completion of the event denoted in the sentence (and hence, boundedness). However, it has been argued before that perfective markers such as *le* in Chinese, do not always entail the completion of the event (Smith 1997; Koenig and Muansuwan 2000).

Smith (1997) shows that even when the event-type denoted by the predicate is an accomplishment in Vendler’s (1967) terminology, the perfective marker *-le* does not guarantee that the end-point associated with the event is reached:

- (46) *Wo zuotian xie-le gei Zhangsan de xin keshi*
 I yesterday write-PRT to Zhangsan PRT letter but
mei xie-wan.
 not write-finish
 ‘I wrote a letter to Zhangsan yesterday, but I didn’t finish it.’

Consider also the following example:

- (47) *Ta chi-le mian, keshi mei-chi-wan.*
 he eat-PRT noodles but not-eat-finish
 ‘He ate the noodles, but he did not finish them.’

Tai (1984) claims that in sentences such as (46) and (47), *le* is used to mark the completion of an activity rather than the end point of an event. In this respect, Mandarin differs from English. Chinese is not the only language where perfectivity does not necessarily entail the

completion of the event; cf. Binnick (1991) on Slavic languages, Singh (1991) on Hindi, and Koenig and Muansuwan (2000) on Thai.

These examples show that we can distinguish different types of perfective predicates in Chinese. Sybesma's (1992) claim that a predicate that is bounded independently of its object, triggers a strong reading on its object, can be maintained, but not his claim that all predicates in *ba*-sentences are bounded in this way. At this point, I will further explore the relation between a bounded predicate, such as *chi-wan* 'eat-finish', and the strong interpretation of its object. I agree that the interpretation of objects can depend on the type of predicate. The reason, I assume, lies in the complexity of the event structure. Following Rappaport Hovav & Levin (1998, 1999), I believe that the complexity of the event structure influences the specificity of the argument in an event. I will explain this in the following subsection.

4.3.2 Complexity of event structure

Levin (1999) argues that different types of events should be distinguished by their complexity. That is, a distinction can be made between complex causative events consisting of two sub-events, and simple non-causative events consisting of a single sub-event:

(48) Simple event structure templates:

- a. [x ACT<MANNER>_] (activity)
- b. [x STATE] (state)
- c. [BECOME [x STATE]] (achievement)

(49) Complex event structure template:

[[x ACT<MANNER>_] CAUSE [BECOME [y STATE]]]
(causative)

According to Rappaport Hovav & Levin (1998, 1999), the complexity of an event structure affects the licensing of objects. They propose the following principle governing the event structure-to-syntax mapping:

Structure Participant Condition:

There must be an argument XP in the syntax for each structure participant in the event structure.

A simple event structure only involves one structure participant: verbs such as activities need to express only one argument, which will be the subject. Two argument activity verbs (transitive verbs) can thus leave one argument, that is, the object, unexpressed without violating the Structure Participant Condition. A complex event structure contains two structure participants. To obey the Structure Participant Condition, they must express both these participants in the syntax. Note that the object is not only a participant in the first sub-event, but also in the second sub-event. As a result, objects in such complex events cannot be non-specific. They participate in two related events, so in the second event they must at least be specific (anaphoric, strong). Thus, this approach links the complexity of the event structure to the strength (specificity) of NPs. This view can be easily used to deal with the relation between certain types of predicates and the strength of object NPs in Chinese. Moreover, this approach is for the greater part compatible with Sybesma's (1992). Sybesma establishes an underlying structure for *ba*-sentences that reflects a complex event structure as well. The basic meaning of causative and canonical *ba*-sentences is paraphrased by Sybesma as follows: the subject brings about a new state of affairs as a result of the event denoted by the verb. This corresponds to Levin's complex event structure stated in (49), and thus via the STRUCTURE PARTICIPANT CONDITION it explains the strength of the object NP in the context of a causative or resultative predicate, such as *chi-wan* 'eat-finish'. However, unlike Sybesma, I do not assume that all predicates in *ba*-sentences are necessarily complex event denoting. It might be the case that generally predicates in a *ba*-sentence are like that (which might be related to the fact that *ba* was originally a verb itself), but this is no inviolable constraint on *ba*-sentences, as I showed above.

Let us now see how the distinction between complex and simple event structures is expressed in Chinese. It has been argued in

the literature that there are no mono-morphemic verbs in Chinese that encode achievements or accomplishments (Tai & Chou 1975). Lin (2004) describes the Chinese verbal system as follows (Lin 2004: 54):

- (50) primitive event types: activity, state
 state + *le* → achievement
 activity + achievement → accomplishment

If we compare English and Chinese verbs that express activities and achievements in (51), we observe a clear pattern:

(51)	English	Activity	Achievement
		<i>look (at)</i>	<i>see</i>
		<i>study</i>	<i>learn</i>
	Chinese	<i>kan</i> 'look'	<i>kan-jian</i> 'see'
		<i>xue</i> 'study'	<i>xue-hui</i> 'learn'

Unlike in English, there are no mono-morphemic words that denote a complex event in Chinese. Complex events are expressed by verbal compounds instead, in which the first verb denotes an activity and the second verb denotes the resulting state. Furthermore, verbs such as *eat* and *write* can form accomplishments in English, but not in Chinese. Compare the sentences (46) and (47), repeated below for convenience, with their English equivalents in (52) and (53):

- (46) *Wo zuotian xie-le gei Zhangsan de xin keshi*
 I yesterday write-PRT to Zhangsan PRT letter but
mei xie-wan.
 not write-finish
 'I wrote a letter to Zhangsan yesterday, but I didn't finish it.'

- (47) *Ta chi-le mian, keshi mei-chi-wan.*
 he eat-PRT noodles but not-eat-finish
 'He ate the noodles, but he did not finish them.'
- (52) **John wrote a letter yesterday, but he didn't finish it.*
- (53) **John ate the noodles, but he didn't finish them.*

Lin (2004) argues that in Chinese the marker *le* indicates a change of state and thus converts states into achievements. Hence, we could better translate (46) as 'I was writing a letter to Zhangsan yesterday, but I didn't finish it'. Accomplishments are derived through verbal compounding of achievements with an activity verb. The distinction between achievements and accomplishments is mainly a matter of duration of the first subevent. An achievement is punctual, while an accomplishment covers a longer time-interval.

While Li and Thompson (1981) claim that the preverbal position causes the definiteness of the *ba*-NP, Sybesma (1992) and Liu (1997b) both argue that it is the type of predicate involved. Both Sybesma and Liu claim that the predicate in a *ba*-construction is bounded, that is, denoting an event with an inherent end point and a resulting state. They assume that there is a connection between the boundedness of the predicate and the specificity of the *ba*-NP, although they differ in their definitions of bounded predicates and specific NPs. In this section I argued that it is not true that all predicates in *ba*-sentences denote bounded (completed) events, and therefore that it cannot be maintained either, that *ba*-NPs always get a strong reading. However, I do believe that there is a certain type of predicate (denoting a complex event structure) that triggers a strong reading of its object. Perfective predicates (marked by *le*) do not necessarily denote complex event structures, however. The object of a simple perfective verb can get a weak (non-specific) reading in preverbal position. In that case, *ba* is obligatory, whereas it is optional in case of a complex predicate, because then the object gets a strong interpretation due to the predicate.

Although there is indeed a dependency between the predicate and the object NP in the *ba*-construction, it is problematic to claim that all the predicates in the *ba*-construction are bounded and that all *ba*-NPs are strong. As was mentioned in the previous section, the *ba*-NP can get a weak reading.

4.3.3 *Intensional contexts*

It should be noted that the relation between the complexity (boundedness) of a predicate and the specificity of its object may be overruled in certain contexts, such as an irrealis context, an imperative context and a context in which the NP is in the scope of an event operator of universal quantification. In these contexts, it is possible for a *ba*-NP in a complex event to have a non-specific interpretation again:

- (54) *Ta neng ba yi-ge pingguo chi-wan.*
 he can BA one-CL apple eat-finish
 ‘He can finish an apple.’

The object in *ba yi-ge pingguo chi-wan* ‘finish an apple’ in (54) can get both a non-specific and a specific reading. In the latter case, *yi-ge pingguo* ‘an apple’ refers to a particular entity. Similarly, the object in (55) gets a non-specific reading since the event is yet to take place:

- (55) *Yao guonian le, ta zhunbei ba yi-jian xin yifu*
 will have-new year he plan BA one-CL new clothes
zuo chulai.
 make out
 ‘The New Year is coming; he is planning on making new clothes.’

The indefinites in the above cases have a reading that refers to no particular individuals, but rather links to the ‘individual concepts’ in terms of intensional semantics. When an event takes place habitually, in the future or in an imaginary world, the object NP argument is an

indefinite. In this case, there is no relation between the predicate and its object NP. According to Van Geenhoven (1996), following Zimmermann (1993), intensional predicates preferably take weak (property-denoting) objects (cf. Chapter 1, Section 1.4).

4.4 An OT semantic analysis

In the previous two sections it became clear that there are two reasons why *ba*-NPs very often get a strong interpretation. The first reason is that *ba*-NPs are always in preverbal position and the second reason is that *ba*-NPs are often objects of complex event denoting predicates. However, two other constraints appear to be in conflict with these, such that *ba*-NPs can get a weak interpretation as well. The first conflicting constraint requires lexically indefinite NPs to get an indefinite reading. The second conflicting constraint prefers an NP in the scope of an intensional predicate to get a weak interpretation. I will now formulate four constraints on the basis of these universal yet violable constraints that govern the interpretation of *ba*-NPs.

I pointed out in the previous sections and also in Chapter 3 already, basically following Li and Thompson (1981), that the preverbal position is associated with high-prominent or strong NPs. The following constraint hierarchy was formulated in Chapter 3:

(56) *PRE /NSPEC>> *PRE /SPEC

This constraint hierarchy expresses that avoiding preverbal non-specific (more generally, weak) NPs is more important than avoiding preverbal specific or definite (strong) NPs.

A conflicting constraint states that the unmarked reading for (lexical) indefinites is non-specific (Partee 1987; van der Does & De Hoop 1998; de Hoop and Krämer 2006):

(57) MAXIND: Indefinites get a non-specific reading.

MAXIND is violated when an indefinite NP gets a specific reading. Since indefinite and cardinal NPs can occur in preverbal position and

still get a weak (non-specific) interpretation (as long as they are marked with *ba*), I conclude that MAXIND outranks *PRE/NSPEC. This yields the following constraint hierarchy:

(58) MAXIND >> *PRE/NSPEC

However, in the previous section it became clear that MAXIND itself must be outranked by a constraint which triggers a strong reading on objects of complex event denoting predicates, since weak objects of such predicates obtain a strong reading. The relevant constraint can be formulated as follows:

(59) ECOMP-OBJ: Objects of complex denoting events get a specific reading.

I assume that the constraint in (59) is universal, although the linguistic forms of complex denoting events may vary from one language to the other.

The next step is to formulate a constraint that captures the fact that weak NPs under an intensional verb tend to get a weak reading (Zimmermann 1993; Van Geenhoven 1996, cf. Chapter 1, Section 1.4):

(60) INT-IND: Indefinite NPs under an intensional verb get a non-specific reading.

Since weak objects under intensional verbs (such as in (54)) are ambiguous between a weak and a strong interpretation, I assume that INT-IND and ECOMP-OBJ are not ranked with respect to each other. That is, the two strongest constraints are tied constraints, as shown in the following ranking:

(61) { INT-IND , ECOMP-OBJ } >> MAXIND >> *PRE/NSPEC

Let us now check whether the Chinese data can be accounted for with the constraint ranking in (61). The OT evaluations are given in the tableaux below.

Tableau 1. *A bare NP in preverbal position*

<i>Ta (ba) pingguo chi-le</i> he BA apple eat-PRT	INT- IND	ECOMP- OBJ	MAX IND	*PRE /NSPEC
“He ate an apple/apples.” (non-specific)				*!
☞ “He ate the apple/the apples.” (definite)				

The input in Tableau 1 is a sentence containing a preverbal bare NP. *Ba*-marking is optional in this case. The first candidate is a non-specific interpretation and the second candidate is a specific interpretation of the bare NP. The three highest ranked constraints are vacuously satisfied by both constraints. There is no intensional verb, there is no complex event denoting verb, and the bare NP is not a lexically marked indefinite NP. Hence, the only constraint that can distinguish between the two interpretations is the constraint that penalizes a non-specific reading in a preverbal position. Thus, the object NP gets a definite interpretation in this case. A bare NP is always interpreted as a definite NP when it is in preverbal position. Unlike Sybesma (1992), I assume that the interpretation of bare NPs is determined mainly by their syntactic position rather than by the nature of predicate.

When the input is a singular indefinite object NP, however, as in Tableau 2, the second candidate violates the constraint MAXIND, which is ranked higher than the constraint *PRE/ NSPEC. This yields the first candidate as the optimal interpretation of *yi-ge pingguo*: the object is interpreted as a non-specific apple, which again fits the data.

Tableau 2. *A singular indefinite object in preverbal position*

<i>Ta ba yi- ge pingguo chi-le</i> he BA one- CL apple eat- PRT	INT- IND	ECOMP- OBJ	MAX IND	*PRE /NSPEC
☞ “He ate an apple.” (non-specific)				*
“He ate a (particular) apple.” (specific)			*!	

However, if the predicate *chi-le* ‘eat-PRT’ of the input sentence in Tableau 2 is changed into *chi-wan le* ‘eat-finish PRT’, the indefinite object gets a specific reading, which is due to the complex event denoting predicate, that activates the higher ranked constraint ECOMP-OBJ as shown in Tableau 3:

Tableau 3. *A preverbal indefinite object with a complex event denoting predicate*

<i>Ta ba yi- ge pingguo chi-wan le</i> he BA one- CL apple eat-finish PRT	INT- IND	ECOMP- OBJ	MAX IND	*PRE /NSPEC
“He finished an apple.” (non-specific)		*!		*
☞ “He finished a (particular) apple.” (specific)			*	

Obviously, we will get a similar result for another type of weak object NP, a cardinal NP. This is illustrated in Tableau 4:

Tableau 4. *A preverbal cardinal object with a complex event denoting predicate*

<i>Ta ba shi-ge pingguo chi-wan le.</i> he BA ten-CL apple eat-finish PRT	INT- IND	ECOMP- OBJ	MAX IND	*PRE /NSPEC
“He finished ten apples.” (non-specific)		*!		*
☞ “He finished the ten apples.” (specific)			*	

We argued that the constraint INT-IND should be ranked equally high as ECOMP-OBJ in Chinese, since preverbal indefinite object NPs of complex event denoting can get both a specific and a non-specific reading under an intensional verb. This is shown in Tableau 5:

Tableau 5. *A preverbal cardinal object with a complex event denoting predicate under an intensional verb*

<i>Ta neng ba yi-ge pingguo chi-wan</i> he can BA one-CLapple eat-finish	INT- IND	ECOMP- OBJ	MAX IND	*PRE /NSPEC
☞ ‘He can finish an apple.’ <i>yi-ge pingguo</i> (non-specific)		*		*
☞ ‘He can finish the apple.’ <i>yi-ge pingguo</i> (specific)	*		*	

The constraints I formulated above show that the type of NP, the syntactic position and the nature of predicate all play a role in the interpretation of object NPs in preverbal position in Chinese. These constraints are universal: it is the particular ranking of the constraints that is specific for the Chinese language. Another important assumption is that the constraints are violable. It is exactly this combination of universality and violability of constraints that makes this approach different from the previous analyses of the interpretation of Chinese object NPs in *ba*-sentences.

4.5 Conclusion

In this chapter, I have shown that weak NPs do occur in the *ba*-construction. This finding conflicts with the original claim of (Lii 1975; Teng 1975; Li & Thompson 1981; Li 1990; Sybesma 1992) that *ba*-NPs can only have a strong reading. Indefinite objects can appear in the *ba*-construction and *ba* does not imply that the indefinite objects get a specific reading. *Ba*-marking itself does not influence the strength (definiteness, specificity) of a weak NP. The type of predicate does influence the interpretation of the object. However, it is not the

case that predicates in the *ba*-construction always denote a bounded event. I argue that the complexity of the event structure influences the specificity of the argument in an event. In addition, the relation between the complexity (boundedness) of a predicate and the specificity of its object may be overruled in certain contexts. In an irrealis context, an imperative context and a context in which the NP is under the scope of an event operator of universal quantification it is possible for a *ba*-NP in a complex event to have a non-specific interpretation again. I have also shown that an OT semantics model can perfectly account for different interpretations of objects in Chinese: the various factors that influence the interpretation of objects in Chinese can all be accounted for by a language-specific ranking of universal violable constraints, rather than by language-specific or inviolable constraints.

Chapter 5

Acquisition of indefinite objects

5.1 Introduction

In the previous chapter, I concluded that the interpretation of indefinites in Chinese can be characterized as the optimal output resulting from the interaction between various independently motivated constraints. However, the interpretation of indefinites in child language may be different from that in adult language (Lee 1986; Su 2001; Fan 2005). The ranking of the constraints in child language could differ from the adult ranking. For children, the process of language acquisition is precisely the development from child language to adult language rankings. In order to arrive at an adult ranking of the constraints, children constantly adjust their own ranking until it is the same as the adult's (Prince & Smolensky 1993/2004).

In this chapter, I present a study of children's interpretation of an instance of the indefinite object, namely the singular indefinite object *yi-CL N*. Since *yi-CL N* is used both as an indefinite and as a numeral phrase (cf. Chapter 1), it is interesting to see how children acquire the different interpretations of *yi-CL N*. This issue, again, reflects the relationship between universal and language specific factors. Cross-linguistically, indefinites are interpreted ambiguously, getting either a non-specific or a specific reading (cf. Chapter 1). With respect to the acquisition of indefinites, it has been assumed that children have a universal tendency to assign narrow scope to indefinite objects (Krämer 2000; Lidz & Musolino 2002; De Hoop & Krämer 2006). I will call this view the *Universalist Hypothesis*.

In Chinese, the singular indefinite is also a numeral expression. There are no other morphological markers for (in)definiteness. Also, specific to Chinese, quantifier relations are dependent on word order, which is isomorphic to the scope relations in logical forms (Huang 1982; Lee 1986; Aoun & Li 1993). On the basis of these language specific factors, previous acquisition research on *yi-CL N* (Lee 1986;

Su 2001; Fan 2005) claims that Chinese children initially (at least up until the age of 4) have a default non-scopal reading. The authors attribute this to the fact that the singular indefinite is interpreted with a numeral reading in early stages. The lexical difference between English *a/an* and Chinese *yi-CL N* is considered to be the factor that determines the children's interpretation of *yi-CL N* in Chinese, that is, English *a/an* is an indefinite marker, while *yi-CL N* is initially interpreted as a numeral expression in Chinese. For this reason, I call this view the *Input-Determined Hypothesis*.

The following questions are addressed in this chapter: how and when do language specific factors come into play in children's interpretation of *yi-CL N*, to what extent are patterns of child language acquisition determined by language specific factors, and to what extent are they universal?

In Section 5.2, I will investigate the interpretations of *yi-CL N* when it interacts with another quantifier in terms of scope readings. Three contexts are considered: sentences containing a universal quantifier, sentences containing a numeral expression and sentences containing negation. Previous assumptions are introduced and discussed, and language specific factors that play a role in quantifier relations in Chinese are described. In Section 5.3, I will present the Universalist Hypothesis of indefinite acquisition and discuss previous *yi-CL N* acquisition studies in Mandarin, from which the Input-Determined Hypothesis is derived. Also, predictions on the basis of the competing hypotheses are given in this section. In Section 5.4, two experiments are presented; they are further discussed in Section 5.5. Before coming to conclusions, an OT analysis regarding the relation between language universal and language specific factors concerning Chinese language acquisition is given in Section 5.6.

In Chinese adult language, *yi-CL-N* is ambiguously interpreted, but how about child language? Do children have the same scope preferences as adults? Does the numeral meaning of *yi-CL-N* show up in child language? Does it play a similar role as in adult Chinese, or is the numerality of the classifier more important for children, as suggested by Su (2001)? And what kind of developmental changes take place? I will try to answer these questions later on, but

first we have to consider the following two issues concerning the adult language: Do quantifiers exhibit both narrow scope readings and non-narrow scope readings in Chinese? Do language specific factors affect the interpretation of *yi-CL-N* when it interacts with other quantifiers?

Scope ambiguity of indefinites can be found in many languages. However, language specific factors may be involved in determining quantifier scope relations. In the next section I will first introduce three contexts where *yi-CL-N* interacts with another quantifier: sentences containing a universal quantifier, sentences containing a numeral expression or a frequency quantifier and sentences containing negation. Previous assumptions on Chinese quantifier relations are introduced and relevant language specific factors are discussed.

5.2 *Yi-CL N* and quantifiers: language specific phenomena

5.2.1 Three contexts

5.2.1.1 *Yi-CL N* and the universal quantifier

In Chinese, *yi-CL N* can occur in a sentence containing a universal quantifier. To capture the scope relations, Lee (1986) uses the following test items in a picture identification task:

- (1) *Mei-ge xiaopengyou dou chi le yi-ge dangao.*
 every-CL child all eat PRT one-CL cake
 ‘Every child is eating a cake.’
- (2) *You yi-ge cangao mei-ge xiaopengyou dou zai*
 have one-CL cake every-CL child all PRT
chi.
 eat
 ‘There is a cake which every child is eating.’

When the universal quantifier *dou* ‘all’ precedes *yi-CL N* in (1), the preferred interpretation of the sentence is ‘for every child, each has a cake and he is eating it, hence more than one cake is involved’. 80%

of the adult subjects have this interpretation. When *yi*-CL N precedes the universal quantifier in (2), adult subjects prefer the interpretation ‘there is only one cake that is being shared by every child.’ 90% of the adult subjects have this interpretation. This is in contrast with its English counterpart, in which the indefinite subject can be interpreted in two ways, as shown in (3) and (4):

(3) Some child likes every truck.

(4) (You) *yi-ge xiaopengyou xihuan mei-liang kache.*⁹
 have one-CL child like every-CL truck
 ‘Some child likes every truck.’

The English sentence in (3) is ambiguous, while its Chinese counterpart in (4) is not. The only possible interpretation for (4) is ‘there is a certain child and he likes every truck’. This example again shows that in Chinese, indefinites in the subject position cannot take a narrow scope reading. Such an observation leads to the hypothesis that the quantifier scope in Chinese is determined by the order of the quantifiers in the surface form. I will discuss this issue in more detail in Section 5.3.1.2.

5.2.1.2 *Yi-CL N and another numeral expression*

As mentioned in Section 1.6 of Chapter 1, a distributive reading is not allowed in a sentence containing multiple numeral expressions. For the sake of convenience (58) and (58’) in Chapter 1 are repeated in (5) and (5’):

(5) *Liang-ge laoshi gai le liu-fen kaojuan.*
 two-CL teacher mark PRT six-CL scripts
 ‘Two teachers marked six scripts.’

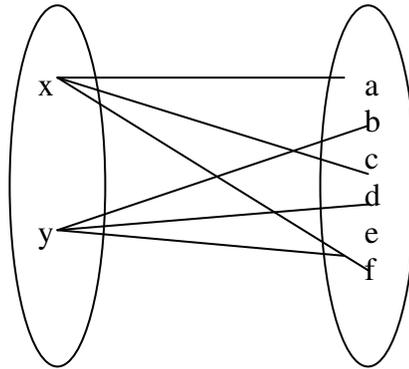
⁹ Though there is a traditional claim that *yi*-CL-N cannot occur in the sentence initial position without *you*, an existential marker, Fan (2005) shows that this sentence type is perfectly acceptable.

- (5') *a. Each of the two teachers marked six different scripts. So twelve scripts were marked by two teachers in all.
 * b. Each script was marked by two different teachers. So six scripts were marked by twelve teachers in all.

As was mentioned, the distributive reading of a quantifier is scope dependent. It seems that neither of the two numeral expressions in (5) gets a distributive reading, they have a cumulative reading instead. Since a cumulative reading refers to a context where each member of either set is connected with at least one member of the other set, it is a scope-independent reading, as shown in Figure 1:

- (6) $x, y = \text{teacher}$
 $a, b, c, d, e, f = \text{script}$

Figure 1. *Set theoretic representation of scopal readings*



It is possible for one teacher to mark one script and the other teacher to mark five scripts, or for the two teachers to mark the six scripts together. Either way, the number of teachers and the number of scripts are fixed to be two and six. The examples above lead to the conclusion that a construction as in (5) is special in the sense that only cumulative readings are allowed for numeral expressions.

The same restriction holds for a sentence containing *yi-CL N* and another numeral expression, as given in (7) and (8):

(7) *Yi-ge xuesheng chi le liang-kuai dangao.*
 one-CL student eat PRT two-CL cake
 ‘A student ate two cakes.’

- (7') *a. For one student, he (she) ate two cakes. It is possible to have more than one student and more than two cakes.
 b. There are two cakes that have been eaten by one student.

(8) *Liang-ge xuesheng chi le yi-kuai dangao.*
 two-CL student eat PRT three-CL cake
 ‘Two students ate one cake.’

- (8') *a. For two students, each ate one cake. Two cakes have been eaten.
 b. There is one cake that has been eaten by two students.

Sentences (7) and (8) can only be interpreted as (7'b) and (8'b) respectively. As we can see, sentences (7) and (8) contain the same construction as sentence (5), which may indicate that *yi-CL-N* is treated as a numeral expression and that it does not behave as an indefinite in this type of construction. The construction containing multiple numeral expressions in Chinese is obviously different from its English counterpart:

(9) Two boys ate three cakes.

The distributive reading can be obtained for either the subject or the object in (9), which shows that numeral expressions in Chinese are more restricted in distributive readings than numeral expressions in English.

5.2.1.3 *Yi-CL N and negation*

The two interpretations of indefinites can be captured in an English negative sentence, as shown in (10) and (10'):

- (10) He didn't write a letter yesterday.
- (10') a. He didn't write any letters.
 b. There is a particular letter that he didn't write. He may have written other letters.

However, in Chinese, *yi*-CL N cannot always occur as an object in a negative sentence:

- (11) * *Zuotian, ta meiyou xie yi-feng xin.*
 yesterday, he not-have write one-CL letter
 'He didn't write a letter yesterday.'

It has been claimed that *yi*-CL N is not licensed under negation, only definite NPs and bare NPs can occur there (Huang 1987; Zhang 1997), as shown in (12) and (12'):

- (12) *Zuotian, ta meiyou xie na-feng xin.*
 yesterday, he not-have write that-CL letter
 'He didn't write that letter yesterday.'
- (12') *Zuotian, ta meiyou xie xin.*
 yesterday, he not-have write letter
 'He didn't write letters/a letter yesterday.'

However, this claim may be too strong. Consider the example shown in (13), where a resultative predicate *xiewan* 'finish' is presented. The indefinite object gets a specific reading in this case, as pointed out in the previous chapter. It seems that only non-specific indefinite objects (or indefinites with narrow scope reading) are excluded under negation, while specific indefinites (or indefinites with non-narrow scope readings) are allowed:

- (13) *Zuotian, ta meiyou xie-wan yi-feng xin, jiu shi
yesterday he not-have write-finish one-CL letter, PRT is
gei ni de na-feng.
to you PRT that-CL
'He didn't finish a letter yesterday, the one to you.'*

There is another way to license *yi-CL N* in a negative sentence. An example is given in (14), where the indefinite object is stressed and has a universal reading:

- (14) *Zuotian, ta meiyou xie YI-feng xin.
yesterday he not-have write one-CL letter.
'He didn't write a SINGLE letter yesterday.'*

Now, compare example (14) with the following English sentences (Rohrbaugh 1997):

- (15) a. That store didn't charge me right for almost **ANY**thing!
b. I didn't get almost **ANY** of the Cap 'n Crunch, and now it's gone!

Notoriously, *any* in English is ambiguous between negative polarity *any* and free-choice *any*. Negative polarity items refer to linguistic expressions that can occur only in negative and not in affirmative contexts. A free-choice item refers to an item that has non-specific reference, or for which the choice of reference is always free. Free-choice *any* is not licensed by a negative context. It is a positive polarity item. It can also be modified by *almost*, whereas the negative polarity *any* cannot:

- (16) *I didn't see almost anybody.
(17) Almost any cat can catch mice.

However, in (15b), *any* is modified by *almost* in a negative context. When *any* is stressed, it has a free-choice reading and the emphatic

mood licenses it in a negative context. If we treat non-specific singular indefinites in Chinese as positive polarity items, then what is licensed in a negative context is a free-choice universal reading¹⁰.

Sentence (18) expresses the same meaning, where *yi*-CL N is moved to a position before the negator and is followed by a universal quantifier *ye*:

- (18) *Zuotian, ta yi-feng xin ye meiyou xie.*
 yesterday he one-CL letter all not-have write.
 ‘He didn’t write a SINGLE letter yesterday.’

It seems that in preverbal position, *yi*-CL N has to be marked with *ye/dou* to get the free-choice reading, while in the postverbal position, emphatic stress is used to license this reading. Since the free-choice universal reading is a non-narrow scope reading, the original claim that a narrow reading of an indefinite is not licensed under negation holds.

5.2.1.4 Summary

In this section I have discussed the interpretation of *yi*-CL N in three contexts. Interacting with a universal quantifier it takes narrow scope in the object position and a non-narrow scope reading in subject position. When *yi*-CL N occurs in a sentence containing a numeral expression, it takes a scope-independent reading in both subject and object position and is interpreted as ‘exactly one’. *Yi*-CL N with a narrow scope reading cannot be licensed in a negative sentence. In the

¹⁰ Henriëtte de Swart (p.c.) pointed out that modification by *almost* is not conclusive, and that this criterion does not always work to pick out a universal reading; in particular, it seems compatible with numerals (cf. Giannakidou 2001 and de Swart & Sag 2002). Furthermore, fci readings under negation are the exception, rather than the rule, and they come with special meaning effects (cf. Vlachou 2007 for extensive discussion). However, *ye* does induce a universal, free-choice reading just as *dou* does in this type of construction (Lu & Ma 2001). It is well acknowledged that *ye* and *dou* can be used interchangeably when they are used as a sum operator, the only difference is that *ye* has a preference for negated predicates (Huang 1996).

following section, I will introduce earlier assumptions on quantifier relations in Chinese.

5.2.2 *Quantifier relations in Chinese*

In this section I will discuss three relevant hypotheses on quantifier relations in Chinese: the Isomorphism Hypothesis (Huang 1982; Lee 1986; Aoun & Li 1993); the hypothesis that there are two types of numeral expression (Li 1996, 1998) and the hypothesis that bounded predicates result in strong readings (Sybesma 1992). The former two hypotheses are assumed to be specific for Chinese. However, it is clear that the phenomena they seek to explain are not specific to Chinese. The question is whether they are language specific hypotheses, or whether they can be considered to be universal constraints with a different ranking in different languages.

5.2.2.1 *Isomorphism Hypothesis*

Indefinites in English sentences that contain a universal quantifier and an existential quantifier are ambiguous. This is not always the case in Chinese:

(19) *Mei-ge xuesheng chi le yi-kuai dangao.*
 every-CL student eat PRT one-CL cake
 ‘Every student ate a cake.’

(20) *Yi-ge xuesheng mai le shudian li de mei-fu hua.*
 one-CL student buy PRT bookstore in PRT every-CL
 painting
 ‘A student has bought every painting in the bookstore.’

There is an ongoing debate on whether the indefinite object in (19) is ambiguous (between an ‘at least one’ reading and an ‘exactly one’ reading) or not (Jiang 1998), but definitely, the indefinite subject in (20) can only get a wide scope reading. It has been claimed in the literature that Chinese objects do not exhibit a wide scope reading. This hypothesis is supported by the fact that the object cannot take

scope over the subject resulting in a reading in which the number of subject referents is independent of the object, as was mentioned in Section 1.6 of Chapter 1 and Section. 5.2.1.2 of this chapter.

The claim that objects lack a wide scope reading in Chinese has led to the hypothesis that Chinese quantifier scope is determined by linear order, and that the scope relation of quantifiers in logical form is isomorphic to the position sequence in surface form. This idea of isomorphism in Chinese syntax is expressed in Huang (1982). Huang uses the c-command relation for the description of quantifier relations in Chinese:

General condition on scope interpretation (Huang 1982: 220)

‘Suppose A and B are both QPs or both Q-NPs or Q-expressions, then if A c-commands B at SS, A also c-commands B at LF’

C-command is a notion that comes from generative syntax and is defined as follows (Chomsky 1986):

C-command

A c-commands B iff neither dominates the other and the first minimal node dominating A also dominates B.

In order to illustrate the notion of c-command, a simple tree structure is depicted in Figure 2:

Figure 2. *Tree structure*



According to the definition of c-command, we can derive the following relations from Figure 2:

- A c-commands C, D, and E.
- B does not c-command any nodes.
- C c-commands A.
- D c-commands E.
- E c-commands D.

The General condition on scope interpretation defined above was revised in Lee (1986) by linking the linearity principle with the c-command relation; now, the relationship between two quantified expressions is captured in terms of command rather than c-command:

Revised general condition on scope interpretation (Lee 1986: 142)

‘Suppose A and B are both QPs or both Q-NPs or Q-expressions, then

- (i) if A asymmetrically commands B at SS, A has scope over B at LF;
- (ii) if A and B command each other and A precedes B at SS, A has scope over B at LF.

A commands B iff neither dominates the other and the first minimal clause dominating A also dominates B.’

Lee (1986) claims that the c-command relation cannot explain the Chinese data concerning sentences with embedded clauses. For instance, when a quantifier is embedded in a clause in the subject position, or in a relative clause, the c-command relation fails to capture the quantifier relations. Applying the command relation, on the other hand, solves this problem.

Aoun and Li (1993), however, follow Huang in claiming that c-command rather than command determines the scopal relations of quantifiers in Chinese. In order to solve the problem mentioned by Lee (1986), they apply the c-command relation not only to the concerned quantifier, but also to a member of the chain containing the quantifier:

The Scopal Principle (Aoun & Li 1993: 21)

‘An operator A may have scope over a quantifier B iff A c-commands a member of the chain containing B.’

When a quantifier moves from its base position to another position it forms a chain with its trace. Aoun and Li (1993) think the Chinese data can be accounted for by applying the Scopal Principle.

The notions used in the three approaches above are not exactly the same. However, they do share the general assumption of Isomorphism in Chinese: the scopal relations of quantifiers in logic forms are isomorphic to the positions sequences of the quantifiers in surface forms. Therefore, I call this assumption the *Isomorphism Hypothesis*. In the following section I will discuss the shortcomings of this hypothesis.

5.2.2.2 Shortcomings of the Isomorphism Hypothesis

There are three problems with the Isomorphism Hypothesis as an account for the quantifier relations in Chinese. First, the Isomorphism Hypothesis is assumed to be specific for Chinese only. However, the same phenomenon can be found in Japanese and Korean, so lacking a non-narrow scope reading for an object is not specific for Chinese. Furthermore, it has been claimed that the order of quantifiers in the surface form is relevant to scope assignment in general (Gil 1985), which means that universally the surface structure has an effect on scope assignment. Isomorphism of quantifier scope in surface form and LF is treated as a variation in parameter settings in Huang (1980) and Lee (1986), which, therefore, is language specific in nature. If so, it fails to capture the similarity between “absolute” isomorphism in Chinese, and the same tendency in other languages, such as Japanese and Korean. In other words, the Isomorphic Hypothesis may not be language specific after all.

The second problem with the Isomorphism Hypothesis is the following. Objects in a construction of multiple numeral expressions cannot take a distributive reading. This is understood as support for the Isomorphism Hypothesis. However, in this type of construction, the subject numeral expression does not exhibit a distributive reading

either. Both the subject and the object have a scope-independent reading. Therefore, this phenomenon cannot be explained by the Isomorphism Hypothesis.

Thirdly, even if we assume the Isomorphism Hypothesis to be a universal constraint, it should not be treated as a constraint that cannot be violated. Take the construction of multiple numerals for example. As was mentioned in Section 5.3.1.2, a distributive reading is restricted in such a construction. This is not specific for Chinese. In Turkish, a similar restriction is found in constructions containing multiple numerals as in Chinese (Kennelly 2004: 149-152):

- (21) *Üç kız dört sepet kaldırmış.*
 three girls four basket lifted
 ‘Three girls lifted four (nonspecific) baskets’ (only four baskets)

In the above example, neither the subject nor the object numerals have a distributive reading, which means that they do not have scope over each other. According to Kennelly, this distributivity restriction is a universal phenomenon. Kennelly investigated English native speakers on the interpretation of the similar construction in (22) and found 12 out of 15 people rejecting the distributive reading in (22’b):

- (22) Three girls lifted four baskets.
- (22’) a. Three girls lifted only four baskets.
 b. Three girls lifted twelve baskets.

Kennelly claims that a distributive reading in this construction is universally rejected. However, by imposing a contrastive context, the distributive reading can be induced. Similarly, in the Turkish data, when a focus operator, comparable to ‘only’ in English, is added to the subject numeral, the distributive reading of the subject is obtained, as in (23).

- (23) *Sadece üç öğrenci dört kitap okumuş.*
 only three student four book read
 ‘Only three students read four (nonspecific) books.’
 (ambiguous: four or twelve books; twelve books is the salient reading)

These examples show that universal constraints can be violated due to other (higher ranked) universal constraints.

5.2.2.3 Two types of numeral expression

The second hypothesis on quantifier relations in Chinese is the assumption that there are two types of numeral expressions: the individual-denoting numeral phrases and the quantity denoting numeral phrases (Li 1996, 1998). This hypothesis is proposed in order to account for constructions with multiple numeral expressions. As was mentioned above, in the construction with multiple numeral expressions, these numeral expressions fail to get a distributive reading:

- (24) *Wu-ge xuesheng xi le shi-ge wan.*
 five-CL student wash PRT ten-CL bowl
 ‘Five students washed ten bowls.’

In (24), the numeral expression in the object position has a scope independent reading: there are always ten bowls, never fifty. It is claimed in Li (1996, 1998) that the numeral expressions in (24) are quantity denoting number expressions. They are not quantificational and cannot quantify over individuals, differing from individual-denoting expressions or non-quantity denoting indefinites:

- (25) **San-ge xuesheng zai xuexiao shoushang le.*
 three-CL student at school hurt PRT
 ‘Three students were hurt at school.’

According to Li, Chinese is a topic prominent language. Therefore, the subject position is a strong position licensing only strong NPs.

Sentence (25) is rejected because the numeral expression is a quantificational expression, which quantifies over individuals and is an example of a weak NP. Li distinguishes two categories of numeral expressions:

- (26) a. [DP D [NUMP san-ge xuesheng]
 three-CL student
 b. [NUMP san-ge xuesheng]
 three-CL student

In (26a) the numeral expression has a determiner projection. The slot D is filled by an indefinite feature. Hence, the numeral subject in (25) is a weak NP. Weak NPs are not allowed to occur in topic or subject position in Chinese, which explains why sentence (25) is ungrammatical. In (26b), the numeral expression does not have a determiner projection and the numeral subject in (24) is a numeral expression of the type in (26b). The reason why the numeral subject in (24) cannot have a distributive reading is because it is a quantity denoting expression and therefore cannot quantify over individuals. No scope interaction takes place in this case.

5.2.2.4 Shortcomings of Li (1996, 1998)

In the construction of multiple numeral expressions, both numeral expressions have a scope-independent reading. Therefore, the sentence is not ambiguous. However, if the predicate is in an intensional context, it is possible to have two interpretations for this sentence:

- (27) *Wu-ge xuesheng neng xi le shi-ge wan.*
 five-CL student can wash PRT ten-CL bowl
 ‘Five students can wash ten bowls.’

- (27’) a. For five students, there are ten bowls and they can wash the ten bowls.
 b. For five students, each can wash ten bowls.

Another way of inducing a distributive reading for a construction with multiple numeral expressions is to modify the subject numeral expression in the subject position with a morpheme *you*:

(28) *You liang-ge xuesheng chi le san-kuai dangao.*
 have two-CL student eat PRT three-CL cake
 ‘Two students ate three cakes.’

(28’) *You liang-ge xuesheng chi le yi-kuai dangao.*
 have two-CL student eat PRT one-CL cake
 ‘Two students ate a cake.’

You ‘have’ is both used as a specific NP marker meaning ‘certain’, and as an existential marker meaning ‘there exist’. In a multiple-numeral construction, adding *you* can induce the distributive reading expressed by the subject numeral expression. In (28), the additional interpretation can be that there exist two students, each of them ate three cakes, and hence six cakes were eaten. However, the subject NP cannot take narrow scope with respect to the object and the sentence cannot be interpreted as ‘there are three cakes, each one was eaten by two different students, and hence six students were eating’. To prove the effects of *you*, I conducted a test. Two types of sentences were tested: sentences with and without *you*. Consider the following examples:

(29) *Liangzhi xiaomao tiaojin le yi-ge lanzi.*
 two-CL kitten jump-in PRT a/one-CL basket
 ‘Two kittens jumped into a basket.’

(30) *You liangzhi xiaomao tiaojin le yi-ge lanzi.*
 have two-CL kitten jump-in PRT a/one-CL basket
 ‘Two kittens jumped into a basket.’

(29) and (30) are sentences containing the construction of multiple numeral expressions. The only difference is that one starts with *you* and the other does not. A truth-judgement task was conducted to test

the interpretation of *yi*-CL N in object position. Toys were presented to yield either a narrow or non-narrow scope reading of the indefinite. A narrow scope reading of the indefinite was acted out by having two toy cats jump into two baskets; a non-narrow scope reading was acted out by having two cats jump into one basket.

There were six test items for each type of sentence: 3 items for 2-objects and 3 items for 1-object and there were two groups of adult subjects. The first group, consisting of 12 subjects, was exposed to the six items without *you*. The second group, consisting of 15 subjects, was tested on the six items with *you*. Only 5% of the adult subjects accepted the narrow scope interpretation of *yi*-CL N for the test items without *you*, while 44.4% accepted the narrow scope interpretation for the test items with *you*. In both cases, the non-narrow scope reading of indefinites was preferred. The test results support the claim that *you* can help to induce the distributive reading of the numeral expression it modifies.

5.2.2.5 *Strong objects in bounded predicates*

A third hypothesis was mentioned and discussed in Chapter 4 which holds that a bounded predicate results in a strong reading (definite, generic or specific) of its object (Sybesma 1992). Besides the predicate types discussed in Chapter 4, there is another type of predicate claimed to be a bounded predicate (Leung 2003): a predicate containing a verbal numeral classifier. In this section, I will introduce the assumptions relating to this type of predicate.

There are two types of numeral classifiers in Chinese: nominal numeral classifiers (NCL) and verbal numeral classifiers (VCL). NCLs refer to classifiers used in the nominal domain, in other words, they are used to modify NPs, like *liangzhi* ‘two’ in (31), and occur in argument positions. VCLs, like frequency quantifiers, are used in the verbal domain. They are used as a verbal modifier, like *liangci* ‘twice’ in (32):

- (31) *Liangzhi xiaomao tiaojin le yi-ge lanzi.*
 two-CL kitten jump-in PRT a/one-CL basket
 ‘Two kittens jumped into a basket.’
- (32) *Xiaomao liangci baoqi le yi-ge piqiu.*
 kitten twice hold-up PRT a/one ball
 ‘A/One kitten held a ball twice.’

Leung (2003) claims that a VCL is used to express the boundedness of an event: in Mandarin, events which happened before the time of utterance have to be expressed by [V-Num-VCL-Obj] or [V-Obj-Num-VCL] with overt numerals. For instance, the VCL *ci* ‘time’ in Chinese signals the completeness of a whole event. Therefore, predicates which have the forms of [V-Num-VCL-Obj] or [V-Obj-Num-VCL] express a bounded predicate. If the VCL plays a role in forming a bounded predicate in Chinese, then *yi*-CL N should receive a specific reading in such a predicate.

5.2.2.6 Discussion

We have to be careful in claiming that VCL predicates are always bounded, since *liangci* ‘twice’ can occur in different positions in the sentence. Does the position of *liangci* influence the interpretation of *yi*-CL N?

Soh (1998) claims that there are different scopal relations between sentences with objects to the left of frequency quantifiers and sentences with objects to the right of frequency quantifiers:

- (33) *Wo qing-guo quanbu de xuesheng liangci.*
 I invite-ASP all PRT student two time
 ‘I have invited all students twice’
- (34) a. all students>>>two times (distributive reading)
 b. two times>>>all students (group reading)

When the object *qianbu de xuesheng* ‘all students’ precedes the frequency quantifier, it is possible to have either a distributive reading

or a group reading. However, when it is to the right of the frequency quantifier, only the group reading is allowed as shown in (35):

(35) *Wo qing-guo liangci quanbu de xuesheng.*
 I invite-ASP two time all DE student
 ‘Twice, I have invited all students’

(35’) a. ?*all students>>two times (distributive reading)
 b. two times>>all students (group reading)

The disparity in scopal relation leads Soh (1998) to postulate that [V-Obj-Num-VCL] is the result of *object scrambling* of [V-Num-VCL-Obj]. The [V-Obj-Num-VCL] construction allows an additional scopal relation because of the Scopal Principle assumed in Aoun and Li (1993):

The Scopal Principle (Aoun & Li 1993:21):

‘An operator A may have scope over a quantifier B iff A c-commands a member of the chain containing B.’

In the constructions of [V-Obj-Num-VCL], the object moves to the left of frequency quantifiers and leaves a trace in the original position. Therefore it c-commands the frequency quantifier and its trace is c-commanded by the frequency quantifier, so two scopal relations are allowed. In the case of [V-Num-VCL-Obj], the frequency quantifier c-commands the object, so only one scopal relation is available. So, according to Soh, the different positions of *liangci* yield different interpretations of the objects.

Furthermore, and even in the case when a VCL predicate is bounded, it does not always yield strong objects. As discussed in Chapter 4: the effect of intensionality can overrule the effect of boundedness of the predicate. The effect of intensionality is shown for a bounded predicate formed with a frequency quantifier:

- (36) *Xiaomao neng liangci bao-qi yi-ge piqu.*
 kitten can twice hold-up one-CL ball
 ‘The kitten can lift a ball twice.’

In (36), the intensionality constraint INT-IND is in conflict with the boundedness constraint ECOMP-OBJ. (See Chapter 4, Section 4.3.3 for a detailed discussion.) Since sentence (36) is ambiguous, apparently neither constraint strictly dominates the other, since both interpretations are possible. In Section 5.5 some experiments will be discussed which provide an answer to the question which interpretation is preferred.

5.3 Acquisition of indefinites

5.3.1 Acquisition of indefinites: the universalist view

Scope ambiguity of indefinites is a cross-linguistic phenomenon. Language specific factors are involved in the interpretations of indefinites, as shown for Chinese above. A question central to the study of language acquisition is to what extent patterns of child language are universal, or, the other way around, determined by the language input. It has been claimed that there is a universal tendency to assign narrow scope to indefinite objects in child language (Krämer 2000; Lidz and Musolino 2002; De Hoop and Krämer 2006). Supporting the universal tendency of preferring weak indefinite objects in child language, we can distinguish different approaches with different explanations. In Krämer (2000) and De Hoop & Krämer (2006), scope assignment in child language is related to the semantic properties of indefinites. For this reason, I term their approach the Semantic Universalist Hypothesis. Lidz and Musolino (2002), in contrast, claim that for children, c-command relations of quantifiers in surface form determine scope. I call this claim the Syntactic Universalist Hypothesis.

In Dutch, indefinites can appear to the left and to the right of an adverb. Krämer (2000) distinguished between indefinites denoting a property and indefinites denoting a free variable, following Van

Geenhoven (1996). Property-denoting indefinites, or “predicative indefinites”, receive their existential interpretation through a mechanism of semantic incorporation in the verb. The indefinites that appear after the adverb or that appear in post-negation position often receive a predicative interpretation. Predicative indefinites may take narrow scope with respect to operators that affect the verb. In contrast, the indefinites in a position preceding the adverb or negation are normally interpreted as free variable indefinites. These free variable indefinites receive an existential interpretation through accommodation to the discourse context. They are insensitive to operators that affect the verbs and may take scope over them:

- (37) a. *De jongen heeft geen vis gevangen.*
 the boy has no fish caught
 ‘The boy did not catch any fish.’
- b. *De jongen heeft een vis niet gevangen.*
 the boy has a fish not caught
 ‘The boy did not catch a (particular) fish.’

In (37a), the indefinite object is positioned to the right of the negation word and is called a ‘low indefinite’ in Krämer (2000). It can only take a narrow scope reading. In (37b), the indefinite object is located to the left of negation, and is called a ‘high indefinite’. It is a free variable indefinite taking scope over the negation.

Krämer (2000) examined children’s interpretations of the indefinite objects in both positions regarding negation by employing a truth value judgement task. Subjects were told short stories accompanied by pictures. At the end of each story, a hand puppet uttered a statement about the story. The subjects were required to judge whether the statement was correct or not. The experimental results show that children interpret indefinites adult-like (having a narrow scope reading) in 100% of the cases when they are positioned to the right of an adverb or a negation. However, children fail to assign a non-narrow scope reading to indefinites preceding the adverb or negation. Here, 100% of the adults *accept* a non-narrow scope reading, while 84% of the children (4:0-7:0) *reject* a non-narrow scope

reading. In the second experiment, Krämer tested the scope relations between singular indefinites and *twee keer* ‘twice’ by using an act-out task. She compared the performance of sentences with an indefinite object NP to the left of *twee keer* ‘twice’ in (38b), and an indefinite object NP to the right of *twee keer* ‘twice’ in (38a) (Krämer 2000: 119):

- (38) a. *Je mag twee keer een potje omdraaien.*
 ‘You may turn over a (any) jar twice.’
 (should involve one or two jars)
- b. *Je mag een potje twee keer omdraaien.*
 ‘You may turn over a (particular) jar twice.’
 (should involve only one jar.)

According to Krämer, adults always (100%) interpret the indefinites with a narrow scope reading when they occur after *twee keer* and in this case children (4:0-7:0) gave adult-like responses (93%). However, when indefinites preceded *twee keer*, 92% of the adults prefer the non-narrow reading of indefinites, while child responses rather differ: 49% had a non-narrow scope reading and 51% a narrow scope reading. The results of this study show that Dutch children between 4 and 7 years old assign narrow scope readings in both positions. On the basis of the experimental results, Krämer (2000) proposes the Non-Integration Hypothesis:

Krämer’s Non-Integration Hypothesis:

Children acquire the predicative interpretation of indefinites early. The free variable interpretation is acquired later because it requires discourse integration.

In order to get the predicative interpretation of indefinites, the hearer only has to pay attention to information provided by the sentence in which the indefinite NP occurs. The free variable interpretation requires a process of discourse integration by integrating separate utterances into a discourse and making use of discourse information. Since the latter is the more complicated and advanced mechanism, it is

predicted that children have a later acquisition of the high indefinites with a free variable interpretation.

Though children (4:0-7:0) interpret indefinites as non-specific in the object position, they tend to interpret indefinites in the subject position with a specific reading. More importantly, they also get the specific reading for indefinite subjects which occur in an existential construction; here adults prefer a narrow scope reading (Termeer 2002; Flobbe 2006). This subject-object a-symmetry is described and studied in De Hoop & Krämer (2006) who reinterpret the experimental results of Krämer (2000): children are adult-like in their interpretation of specific indefinite subjects and in their interpretation of non-specific indefinite objects. However, they differ from adults when they have to interpret non-specific indefinite subjects and when they have to interpret specific indefinite objects.

In De Hoop & Krämer (2006) the form and interpretation of indefinites are reinterpreted with the notion of markedness within a bidirectional OT framework (Blutner et al. 2006). The non-specific reading is considered to be the unmarked interpretation of an indefinite object, and the marked interpretation of an indefinite subject. The specific reading is taken to be the unmarked interpretation of an indefinite subject and the marked meaning of an indefinite object. In bidirectional OT, the unmarked form combines with the unmarked meaning and the marked form goes with the marked meaning. De Hoop & Krämer (2006) claim that the optimization of form and meaning is a bidirectional process for adults, but unidirectional for children. In other words, children effortlessly pair an unmarked meaning with an unmarked form, but are delayed in getting a marked meaning for a marked form. Instead, children will assign an unmarked meaning to a marked form, which explains why they fail to get a specific interpretation for an indefinite object in the scrambled position and to get a non-specific interpretation for an indefinite subject in an existential construction.

Although the views in Krämer (2000) and De Hoop & Krämer (2006) are different, they share the assumption that the cause of the children's difficulty with the non-narrow scope assignment lies in the

nature of the indefinites. The difficulty either lies in discourse integration or in the mapping of marked meanings to marked forms.

Lidz and Musolino (2002) investigate how children and adult speakers of English and Kannada interpret ambiguous sentences containing numeral expressions and negation, like in (39):

(39) *Donald didn't find two guys.*

Sentence (39) is ambiguous between a non-narrow scope reading and a narrow scope reading of the numeral expression (Lidz & Musolino 2002: 126):

- (40) a. There are two particular guys that Donald did not find.
 b. It is not the case that Donald found two guys.

According to the interpretation given in (40a), it is possible that Donald found three other guys, but not the two guys he wanted to find. The numeral expression *two guys* takes scope over the negation in this case. (40) is a condition where the numeral expression has narrow scope within negation. It is obvious that the surface syntactic structure of (40) and its semantic structure are not isomorphic.

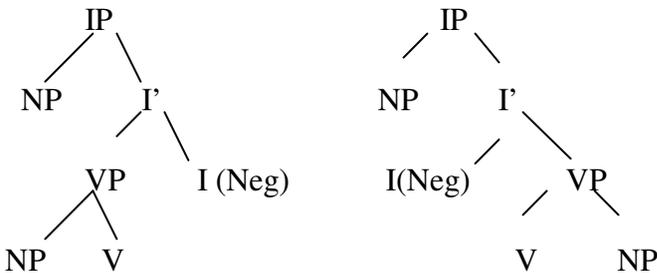
It has been claimed that, unlike adults, young children systematically interpret negation and quantified NPs on the basis of their position in c-command relations rather than on the basis of linear order. The experiments in Lidz and Musolino (2002) are designed to test this claim. Stories are acted out in front of the subjects using small toys. A puppet watches the stories and makes a statement about what he thinks happens in the story. The subjects are required to judge whether the puppet's statement is correct or not.

There is no significant difference in adult acceptance rates found between the condition where the numeral expression takes non-narrow scope and the condition where the negation takes wide scope (93% and 97% respectively). This indicates that adults behave similarly with respect to the non-narrow and the narrow scope reading of numeral expressions. However, for children the contrast between the two conditions is significant: 81% vs. 33% respectively ($p=0.001$).

The experimental results for English support the hypothesis of Musolino et al. (2000). There are two principles that can explain such an interpretation. One principle is based on the notion of linear order: the preferred scope reading for quantified phrases corresponds to the left-to-right ordering of the phrases in the surface form of the sentence (Fodor 1982). The other principle accounts for the preference in terms of the c-command relation between quantified phrases (Reinhart 1983). In (39), the negation both c-commands and precedes the numeral expression making it unclear which principle is obeyed in order to get a narrow scope interpretation. Therefore, an experiment on Kannada is conducted to see whether Musolino et al.'s hypothesis is a cross-linguistic phenomenon and, if so, which principle accounts for children's interpretations of scope relations. In Kannada, linear order and c-command relations are not confounded as negation does not precede a numeral object but it does c-command it, as shown in (41) and (42):

- (41) *Anoop eradu kaaru toley-al-illa.*
 Anoop two car drive-inf-neg
 'Anoop didn't drive two cars.'

- (42) a. Kannada b. English



The experimental design for Kannada is the same as the one for English. Regarding the interpretation of the numeral object, the acceptance rate of adults is 87.5% for the non-narrow scope reading and 85.4% for the narrow scope reading; the acceptance rate of

children (4;0-5;0) is 22.9% and 75% respectively. These results support the hypothesis of Musolino et al. (2000) on the basis of the principle of c-command relations.

It should be noted that in Dutch, an indefinite object is located either before or after the negation. The negator either c-commands or is c-commanded by the object. Hence the two positions should each yield a different interpretation, which is not the case in Dutch child language (Krämer 2000; De Hoop & Krämer 2006). This is counterevidence to the claim that syntactic structure is the reason for the absence of a non-narrow scope reading of indefinites in child language (Lidz and Musolino 2002). Besides, as we will see, the results of several Chinese experiments (Lee 1986; Su 2001; Fan 2005) do not support the claim made in Lidz and Musolino (2002) either.

To sum up, with regard to scope ambiguity of indefinites an important claim says that there is a language independent tendency for children to interpret indefinite objects with a narrow scope reading (Universalist View). This tendency is accounted for in terms of semantic properties of indefinites in the Semantic Hypothesis, or in terms of c-command relations in the Syntactic Hypothesis. In the Semantic Hypothesis, Krämer (2000) believes that children need discourse integration in order to acquire the non-narrow scope readings of indefinites and De Hoop & Krämer (2006) believe that children effortlessly pair an unmarked meaning with an unmarked form, but are delayed in getting a marked meaning for a marked form. In the Syntactic Hypothesis, Lidz and Musolino (2002) believe that the difficulty with the non-narrow scope assignment of children lies in the fact that children tend to follow the c-command relations between quantifiers when interpreting sentences.

5.3.2 *The input-dependent view*

The Universalist View is not supported by previous acquisition work on indefinites in Chinese (Lee 1986; Su 2001; Fan 2005). In these studies it is claimed that the interpretation of indefinites in child language is determined by the input, i.e. the language specific properties of indefinites. I will call this view the Input-Dependent

View in this dissertation. In a study of the acquisition of Spanish indefinites by Miller and Schmitt (2004), the results show that the numerality of the determiner is a factor. Their results do not provide an answer to the question whether, in addition to the numerality factor, there is also a narrow scope tendency.¹¹ It is worth noting that the Spanish data are not exactly the same as the Chinese data. In Miller and Schmitt (2004) bare singular nouns and indefinites are examined. Their findings show that Spanish children allow both a specific and a numeral reading. The numeral reading here refers to the number of objects involved, i.e. 'one', which is not identical to a specific reading or a non-narrow scope reading of indefinites. Therefore, the lexical difference between Spanish indefinite *una* 'one, a/an' and English *a/an* is a factor, but does not lead to an entirely different course of acquisition. In other words, the Spanish data illustrate a language specific factor, but nevertheless support the universal tendency of interpreting indefinites with the narrow scope reading at an early stage. The main claim of previous acquisition studies in Chinese is that the lexical difference between Chinese *yi-CL N* and English *a/an* leads to a completely different order of acquisition: Chinese children acquire the specific or numeral reading first and the non-specific reading later, while English children first acquire the non-specific reading as default and the specific reading only later.

For this reason, it is necessary to re-examine the Chinese data and see whether language specific factors in Chinese lead to a language specific pattern of acquisition, or whether they do not affect a universal acquisition order of indefinite interpretations. In order to get a clearer picture of the previous claims concerning the Chinese data, I will describe the main research in the next section.

¹¹ Gualmini (2002) and Miller and Schmitt (2004) show that children are capable of non-narrow scope object readings. For this, De Hoop & Krämer (2006) assume that although children can have the non-narrow scope interpretations of indefinite objects, they do need more contextual support than adults. The narrow scope reading is the clear preference of children in spite of all this.

5.3.3 Previous acquisition studies of *yi-CL N*

5.3.3.1 Lee (1986)

Lee (1986) examines Chinese adults and children on the scope relations between a universal quantifier and a singular indefinite. A picture identification task is employed, in which for each recorded sentence three pictures are given as a possible description. Subjects are required to select the picture that fits the sentence best. The two test sentences contain a universal quantifier preceding *yi-CL-N*, as in (43):

- (43) a. *Mei-ge xiaopengyou dou zai chi yi-ge dangao.*
 every-CL child all PRT eat one-CL cake
 ‘Every child is eating a cake.’
- b. *Mei-ge xiaopengyou dou zai he yi-bei shui.*
 every-CL child all PRT drink one-CL water
 ‘Every child is drinking a glass of water.’

There are three children in each of the three pictures. Selecting the picture where the three children are each eating a different cake represents a narrow scope interpretation of the indefinite object; the non-narrow reading of the object is represented by the picture in which there is only one cake for the three children. The non-scope reading of a universal quantifier is represented by a picture in which two of the children are eating one cake together; while the third child is eating another cake (two cakes are present in the picture). The results of Lee’s (1986) experiment are given in Table 4:

Table 4. *Acquisition of mei...yi 'every...a' in Mandarin Chinese (picture-identification)*

Age (number of subjects)	Universal>Yi (both sentences)	Universal>Yi for one sentence; Yi>Universal for another sentence	Yi>Universal (both sentences)	A non- scopal reading for at least one sentence
3 (19)	21%	47%	5%	26%
4 (22)	9%	45%	41%	6%
5 (20)	15%	15%	70%	0
6 (24)	12.5%	38%	50%	0
7 (23)	35%	13%	52%	0
8 (13)	23%	46%	31%	0
Adults (20)	80%	20%	0	0

The degree of inconsistency can be observed in the third column. Between 13% and 47% of the subjects gave a non-narrow scope interpretation of the universal quantifier in one sentence and a narrow scope reading in the other, only the age groups of five and seven showed a significant level of consistency. According to Lee (1986), the high level of inconsistency, shows that children did not make a strong difference between the non-narrow and narrow interpretations, but selected the first picture that seemed to them to represent the meaning of the sentence. There is a general increase in consistent narrow scope readings of the universal quantifier at the age of three, four and five, from 5% vs. 41% to 70%, followed by a steady decline after the age of five. The non-scope reading is restricted to the age groups of 3 and 4. Lee does not discuss what the non-scope reading might indicate in this Chinese experiment. However, in a comparable English experiment, he accounted for the non-scope reading as an indication of the failure to capture the quantificational status of the universal quantifier and *yi*-CL N. In this case, both quantifiers are assigned a cumulative reading.

There is a bias to select the picture in which exactly one cake is present. Lee interprets this as a bias for a narrow scope reading for the universal quantifier, but it could equally well be phrased as a bias for a one-object reading, which is a cumulative, non-scopal reading.

The percentage of subjects showing a consistent narrow scope interpretation is more than 4 times higher than that of subjects showing a non-narrow scope interpretation of the universal quantifier. Lee also noticed that 20% of the adult subjects fluctuated between a non-narrow and narrow scope interpretation, indicating that a narrow scope reading of the universal quantifier is possible. This is due to the entailment relation between the non-narrow and narrow scope reading of the sentence (recall Section 5.2 of this chapter).

To compare the findings for Chinese with English, Lee tested English children using the same methodology (picture identification task) on the two sentences in (44) and (45). The results are given in Table 5:

(44) Every child is eating a cake.

(45) Every child is drinking a glass of water.

Table 5. *Acquisition of Every...a in English (picture-identification)*

Age (total number of subjects)	every>a (both sentences)	One sentence for every>a; Another sentence for a> every	a>every (both sentences)	at least one sentence for non-scope reading
3 (20)	5%	55%	20%	20%
4 (20)	45%	30%	15%	10%
5 (22)	50%	13.6%	13.6%	22.8%
6 (21)	57%	28%	5%	10%
7 (20)	55%	20%	25%	0
8 (20)	95%	5%	0	0
Adults (21)	67%	28%	5%	0

Contrary to what was observed for Chinese, there is a bias towards a wide scope interpretation of the universal quantifier, beginning at the age of 4. A declining preference of narrow scope interpretation can be seen from the age of 3. The second difference compared to the Chinese data is that many more English children selected the reading in which 3 children were eating a total of 2 cakes. Non-scopal readings are found in the age groups between 3 and 6. Lee claims that the non-scope reading is an indication of assigning a ‘group reading’ (cumulative reading) to both quantifiers, or an indication of the failure to assign a quantificational status to the quantifiers. Among the children who had a group reading, some opted for a complete group reading (equivalent to a narrow scope reading of *every N*) while others opted for an incomplete group reading equivalent to a non-scope reading. The third difference with the Chinese data is that there are more adult subjects who choose the narrow scope reading of a universal quantifier in one sentence and the non-narrow scope reading in another sentence, indicating that the universal quantifier is more likely to be ambiguously interpreted in English adult language than in that of Chinese.

The high level of inconsistency in responses is not observed in the act-out experiments where the same bias for a narrow scope reading of a universal quantifier is present (cf. Lee 1986 for a more detailed illustration). More obvious evidence for a bias of the non-narrow scope interpretation of *yi-CL-N*, according to Lee (1986), is given in an experiment with another type of test sentence, illustrated in (46) (Lee, 1986: 282):

- (46) *Yi-ge houzi dai zhe yi-ding maozi hen haowan.*
 one-CL monkey wear PRT one-CL hat very funny
 (That) each monkey is wearing a hat is very funny.’¹²

¹² The translation of this sentence is taken from Lee (1986). Here, *yi-ge* is translated as *each*, but I would rather translate the sentence as ‘That a monkey is wearing a hat is very funny’.

This experiment also uses the picture identification task. There are two pictures corresponding to the test sentence (46): a picture where three monkeys each wear a different hat and a picture where only one monkey wears a hat, the other two monkeys wear nothing on their heads. According to Lee, the first picture illustrates a non-specific reading of *yi-ge houzi* in the subject position, while the second picture illustrates the specific reading of the subject. The results are given in the table below:

Table 6. *Percentage of non-specific and specific readings of the indefinite subject*

Age (total number of subjects)	Non-specific <i>yi-CL-N</i>	Specific <i>yi-CL-N</i>
3 (19)	26%	74%
4 (22)	18%	82%
5 (20)	20%	80%
6 (24)	4%	96%
7 (23)	13%	87%
8 (13)	15%	85%
Adult (20)	45%	55%

Compared to the more or less even distribution of specific and non-specific interpretations in the adult group (55% vs 45%), the specific interpretation is dominant for children. If existential *you* is added in the sentence initial position in (46), adult subjects respond with a specific reading of *yi-CL N* in all cases (see Lee (1986) for a more detailed report about the results). However, for children the situation does not differ from the results obtained for (46). This indicates that children do not rely on existential *you* to get the specific reading of *yi-CL N*.

Lee (1986) claims that the initial reading of Chinese *yi-CL N* is different from English *a/an* in child language. Chinese children start off with a scope-independent interpretation for *yi-CL N*. In contrast, English children initially interpret *a/an* as a non-specific indefinite

marker. Quantifiers, such as *yi*-CL N, are initially viewed as non-operators in child language, and the scope property is learned on the basis of positive evidence (Lee 1986). Unlike adults, the command principle for defining scope relations has not been acquired by children and they will not do so until the age of 7 (see Section 5.3.1 of this chapter). According to Lee, the preference for a non-narrow scope reading of *yi*-CL N in Chinese child language is a result of combining syntactic constraints, language specific properties and discourse principles. Lee explains that *yi*-CL N is more restricted in its non-specific role than English *a/an* N. In certain contexts in which a non-specific indefinite occurs in English, a bare noun is used in Mandarin Chinese. The linguistic difference between the two languages is already reflected in early child language: Chinese children's acquisition of the non-specific reading of *yi*-CL N is delayed in comparison with the acquisition of the non-specific reading of *a/an* N in English.

Lee proposes that *yi*-CL N is initially interpreted as a non-quantificational expression, which results in a scope-independent reading. However, as discussed in Chapter 1, indefinites are generally assumed to be unmarked when they have a non-specific reading (Partee 1987, 1992), and it is assumed that children acquire unmarked interpretations first and marked interpretation later (Jakobson 1968). The results of the acquisition studies on the interpretations of indefinites in Dutch (Krämer 2000), English (Musolino et al. 2000; Lidz & Musolino 2002) all support the view that non-specific readings are the default for indefinites. This issue and other problems related to Lee (1986) will be discussed in Section 5.3.4.

5.3.3.2 *Su (2001)*

In Su (2001), the scope relation between the singular indefinite and negation is investigated among children between 4 to 6 years old. Consider the following example:

- (47) *Tiaotiaohu meiyou tiao guo yi-ge langan*¹³.
 Tigger not-have jump PRT one-CL fence
 ‘Tigger didn’t jump over a fence.’

The subjects are told a story in which there are three fences and Tigger did not jump over the first, nor the second, nor the third one. A puppet uttered sentence (47) to describe the story. The subjects are asked to judge whether the puppet’s statement is correct or not. A ‘Yes’ response is taken as a narrow scope reading of *yi-CL N*; a ‘No’ response indicates the non-narrow scope reading of *yi-CL N*. The percentages of ‘Yes’ responses are given in Table 7:

Table 7. *The percentage of narrow-scope reading of yi-CL N responses by adult subjects and children*

	Adult	Child
<i>Yi > negation</i>	64%	77%
<i>Negation > yi</i>	89%	26%

The adults prefer the reading with the negation taking scope over the indefinite (89% vs. 64%), however, the children have a reverse preference (26% vs. 77%).

Su (2001) assumes *yi-CL N* to initially be a quantity-denoting numeral expression in child grammar. Chinese children predominantly reject the sentences when the scene corresponded to a reading where Tigger didn’t jump over any fence. This could be explained by saying that for the children, indefinites take a non-narrow scope reading. However, Su argues that this is probably not the case. She claims that for children, *yi-CL N* has a quantity-denoting reading, since the reason the children gave for rejecting the test sentences was: “because Tigger didn’t jump over three fences, not just one”. Again, the indefinite *yi-CL N* has both a numeral ‘one’ reading, and an indefinite reading. Chinese children initially take the quantity-denoting reading (non-

¹³ In the previous section, I claimed that sentences like (47) are ungrammatical. Here the test sentence used by Su (2001) is taken to be a sound sentence. Obviously, I have a different judgement here.

scopal) as a default. Hence, initially there is no preference for narrow scope, which is acquired only later.

5.3.3.3 *Fan (2005)*

Fan (2005) tested the same type of sentences used in Su (2001) using the same methodology. Consider the following examples:

- (48) *Lao nainai mei bao yi-ge xiao pengyou.*
 old lady not hold one-CL little friend
 ‘The old lady didn’t hold a little friend.’
- (49) *Xiao pengyou mei na yi-ge pingguo.*
 little friend not take one-CL apple
 ‘Little friend doesn’t take an apple.’

The acceptance rates for a narrow scope reading of *yi-CL N* are shown in Table 8:

Table 8. *The percentage of narrow-scope reading of yi-CL N responses by adult subjects and children*

Fan	Adult	Children (4-5; 5-6; 6-7; 7-8)
<i>Yi</i> > negation	42%	73%; 64%; 44%; 38%
Negation > <i>Yi</i>	84%	91%; 80%; 84%; 93%

The results show that both the narrow scope reading and the non-narrow scope reading of *yi-CL N* are accepted by children at an early age (91.11% versus 73.33%). However, children exhibit a non-narrow scope reading preference: 73% of the 4-year-olds accept the non-narrow scope reading versus only 42% of the adults. Fan (2005) claims that children and adults share the same principles to resolve the scope problems: the principle of Numeric Reading which says that a numeral reading (non-narrow scope reading) is default for *yi-CL N* and the principle of Linear Order, which says that quantifier scope is assigned on the basis of the linear order of quantifiers. However, the ranking of these principles differs in the child grammar from that in

the adult grammar: adults rank the Linear Order Principle higher and children rank the principle of Numeric Reading higher. The strategy of ranking principles in Fan (2005) may remind the reader of an OT analysis. The author herself, however, does not take this perspective. Strikingly, for Fan, the numeral reading corresponds to a wide scope reading, rather than to a non-scopal reading as claimed in Su. Even more strikingly however, there is a great discrepancy between the results in Su (2001) and Fan (2005), which will be discussed in the next section.

The common claim in the previous studies can be summarized as follows: children's comprehension of singular indefinites in Chinese is different from that of English children due to the lexical idiosyncrasy of Chinese *yi-CL N* and English *a/an*. Chinese children initially have specific, or non-scopal interpretations of indefinites.

5.3.4 Problems for the input-dependent view

There are several problems relating to the Input-Dependent View. First, if children understand *yi-CL N* initially as having a specific or scope-independent reading, we would expect that they would also produce *yi-CL N* with the same kind of reading initially. However, empirical counterevidence is found in Min (1994), who presents a longitudinal study of Chinese children's production of NPs. According to her, Mandarin Chinese children use numeral expressions (including *yi-CL N*) with a non-specific reading at an early age. Only occasionally the numeral expression (Number-CL-N) is found in child language at the early stages (1;3.0-1;8.30) where the first occurrences of numeral expressions are used for nonspecific reference. The majority of these cases involved *yi-CL-N*. Below is an example taken from Min (1994:87) describing the utterance produced by a child named Duanlian (3;3.0):

- (50) [Duanlian was making different drawings. After she drew a few pictures, she told the addressee that she could draw a goldfish too, then drew one goldfish.]

Wo hui hua yi-ge jinyu.

I can draw one-CL goldfish

'I can draw a goldfish.'

The example in (50) shows that Mandarin children produce *yi*-CL N with a non-specific reading in an intensional context. It is known that generally production lags behind comprehension. We can predict from these data that children acquire the non-specific interpretation of *yi*-CL N or CL N even earlier. Therefore, the data in Min (1994) can be taken as evidence against the claim that *yi*-CL N is initially interpreted as having a specific status.

Secondly, contradictory results are found in Lee (1986) and Lee (1997), as noticed by Su (2001). *Yi*-CL N is considered to be a 'singular numeral phrase in Lee (1986). It has a non-operator status in the early stages of child language. Young children tend to interpret *yi*-CL N with a scope-independent reading. However, in Lee (1997), numeral expressions are claimed to have an operator status in child grammar. Children initially understand the numeral expression with a scope dependent reading. Lee (1997) examines five types of sentences containing quantifier phrases in subject and object positions. Sentences (51) and (52) are two of the five types of sentences:

- (51) *Suoyoude shushu dou tiao zhe liang-tong*
all uncle each carry-on-shoulder PRT two-CL
shui.

water

'All the men are carrying (on their shoulders) two buckets of water.'

- (52) *You sange shushu tiaozhe liang-tong shui.*
have three uncle carry-on-shoulder two-CL water

'Three men are carrying (on their shoulders) two buckets of water.'

In (51), the subject is a universal quantifier and the object is a numeral expression. In (52), both the subject and the object are numeral expressions. The experiment employed truth-judgement tasks. The results show that 4- and 5-year-olds behave like adults in accepting the distributive reading of the type of sentence in (51), approximately 70% or more of the time. The distributive reading refers to the non-narrow scope reading of the universal quantifier subject and the narrow scope reading of the numeral object: for all men, each carries two buckets of water on their shoulders. For the same type of sentences, cumulative readings are generally rejected by the adult subjects (10% acceptance). The cumulative reading refers to the interpretation that only two buckets of water are involved in the event denoted by sentence (51). The cumulative reading is only acceptable when the object in (51) is a bare nominal (90%). As for the sentence type in (52), Chinese adults generally did not accept a distributive reading (20% acceptance), where the numeral object takes a narrow scope reading. A cumulative reading (non-scope reading) is preferred (more than 90%). However, children (of 4 and 5 years old) overwhelmingly preferred the distributive interpretation. Lee also tested the function of *dou* ‘all’ and found that children were not sensitive to the distributive property of *dou*. The experimental results support the claim in Hornstein (1984) that children assign scope dependent readings to quantified NPs from the very beginning.

Furthermore, in a construction where *yi*-CL-N is interpreted as a specific NP, young children favor the non-specific readings, as reported in Lee (1986: 319):

- (53) a. *Xiaomao quan fang zai yi-ge hezi li.*
 kitten all/entire put at one-CL box in
 ‘Put all the kittens in a box.’
- b. *Quiz quan fang zai yige pingzi li.*
 chesspiece all/entire put at one-CL bottle in
 ‘Put all the chess-pieces in a bottle.’

The sentences in (53) are considered examples with a marked scope order in Lee (1986). This is because the scope relations in these sentences do not follow the Isomorphism Principle governing the scope relations in Chinese. *Quan* in (53) is similar to *dou*, meaning ‘all’. When a *quan/dou* marked object NP is topicalized, it has narrow scope with respect to the singular prepositional object. Lee tested adults and children on these two sentences with a picture-identification task. The results are given below:

Table 9. Acquisition of *quan...yi* ‘all...a’ in Mandarin (act out) in Lee (1986)

Age (number of subjects)	Universal>Yi (both sentences)	Universal > Yi for one sentence; Yi>Universal for another sentence	Yi>Universal (both sentences)	A non- scope reading for at least one sentence
3 (20)	25%	10%	40%	25%
4 (22)	27%	18%	50%	6%
5 (20)	20%	15%	65%	0
6 (24)	25%	21%	54%	0
7 (23)	17%	13%	70%	0
8 (13)	0	8%	92%	0

Lee (1986) thinks that young children interpret sentences in (53) similarly to sentences in (43) where a universal quantifier subject precedes a *yi*-CL N object, because children acquire the marked properties later. Although Lee considers the results in Table 4 and Table 9 to have a similar bias, I found a contrast between the non-narrow scope reading of *yi*-CL N for the youngest group in these two tables, 5% in the former and 40% in the latter. Even if we take into consideration the contrast in the inconsistency level of the two tables (47% vs. 10%), children of the youngest group still have more non-narrow scope readings of *yi*-CL N in the latter case. This may show that young children are not completely insensitive to the different

types of constructions. The percentages of non-specific *yi*-CL N are similar (47% vs. 50%) if the non-scopal readings are considered. Considering the inconsistency in the responses (47% vs. 10%), we can see that the non-specific interpretation of *yi*-CL N is favoured by the youngest group. The discussion so far cannot lead to the conclusion that young children initially interpret *yi*-CL N with a non-specific reading since the results in Lee (1986) do show a narrow scope bias of the universal quantifier in the age groups after 4. Therefore, further experiments are necessary to deal with the discussed issues. For instance, the constructions with multiple numeral expressions are worth exploring because in Lee (1997) a test sentence as in (52) contains the existential *you*, which may increase the possibility of distributive readings, as discussed in subsection 5.3.3.3.

Besides the contradictory results in Lee (1986) and Lee (1997), a great discrepancy is also found between the results of Su (2001) and those of Fan (2005), as was mentioned in the previous section. Although the tested sentences of Fan and Su are of the same type and the experiments are of the same design, there is a big difference in the acceptance rates of a narrow scope reading of *yi*-CL N under negation, given in the following table:

Table 10. *The percentage of narrow-scope reading of yi-CL N responses by adult subjects and children in Su (2001) and in Fan (2005)*

Su	Adult	Children (4- 6)
<i>Yi</i> >negation	64%	77%
Negation > <i>yi</i>	89%	26%

Fan	Adult	Children (4-5; 5-6; 6-7; 7-8)
<i>Yi</i> >negation	42%	73%; 64%; 44%; 38%
Negation > <i>yi</i>	84%	91%; 80%; 84%; 93%

In contrast to Su's 26% acceptance of a narrow scope reading by the child subjects, the acceptance rate in Fan's experiments is around 91% for the children at the age of 4-5 years. This percentage is comparable

to the adult response of 84%. Interestingly, the acceptance of the specific reading of *yi*-CL N in (10) was also high, 73.33% acceptance by children aged 4-5, decreasing to 37.78% for 7-8 year-olds, whereas the adult acceptance was 42.22%.

We have to be careful in claiming that it is the narrow scope reading of *yi*-CL N that is tested in those sentences. Consider Su's test item from above, repeated in (54). The indefinite seems to be embedded in a bounded predicate, which tends to be interpreted with a specific reading (see Chapter 4 for the discussion of the influence of a bounded predicate on the interpretation of the object). Let us see how the narrow reading and non-narrow scope reading of negation were captured in her design.

- (54) a. *Tiaotiaohumeiyou tiao guo yi-ge langan.* (Su 2001)
 Tigger not-have jump PRT one-CL fence
 'Tigger didn't jump over a fence.'
- b. *Lao nainai mei bao yi-ge xiao pengyou.* (Fan, 2005)
 old lady not hold one-CL little friend
 'The old lady didn't hold a little friend.'

No fences are jumped over by the tiger in the story context designed for test sentence (54a). The old lady holds no children in the design for test sentence (54b). The subjects looked at pictures or listened to stories describing the mentioned contexts, and then they listened to the recorded sentences (54a) and (54b). The subjects are required to judge whether the sentences correctly describe the pictures that they saw or the stories that they heard. A positive answer is considered a confirmation of a narrow scope reading of *yi*-CL N. However, it can also represent the interpretation of *yi*-CL N as in (55) below, where a universal reading or a non-narrow scope reading is detected:

- (55) *Zuotian, ta meiyou xie YI-feng xin.*
 yesterday he not-have write one-CL letter
 'He didn't write a SINGLE letter yesterday.'

This is probably due to the phenomenon of entailment which appears with quantifiers in negation:

$$(56) \neg\exists x \Phi(x) = \forall x \neg\Phi(x)$$

The symbol \neg represents negation, which is treated as an operator in logic. The equivalence in the two formulas in (56) shows one point: a narrow scope interpretation of an existential quantifier under negation equals to the non-narrow scope interpretation of a universal quantifier over negation. Since *yi*-CL N can either take an existential reading or a universal reading when it is located after the negator and since the phonological accent may be overlooked by adults who have proper contexts at their disposal, it is the question whether adults' acceptance of the sentences is evidence for a narrow scope existential reading or a non-narrow scope universal reading of the indefinite.¹⁴ Considering the concerns about the felicity of non-specific singular indefinites in the literature, I will treat the scope relation between *yi*-CL N and negation as an open question and in my own experiments I will not use test items with negation when examining the interpretation of *yi*-CL N.

To sum up, we conclude on the basis of the previous acquisition studies of *yi*-CL N in Chinese that there are some problems with the Input-Dependent View. The evidence in production contradicts this view and there are contradictory results in the experimental data. These problems motivate the set-up of further experiments.

5.3.5 *Setting up the experiment and predictions*

On the basis of the different competing hypotheses, we can make different predictions for the results of the first experiment. Following the Universalist Hypothesis (Krämer 2000; Lidz & Musolino 2002; De

¹⁴ Since I did not do any empirical work to provide evidence for the phonological factor involved here, I can only express my doubt about the felicity of the test sentences and explain why I tried to avoid using these kind of sentences in my experiments.

Hoop & Krämer 2006 and Lee 1997), we predict that Chinese children initially prefer narrow scope *yi*-CL N objects and language specific factors (boundedness, numeral reading *yi*-CL N, word order) emerge later. Alternatively, if we rely on the Input-determined Hypothesis (Lee 1986; Su 2001; Fan 2005), opposite predictions can be made: Chinese children initially prefer a non-narrow scope reading of *yi*-CL N and narrow readings emerge later.

The set up of the first experiment bears in mind three considerations. Firstly, I want to test the constructions with numeral expressions in the subject and object position, as in Lee (1997). The test sentences in the present experiment, however, should not contain existential *you* because, as was discussed in Section 5.3.2.5, *you* can induce a distributive reading of the subject quantifier. In this way, we can see whether children still favor a narrow reading of the numeral object regardless of *you*. If this is the case, we can say that children do prefer a narrow scope reading of numeral objects. Secondly, the interpretive possibilities of an indefinite combined with a negation make interpreting the results difficult, as explained in Section 5.4.4. And indefinite object NPs are often not acceptable when appearing to the right of negation, as explained in Section 5.3.1.3. Because of this, I need a different type of construction which is comparable to other types used in experiments on Chinese or in different languages on the one hand. On the other hand I need to test whether variation in the types of constructions matters for the scope relations. As Krämer (2000) examines constructions containing *twee keer* ‘twice’ and indefinites, it will be interesting to include this type of sentence in the experiments. Thirdly, as discussed in this chapter, the boundedness of predicates may affect the interpretation of *yi*-CL N. This observation has not been taken into account in previous acquisition studies of *yi*-CL N. Bounded contexts were used in previously discussed studies, for example Su (2001) and Lee (1986). Therefore, it will be interesting to see to what extent the boundedness of the context contributes to the interpretation of *yi*-CL N. On the basis of these three considerations, I will test two sentence types in two conditions: the first type is a sentence containing a numeral subject and an indefinite object *yi*-CL N, the second type is a sentence containing a preverbal adverbial

quantifier *liangci* ‘twice’ followed by the indefinite object *yi*-CL N. These two types of sentences are to be tested in two conditions, presenting intensional and bounded predicates respectively. Concrete examples will be given in the next section.

5.4 Experiments

5.4.1 *The judgement experiment*

The first experiment I conducted is a judgement experiment. I examine the interpretation of ‘*yi*-CL N’ employing two types of sentences and contexts that have not previously been investigated. The purpose is to examine children’s interpretation of *yi*-CL N and to see whether children initially have predominantly non-narrow readings or that they initially have more narrow readings than adults, which will support either the Input-Dependent View, or the Universalist View.

Furthermore, the results may show whether the type of construction (bounded versus intensional) makes a difference. As we have discussed in the previous chapter, the nature of predicates has an effect on the interpretation of indefinite objects. Indefinite objects of an intensional predicate are more likely to have a narrow reading than those in a bounded predicate (see Chapter 4, Section 4.4.). None of the previous investigations of scope in Chinese child language involves indefinite objects of intensional predicates that preferred the narrow reading. It is possible that these readings were biased because of the construction type (bounded) that was tested (Su 2001; Fan 2005).

5.4.1.1 *Method and design*

The test sentences are classified into two groups according to two construction types: test items within the intensional condition consist of a set of sentences under an intensional verb *neng* ‘can’; test items in the boundedness condition are sentences with a bounded predicate. Construction type is a between subjects condition. Each age group consists of 24 subjects, 12 of which are tested in the intensional condition with 17 test items. These were made up of 5 control items and 12 test items, 6 of which contained a verbal quantifier, the other 6

contained a numeral subject. Examples are given in (57a) and (58a). The other 12 subjects are tested in the bounded condition with the same number of test items, which are the counterparts of the intensional condition, as shown in (57b) and (58b):

- (57) a. *Xiaomao neng liangci baoqi yi-ge piqu.*
 kitten can twice hold-up a/one-CL ball
 ‘The kitten can hold a ball twice.’
 b. *Xiaomao liangci baoqi le yi-ge piqu.*
 kitten twice hold-up PRT a/one ball
 ‘The kitten held a ball twice.’
- (58) a. *Liangzhi xia-xiong neng ti-qi yi-ge lanzi.*
 two-CL little-bear can lift-up one-CL basket
 ‘Two little bears can lift up a basket.’
 b. *Liangzhi xiao-xiong ti-qi le yi-ge lanzi.*
 two-CL little-bear lift-up PRT a/one-CL basket
 ‘Two little bears lift up a basket.’

In (57), the object *yi-CL N* interacts with a verbal quantifier *liangci* ‘twice’ preceding *yi-CL N*. In (58), a numeral expression *liang CL* ‘two’ is located in the subject position and precedes the object *yi-CL N*. Half of the test sentences are of the type in example (57) and half are like (58).

The experiment employed a truth-value judgement task. An experimenter acted out a situation with some toys for the subject. A sentence is played on the tape recorder, after which the subject is asked to judge whether the sentence correctly describes the situation just performed. There are two scenes for each sentence. For instance, for sentence (59), the following actions are performed:

- (59) 1-object manipulation: two cats jump into one and the same basket
 2-object manipulation: two cats jump into a different basket each.

The 1-object manipulation represents a non-narrow reading of *yi-CL N*; the 2-object manipulation corresponds to a narrow reading of *yi-CL N*. For the 12 test items in each condition, 6 of them are performed with the 1-object manipulation and 6 others are performed with the 2-object manipulation. Since there are two conditions (intensionality and boundedness), the total number of test items with the 1-object manipulation is 12 as is the number of test items with the 2-object manipulation.

For each subject, 17 sentences are tested, alternating with 5 control items, 6 test items (3 with *liangci* and 3 with *liang-CL*) are performed with 1-object, the other 6 test items (3 with *liangci* and 3 with *liang-CL*) are acted out with 2 objects. The detailed set-up of the tested sentences and control items is given in Appendix 1.

5.4.1.2 Subjects¹⁵

Besides the adult group, there were three age groups (4, 6, and 8) of child subjects. All speakers were native speakers of Mandarin, students from Beijing Language and Culture University. All child subjects were born in Beijing and lived there.

The subjects are tested one by one. A training session was held before the real test was executed. Table 11 gives the number of subjects by age and conditions, in which the letters ‘I’ and ‘B’ in the third row of Table 11 stand for the intensional condition and the bounded condition respectively. The range of age is 4;1-4;8 in the first age group, 6;0-6;9 in the second and 8;2-8;9 in the third:

¹⁵ The subjects here refer to all the subjects who behaved correctly in the control item test, meaning 24 subjects in each age group. As a matter of fact, more subjects were tested in the experiments. For instance, 27 subjects in the age group of 4 years old attended the experiment, two failed in the pre-test session and one failed to reject the first two control items. Therefore, these three subjects didn’t complete the entire experiment. 25 subjects in the age group of 6 years old attended the pre-test session. One subject failed to pass the pre-test session and didn’t finish the experiment.

Table 11. *Number of subjects by age and conditions*

	Age Group I		Age Group II		Age Group III		Adults	
	4		6		8			
Conditions	I	B	I	B	I	B	I	B
Number of subjects	12	14	13	12	12	12	12	12
Number of subjects valid	12	12	12	12	12	12	12	12

5.4.1.3 Procedure

Pre-test items

A pre-test was conducted with the child subjects to see whether they understand *liang*-CL ‘two’ N, and *liangci* ‘twice’ or not. Subjects who did not pass the pre-test could not go on to the real test items. There were two subjects in Age group 4, tested for the bounded condition, and one subject in Age group 6 tested for the intensional condition who failed the pre-test. The following pre-test items were used:

- (60) a. *Xiaoma tiao le liangci.*
 kitten jump PRT twice
 ‘The kitten jumped twice’. (The kitten jumped only once.)
- b. *Liang-zhi xiaomao daishangle maozi.*
 two-CL kitten put-on PRT hat
 ‘Two kittens can put on a hat.’
 (Four hats of different shapes and colours. One cat has put on a hat, the other three failed.)

Experimental session

The two groups of 4 years old and one group of 6 years old are tested in a separate room in a kindergarten. One group of 6 years old and the two groups of 8 years old are tested in a separate room in a school. Two experimenters are involved. One experimenter instructs the child subjects, the other collects the results. A training session is held before the actual test session takes place. The experimenter introduces the

toys to the child subject and tells him that they are going to play a game with the toys. The child subject is shown a tape recorder and is told that an auntie is in the recorder, who cannot see the game but who loves to guess what was performed. The child should tell her whether she was correct or not since “everybody is happy to know the truth”. The following example shows how the experiment is explained to a child subject:

E: Hi, how are you doing? You have a nice skirt! How lovely! How do you like your breakfast? What is your favourite animal? You like these cats? Yeah, we have a lot of toy friends here. You want to play with them? All right, let’s play a game together, ok? See, we have a cat here? Cute, isn’t it? And here are four balls. Red, blue, green, yellow! The kitten wants to perform for us. But see here, what is this? Yeah, a recorder, an auntie is in the recorder, she cannot see the performance, but she can guess. The cat will perform, she will guess what the cat does, and you will tell her whether she is correct or not. Ok? Because she wants to know whether she guesses correctly or not. You will help her, right? Ok, let us start. (The experimenter lets the cat hold a red ball, put it down, and hold a yellow ball. Then, the experimenter asks the child subject, “Did you see what he did?” If the child subject nods, the experimenter plays the recorder, which says, “The kitten can hold a ball twice.” The experimenter then asks the child subject, “What did the auntie say?” After the child subject repeats the test sentence, the experimenter asks her to judge whether it describes the performance. Usually, the child subject himself will explain if he gives a No answer, but the experimenter should be careful not to force the child to explain.)

Control Items

All subjects correctly rejected 5 control items in each condition (Intensionality and Boundedness). An example of a control item can be found in (61):

- (61) *Xiaoxiong neng juqi yi-ge lanzi.*
 little-bear can lift-up one-CL basket
 ‘Little bear can lift a basket.’

Here, the experimenter plays with a toy bear making him hold a stone, and plays the recorded sentence (61). The subject is required to judge whether the recorded sentence correctly describes the performance.

5.4.1.4 Results

The experimental results are calculated in terms of percentage of acceptance of the performance and the number of acceptances. First I will analyse the results with respect to the age difference, then I will further analyse the same results from the perspective of the two conditions (intensionality and boundedness).

In Table 12 the total percentage of acceptances for each age group is presented, for the 1-object manipulation as well as the 2-object manipulation:

Table 12. *Percentage of acceptance and the number of acceptances, with a total number of 72*

Age Groups	1-object	2-object
4	97.2% (140)	78.5% (113)
6	95.8% (138)	38.1% (55)
8	100% (144)	39.6%(57)
Adult	91.7%(122)	27.8% (40)

All age groups accept the 1-object reading (i.e. a non-narrow scope reading) with rates above 90%. 4-year old children accept the 2-object reading (narrow scope reading) almost as often (78% vs. 97.2%). The acceptance of the narrow scope reading steeply declines at the age of 6 to 38.1% and remains at the same level for 8-years old. Now examine the effect of the different construction types:

Table 13. *Percentage of acceptance and the number of acceptances, with a total number of 72*

Age Groups	Intensional Condition		Bounded Condition	
	1-object	2-object	1-object	2-object
4	98.6% (71)	83.3% (60)	95.8% (69)	73.6.% (53)
6	94.4% (68)	37.5% (27)	97.2% (70)	38.8 (28)
8	100% (72)	51.3% (37)	100% (72)	27.7% (20)
Adult	87.5% (63)	41.6% (30)	95.8% (69)	13.9% (10)

Regarding the narrow reading of the indefinite object, there is a contrast between Intensionality and Boundedness in the adult group (41.6% vs. 13.9%) and in age group III (51.3% vs. 27.7%). There is a slight contrast for the 4-year olds (83.3% vs. 73.6%) and there is no observable contrast at the age of 6 (37.5% vs. 38.8%).

I applied an ANOVA with multivariate tests to the data, with the conditions Intensionality and Boundedness and the age groups as the between-subjects factors. The analysis revealed the following: there is a main effect of condition (bounded vs intensional); there is no main effect of age by condition: there is a main effect of mode of presentation (1-object/2-object); there is a significant interaction of mode of presentation with condition ($p=0.030$); there is an interaction of mode of presentation with age ($p=0.00$); there is no interaction of mode of presentation with condition and age.

The 4-year olds' acceptance rate is significantly higher than that of all the other age groups. This is a main effect, and the effect is significant. There is an interaction of mode of presentation and age group. This makes sense, as there is a ceiling effect for the 1-object scene. The interaction lies in the following: for all ages mode of presentation has an effect, but not for 4-year olds, as they accept at a very high rate anyway. As the assumption of equal variances was not met, I performed a Dunnett's T3 multiple comparisons post-hoc test to evaluate the effects of age.

There is a significant difference between the two modes of presentation (1-object and 2-object manipulation). All age groups

accept the 1-object reading in more than 90% of the cases; in the meanwhile, all age groups except for the 4-year olds accept the 2-object reading significantly less often. The 4-year olds accept the 2-object readings at a high rate. This difference between the age groups is significant on a post-hoc test. The difference of quantifier type (*liang*-CL ‘two’ versus *liangci* ‘twice’) is not statistically significant when it interacts with conditions ($p=0.566$) or with age groups ($p=0.534$).

5.4.1.5 Discussion

The results show that 4-year old Chinese children accept narrow scope readings more often than adults and older children. The finding supports the Universalist Hypothesis that children initially interpret indefinite objects (including numeral expressions) with a non-specific reading or a scope dependent reading. Narrow scope readings decrease steeply between age 4 and 6 to be followed by a gradual decrease of narrow-scope readings from the age of 6 onward. I will discuss this further in the last section with an OT analysis. The results show that a preference for non-narrow readings starts from age 6 and that it increases with age. The bias for non-narrow readings is predominant in all age groups. The different types of quantifiers have no significant effect on the interpretation. Moreover, adults and older children tend to interpret *yi*-CL N in these constructions with a non-narrow reading, which fits the previous observation that a non-scopal reading is the preferred reading when two numeral expressions interact in one and the same sentence, or when *yi*-CL N interacts with a frequency quantifier (Lee 1997). In combination with intensional verbs the acceptance of the narrow reading of the object increases. However, this increase is not big enough to constitute a significant difference in comparison with the boundedness condition.

5.4.1.6 Further questions

In the judgement experiment, we found that children prefer a narrow scope reading of indefinites at the age of 4. Although the findings support the claim that indefinite objects are initially interpreted as non-specific NPs by Chinese children, it is not clear whether the lack

of non-narrow readings in children derives from the properties of indefinites (Semantic Universalist Hypothesis) or from the c-command relations (Syntactic Universalist Hypothesis). Does the 4-year olds' over-acceptance of narrow scope readings result from c-command? Is there any effect of word order? As all test sentences of this experiment are of the quantifier kind ('two...a' or 'twice...a'), these questions cannot be answered. Therefore, I conducted a second experiment: an act-out experiment.

5.4.2 *The act-out experiment*

The second experiment used an act-out task to compare the adults and the children with respect to their interpretation of *yi*-CL NP in two positions: to the right and to the left of *liangci* ('twice'). All test items are presented in an intensional context.

5.4.2.1 *Method and design*

This experiment follows the method and design of the third experiment in Krämer (2000) for the purpose of comparison. In Dutch, there are two positions for the object NP. In one case, the object linearly precedes the adverbial and c-commands it, in the other case, it follows the adverbial and is c-commanded by it. *Twee keer* 'twice' can be used to distinguish predicative indefinites from free variable indefinites by different syntactic positions. An object NP to the left of *twee keer* is of the type of a free variable indefinite, it has a specific interpretation and takes non-narrow scope; a predicative indefinite is positioned to the right of *twee keer*:

- (62) a. *Je mag twee keer een potje omdraaien.*
 'You may turn over a(any) jar twice.'
 (should involve one or two jars)
- b. *Je mag een potje twee keer omdraaien.*
 'You may turn over a (particular) jar twice.'
 (should involve only one jar)

In (62a), the direct object is in the scope of *twee keer*, and may be interpreted either as turning two different jars or turning one jar twice, while the referents of the two object NPs involved happen to coincide in the latter case. The direct object in (62b) is to the left of *twee keer*, which has scope over *twee keer*. Sentence (62b) means that one (particular) jar may be turned twice.

In Chinese, the word order is slightly different, but just like in Dutch the direct object can appear to the left of *liangci* ‘twice’ or to the right of it:

- (63) a. *Ni keyi liangci da-kai yi-ge hezi.*
 you may twice hit-open one-CL box
 ‘You may open a (any) box twice.’
 (should involve one or two boxes)
- b. *Ni keyi da-kai yi-ge hezi liangci.*
 you may hit-open one-CL box twice
 ‘You may open a (particular) box twice.’
 (should involve only one box)

The adult response on (63a) is either opening two different boxes or opening one particular box twice. The adult response for (63b) is opening only one particular box twice.

The subjects were required to act out simple recorded test sentences with four distinctively coloured toys. The subjects for this experiment are classified into two groups: one group is tested with sentences where the object NP precedes *liangci* ‘twice’ (High objects condition), the other group with sentences where the object NPs appear after *liangci* ‘twice’ (Low objects condition). The setting of the toys and the performance instruction are the same for both groups. The experiment is a between subjects design.

5.4.2.2 Subjects

The groups consist of twelve subjects. Besides the adult group, there are six children groups: two groups of 4-year-olds (4;0-4;9), two groups of 6-year-olds (6;0-6;7), and two groups of 8-year-olds (8;0-

8;6). The adult subjects are students from Beijing Language and Culture University. All children were born in Beijing. Table 14 gives the number of subjects by age and conditions, in which ‘Low’ stands for the condition where the objects appeared after *liangci* ‘twice’, and ‘High’ stands for the condition where the objects preceded *liangci* ‘twice’:

Table 14. *Number of subjects by age and conditions*

	Age Group I 4		Age-Group II 6		Age-Group III 8		Adult	
Condition	Low	High	Low	High	Low	High	Low	High
Number of subjects	14	13	13	12	12	12	12	12
Number of valid subjects	12	12	12	12	12	12	12	12

5.4.2.3 Procedure

Pre-test items

A pre-test was administered to the child subjects to see whether they understood *yi-CL-N* and *liangci* ‘twice’ or not. Any subject who did not perform well enough on the pre-test could not go on to the real test. There were two subjects in Age group 4, tested for the Low condition, and one subject in Age group 4 tested for the High condition and one subject in Age group 6 tested for the Low condition who failed the pre-test. The following pre-test items were used:

- (64) a. *Ni key na yi-ge tang.*
 ‘You may take a candy.’ (Four candies of different colours.)
- b. *Ni keyi tiao liangci.*
 ‘You may jump twice.’
- c. *Ni keyi na yi-ding maozi.*
 ‘You may take a hat.’ (Two hats of different colours. One stone. One ball.)

Experimental session

Two groups of 4-years olds and one group of 6-years olds were tested in a separate room in a kindergarten. All groups were tested in a separate room. The subjects were tested one by one. They were told to act out a recorded sentence with toys. Two experimenters were involved. One experimenter instructed the children, the other experimenter recorded the results. A training session was held before the test session took place. The experimenter played the recorder and asked the subject to act out the sentence she heard. The experimenter instructed the subject to put back the objects to the original place after using them.

The test session started after the training session. 9 sentences were recorded and were played to the subject to act out; 3 of the sentences were control items. The following is an example of a control item:

- (65) *Ni keyi tiqiu.*
 you may kick-ball
 ‘You may kick a ball.’

There is a ball, a stone, a toy bear and a hat in front of the subject. The experimenter played the recorded sentence (65). The subject is required to act out the sentence.

The test items are mixed with the control items. The arrangement of test items and control items is given in Appendix II.

5.4.2.4 Results and discussion

Following Krämer (2000), I use “1-response” when only one object is used in the performance (indicating a non-narrow scope reading of *yi-CL N*) and “2-response” when two objects are used, indicating a narrow scope reading. Table 15 shows the experimental results by percentage and number of the responses:

Table 15. *Percentage and number of the 1- response and 2-response*

Age Groups	<i>liangci</i> c-commands <i>yi-ge</i>		<i>yi-ge</i> c-commands <i>liangci</i>	
	1-response	2-response	1-response	2-response
4	37.5%(27)	62.5%(45)	67%(48)	33%(24)
6	58.3% (42)	41.7%(30)	87.5%(63)	12.5%(9)
8	68% (49)	32%(23)	100% (72)	0%(0)
All Children	54.6% (118)	45.4%(98)	84.7% (183)	15.3%(33)
Adults	65.3 % (47)	34.7%(25)	94.4%(68)	5.6%(4)

In the second condition where *yi-ge* c-commands *liangci*, adults almost always manipulate one and the same object twice. This is what we would expect for Chinese, given that 2-object readings unambiguously indicate narrow scope, which is excluded as the object NP precedes/c-commands *liangci*. In the first condition where *liangci* c-commands *yi-ge*, we find nearly 35% 2-responses, but the majority of adult responses in this condition are 1-responses.

The younger children have more 2-responses than the adults. They even have 33% 2-responses when the object precedes *twice*, a response which is excluded for the adults and which is counterevidence to the Syntactic Universalist Hypothesis. An ANOVA showed that there is an overall effect of age, as children are more likely to have 2-object responses ($p=0.008$), and of word order ($p=0.000$), as there are more 1-responses in the high condition. In general, 1-responses are preferred. The 4-year old children do not display this preference in the low condition. As variances were not equal, Dunnett's T3 was applied for pairwise comparison of age groups. The results revealed a significant difference between 4-year-olds and 8-year-olds ($p=0.032$), and a near-significant difference between 4-year-olds and adults ($p=0.069$).

The results confirm the finding of the previous experiment that young Chinese children more often have a narrow scope reading than

older children and adults, which offers evidence for the Universalist Hypothesis. Even when linear order/c-command excludes narrow readings, 4-year old children allow them. This is evidence against the Syntactic Universalist Hypothesis. The experiment confirms previous Dutch findings.

5.4.2.5 *Comparing the Dutch and Chinese results*

The experimental task in Chinese is the same as the one in Dutch, the choice between 4 differently colored objects is also the same. The actual props and items that feature in the test sentences are not the same. The control items in the Dutch experiments were different from those in the Chinese experiments and the training items were slightly different as well. Also, in the Dutch experiment, the actions were embedded in a game structure in which one puppet was rewarded when there was an outcome of 1, and another puppet was rewarded when there was an outcome of 2. But this does not seem to have any effect on the results (Unsworth 2005 got similar results without the game structure). Therefore, this structure was omitted in the Chinese experiment.

It should be noted that in Chinese, *yi*-CL N is used for ‘one’ and ‘a/an’ without distinction. In Dutch, the singular indefinite article *een* ([ən]) is phonologically distinct from the numeral *één* ‘one’ ([en]). The overall findings are similar to Krämer (2000), but if we compare the outcomes of the two experiments, we find that there are more 1-responses in Chinese:

Table 16. *Percentage and number of 1-response in Dutch and in Chinese*

Dutch Subjects	Low condition	High condition
4;0--5;6	13%(6)	30%(12)
5;6—7;0	0% (0)	43%(18)
Adults	0%(0)	92%(33)

Chinese subjects	Low condition	High condition
4;0—5;0	38%(27)	67%(48)
6;0—7;0	58%(42)	88%(63)
Adults	65%(47)	94%(68)

When the indefinite precedes (c-commands) “twice”, both Chinese and Dutch adults exclude narrow readings, 94% vs. 92% respectively. When “twice” precedes the indefinite, Chinese adults still have a non-narrow, “1-response” reading in 65% of the cases while Dutch adults always reject the non-narrow scope reading of indefinites (0%). At all ages, in either word order, we find more non-narrow scope readings in Chinese.

Both in Chinese and in Dutch, the word order in the high condition (the indefinite preceding the frequency quantifier) excludes a narrow scope reading for adults. When word order allows narrow scope readings, both a 1-response and a 2-response are possible. Dutch adult subjects nevertheless only choose 2-response readings. This unambiguously shows that Dutch adults assign narrow scope to the indefinite in this configuration. Chinese adults may choose either, but prefer 1-responses, these are compatible with non-narrow scope, with non-scopal “one-readings”, and even with narrow scope on a type-similarity reading. The differences between the data of Dutch and Chinese adults will be discussed in the next section.

For the younger children, word order only has a small effect—it does not exclude the narrow scope reading, leading to optionality in the high condition too. Like Dutch adults, Dutch child subjects nevertheless have a strong preference for a narrow scope reading. Chinese child subjects have more non-narrow scope readings than Dutch children. There is a main effect of word order for Chinese with

the 4 year olds. For the Dutch children, the word order effect is not significant.

5.5 Discussion

In the two experiments described above, I tested quantifier scope assignment in bounded and intensional contexts with differences in word order. We have seen that word order factors play a role in the judgements/interpretations of adults (see Chapter 4) and older children, but young children stick to the default narrow scope reading of indefinite objects.

Mandarin children, like Dutch, English and Kannada children, initially prefer narrow scope readings. These readings are even possible when the syntactic configuration excludes them for adults. These findings support the claim that, universally, children start acquiring scope relations with a tendency toward a narrow scope reading for indefinite objects. This is different from what had been proposed by Su (2001) and Lee (1986), whose claims were based on the “numeral” properties of *yi*-CL N. Word order has some effect, but initially this effect is not as strong as the default reading of indefinite objects.

Language specific properties (no distinction between *a/an* and *one* in Chinese) do have an effect as early as at the ages of 4 and 6, resulting in differences between Dutch on the one hand, and Chinese on the other. There are more non-narrow scope readings in Chinese than in Dutch, which reinforces the findings of Lee (1986) and Su (2001). However, they assume that language specific factors are the reason for Chinese children to differ from adults in the interpretation. My study provides counterevidence to this assumption. Su (2001) thinks that language specific factors are the reason for English children to initially interpret *a/an* N with a narrow scope reading. Chinese children start with a non-narrow reading (quantity-denoting reading in her words) and acquire the ambiguous nature of *yi*-CL N only when they can employ pragmatic rules at a later stage. However, in the tested configurations of my study where *yi*-CL N precedes the frequency quantifier *liangci*, adults strongly prefer the non-narrow

scope reading whereas children exhibit a much higher percentage of narrow scope readings of indefinites. These results do not support Su's claim.

Lee (1986) and Fan (2005) conclude that adults follow the isomorphic principle in scope assignment while children initially interpret indefinites with a non-narrow scope reading and do not acquire the scope assignment principle until the age of 6 or 7. However, the results of my study do not support their claim either. In the configurations where *yi*-CL N should be in the scope of other quantifiers according to Lee's or Fan's approach (c-commanded by the frequency quantifier *liangci* 'twice' or by the subject quantifier *liang*-CL N 'two N', Chinese adults do not prefer narrow scope readings as the isomorphic principle suggests, but instead they have more non-narrow readings. This stands in stark contrast with the Dutch adult data in which a narrow scope reading is strongly preferred. Chinese children pattern with adults in their preference for non-narrow scope readings compared to the data of Dutch children.

Interestingly, we find a similar situation in Spanish (Miller & Schmitt 2004), where only 43% of the Spanish adults accepted a narrow scope reading of singular indefinites when they are in the scope of negation. In contrast, in a study reported by Lidz & Musolino (2002), 93% of the English adults accepted the narrow scope reading of indefinites in the scope of negation.

I agree with Miller and Schmitt that in a similar context, Chinese and Spanish adults show different behaviour in the interpretation of indefinites compared to Dutch and English adults. Chinese and Spanish differ from English and Dutch in that *a/an* and *one* is not distinctive. Chinese and Spanish tend to use bare noun phrases rather than singular noun phrases under negation when they are interpreted as weak NPs. In Spanish, a bare noun has singular and plural forms. Bare singulars in Spanish are restricted to the object position and can only be interpreted with a non-specific reading. It is obvious that language specific factors play a role in the adult data and in child language as well. At this point, we need to turn back to the questions posed in the beginning of this chapter: how and when do language specific factors come to play a role in children's

interpretation of *yi*-CL N? To what extent are patterns of child language acquisition determined by language specific factors? And to what extent are they universal? In the next section, I propose an OT analysis of the relevant data of my experiments.

5.6 An OT analysis of the experimental results

5.6.1 Chinese adult data

In the first experiment, I tested sentences of two types. The first type was a sentence structure with a numeral subject and a numeral object. The second type was a sentence structure with a verbal quantifier preceding the numeral object *yi*-CL-N. Both types were tested in two conditions: in an intensional and in a bounded environment. In all cases the numeral object was of the form *yi*-CL-N. Reconsider an example of the first type of sentence in the two conditions:

- (66) a. *Liangzhi xiaoxiong neng ti-qi yi-ge lanzi.*
 two-CL little-bear can lift-up one-CL basket
 ‘Two little bears can lift up a basket.’
- b. *Liangzhi xiaoxiong ti-qi yi-ge lanzi.*
 two-CL little-bear lift-up one-CL basket
 ‘Two little bears lift up a basket.’

The results showed that the non-narrow reading (the cumulative reading) is the preferred reading for adults. However, intensionality has an overall effect of inducing distributivity. As was mentioned above, the tested sentences in this experiment were designed in order to compare the results with Lee (1997). In Lee’s study the cumulative reading is strongly preferred by Chinese adults when interpreting sentences with a numeral subject and a numeral object, as in (67), while Chinese children at the age of 4 prefer a distributive reading of such a construction:

- (67) *You sange shushu tiaozhe liang-tong shui.*
 have three uncle carry-on-shoulder two-CL water
 ‘Three men are carrying (on their shoulders) two buckets of water.’

According to Lee, the distributive reading of the numeral subject corresponds to the narrow scope reading of the numeral object. As was discussed above, I did not use the existential *you* in my study since *you* is claimed to induce distributivity (Li 1999; Yang 2005). The results of my study support Lee’s claim (1997) that Chinese adults prefer a cumulative reading of the subject. These results cannot be accounted for with the Isomorphic Principle. So how do we account for them in OT?

As was discussed in Section 5.2.2.2, the phenomenon mentioned above is not unique in Chinese. Moreover, language specific phenomena can be accounted for by a language specific ranking of universal constraints. Therefore, we need to work out the relevant universal constraints and their language specific ranking to account for the experimental results.

In the configuration under consideration, the subject is a numeral expression and a cumulative reading of the subject is preferred. It has been claimed in the literature that plural subjects are ambiguous between distributive and cumulative readings, and the interpretation of the subject is consistent with the interpretation of the predicate in terms of distributivity. The cumulative reading is found to be the preferred (default) reading of plural subjects, while distributive readings only arise in the context of distributive operators such as *each* or distributive predicates or adverbs (Heim et al. 1991; Link 1983; Dowty 1987; Landman 2000). Empirical studies of sentence processing seem to support the claim that processing distributivity is harder than processing cumulativity of plural subjects (Frazier et al 1999; Frazier & Clifton 2000; Zabbal 2004). In accordance with these findings, I formulate the following constraint:

- (68) *DIS-SUBJ: Avoid distributive readings of plural subjects.

The constraint *DIS-SUBJ states that a distributive interpretation for a plural subject should be avoided. Obviously, *DIS-SUBJ is in conflict with the ISOMORPHISM PRINCIPLE, reformulated in (69), where the scope relation between two quantifiers is claimed to reflect the surface order in terms of c-command relations.

- (69) ISOM: In a multi-quantifier sentence, quantifier A has scope over quantifier B iff A c-commands B.

In order to satisfy ISOM, a subject quantifier should have scope over an object quantifier since the former c-commands the latter. In other words, the subject will get a distributive reading and the object a narrow scope reading. This reading, however, is in conflict with the constraint *DIS-SUBJ. In traditional grammar, principles or constraints are treated as hard constraints and cannot be violated. However, in cases such as (70), both the constraint ISOM and the constraint *DIS-SUBJ are activated and in conflict:

- (70) *Liang-ge xuesheng chi le san-kuai dangao.*
 two-CL student eat PRT three-CL cake
 ‘The two students ate three cakes.’

There is not a problem if we apply the constraints in OT fashion. Recall that constraints in OT are considered to be typically in conflict and the conflicts are resolved through hierarchical ranking of the constraints. The optimal candidate is the one which has the best satisfaction pattern. The preferred reading of the object in (70) is the non-narrow scope reading, indicating that *DIS-SUBJ overrules ISOM in Chinese.

- (71) *DIS-SUBJ >> ISOM

If an overt distributivity operator is added to (70), as in (72), the constraint *DIS-SUBJ can be overruled, since only a distributive reading of the subject is obtained in this case:

- (72) *Liang-ge xuesheng dou chi le san-kuai dangao.*
 two-CL student all eat PRT three-CL cake
 ‘The two students both ate three cakes.’

Thus, distributivity can be induced by overt distributive operators, such as English *each* and Chinese *dou*. I assume the following constraint to capture this generalization:

- (73) D-OP: interpret distributivity markers.

Note that the constraint D-OP is a faithfulness constraint that requires that overt distributive operators in the input should be interpreted in the output. It is obvious that the constraint *DIS-SUBJ is also in conflict with the constraint D-OP and the former is outranked by the latter:

- (74) D-OP >> *DIS-SUBJ

However, the above ranking fails to capture the interpretation contrast in the following sentence pairs:

- (75) a. *Zhangsan he Lisi dou chi le henduopingguo.*
 Zhangsan andLisi all/each eat PRT many apple
 ‘Zhangsan and Lisi all/each ate many apples.’
- b. *Zhangsan he Lisi dou chi le zhexie dangao.*
 Zhangsan andLisi all eat PRT these cake
 ‘Zhangsan and Lisi all ate these cakes.’

The two sentences above share their form: they contain a subject quantifier and an object quantifier. In both sentences, a distributivity operator *dou* is present. So the constraints D-OP and *DIS-SUBJ are activated in both cases. Because of the ranking of these two constraints, we would also expect the same interpretation in the two sentences, namely the distributive reading of the subject. However, we find that only when the object is an indefinite, the subject gets a distributive reading: ‘Zhangsan ate many apples and Lisi ate many

apples', in which the apples eaten by Zhangsan are different from the ones eaten by Lisi. In the case of a definite object, as in (75b), the object is scope independent, and cannot be distributed over regardless of the D-operator *dou*. The distributive reading of the subject in (75a) thus goes hand in hand with the narrow scope reading of the object. Only object NPs that allow scope readings license the distributive reading of the subject. When the object is a definite, it is not possible to have a distributive reading since definite NPs usually take scope independent readings. Therefore, the definiteness of the object has an effect on the interpretation of the subject in that a non-specific (narrow scope) reading of an indefinite object goes hand in hand with a distributive reading of the subject. Hence, if the object is indefinite, the constraint *DIS-SUBJ is violated whenever the constraint MAXIND, that favours a non-specific reading of the indefinite object, is satisfied and vice versa (cf. Chapter 4, Section 4.4).

As shown in (75b), when the object is a definite noun phrase, it can not be interpreted with a narrow scope reading. In this case, the subject quantifier cannot have a distributive reading, not even if a distributivity operator is overtly present. But if the object is indefinite, the distributivity operator can induce the distributive reading of the subject, as shown in (72) and (75a). Therefore, the constraint D-OP ranks higher than the constraint *DIS-SUBJ. In the test sentences of my experiments, only indefinites are involved, so the reading that (75b) gets due to the definite object is not important for the discussion of the data. So far, the following constraint hierarchy is relevant for the multi-quantifier configuration:

(76) D-OP >> *DIS-SUBJ >> ISOM

Recall the first type of test sentences in my experiments, repeated in (77). It is not hard to see that more constraints are activated than the constraints we just mentioned:

(77) *Liangzhi xiaoxiong neng ti-qi yi-ge lanzi.*
 two-CL little-bear can lift-up one-CL basket
 'Two little bears can lift up a basket.'

First of all, the object is an indefinite, so the constraint MAXIND is activated. Secondly, the sentence is in an intensional context, so the constraint INT-IND is activated. Thirdly, the predicate is a resultative predicate, so the constraint ECOMP-OBJ is activated. These three constraints, discussed in Chapter 4, are repeated here:

- (78) MAXIND: Indefinites get a non-specific reading.
- (79) INT-IND: Indefinite NPs under an intensional verb get a non-specific reading.
- (80) ECOMP-OBJ: Objects of complex denoting events get a specific reading.

The faithfulness constraint MAXIND says that an indefinite noun phrase is interpreted in its default non-specific reading. MAXIND is violated when an indefinite noun phrase is the object of a resultative predicate, because this triggers a specific reading. Thus, apparently ECOMP-OBJ outranks MAXIND. MAXIND is also violated when an indefinite quantifier c-commands another quantifier and has a wide scope over that quantifier. In this case, the indefinite is specific. To get this result, the constraint ISOM should rank higher than the constraint MAXIND. The constraint ISOM and the constraint ECOMP-OBJ are in conflict when an indefinite object of a resultative predicate is c-commanded by a subject quantifier. In order to satisfy ISOM, the object should have a non-specific (narrow scope) reading, yet the constraint ECOMP-OBJ requires a specific reading of the object. The object in this case gets a specific reading, which shows that the constraint ECOMP-OBJ outranks the constraint ISOM. As was discussed in Chapter 4, the constraint INT-IND and ECOMP-OBJ are tied constraints, because in an intensional context, an indefinite can have a non-specific reading, even if the predicate is resultative. These considerations result in the following constraint hierarchy:

- (81) {INT-IND, ECOMP-OBJ } >> ISOM >> MAXIND

Now let us try to combine the two constraint hierarchies in (76) and (81). Since the constraint D-OP and the constraint INT-IND do not interact with each other, we do not know how they are ranked with respect to each other. Similarly, the complex constraints *DIS-SUBJ and ECOMP-OBJ do not interact and therefore they are not ranked with respect to each other either. A comma is used to indicate an unclear ranking of two constraints in a hierarchy. Thus, the following constraint hierarchy is established:

- (82) D-OP >> {INT-IND, *DIS-SUBJ, ECOMP-OBJ}>> ISOM >> MAXIND

Now let us verify whether the constraint hierarchy given in (82) can capture the linguistic data or not. Consider the following input sentence taken from Lee (1997):

- (83) *Suoyou de shushu dou tiao zhe liang shuitong.*
 all PRT uncles all carry PRT two-CL water
 ‘All uncles are carrying two buckets of water’

Tableau 1. *Multi-quantifier sentence with dou*

Input (83) <i>Liang-CL shuitong</i>	D-OP	*DIS-SUBJ	ISOM	MAXIND
☞ more than two buckets of water are involved		*		
two buckets of water	*!		*	*

According to the experimental results, adults tend to assign a distributive reading to the subject of (83). This finding is reflected in the tableau above. The narrow scope reading of the object (which goes hand in hand with the distributive reading of the subject) is given as the first candidate, the cumulative reading as the second. The first candidate violates the constraint *DIS-SUBJ because a non-specific

(narrow scope) reading of the indefinite object is obtained under a distributive reading of the subject. The second candidate violates the highest constraint D-OP which requires a distributive reading of the subject when the distributive operator *dou* is present in the input. The second candidate also violates ISOM and MAXIND: it does not have a narrow reading in the object position and it is not a non-specific NP. Violating the highest constraint is more serious than violating any lower ranked constraint. Therefore, the second candidate loses the competition and the first candidate (non-specific, narrow scope reading of the object under a distributive reading of the subject) is the optimal interpretation of (83), which exactly fits the adult data given in Lee (1997).

Now we can examine whether the constraint hierarchy in (82) can also account for the Chinese adult data that were found in my own experiment.

(84) Input sentence form:

Liang-ge xiaoxiong neng ti-qi yi-ge lanzi.

two-CL little-bear can lift-up one-CL basket

‘Two little bears can lift up a basket.’

Tableau 2. *Liang-CL N---yi-CL N in an intensional condition*

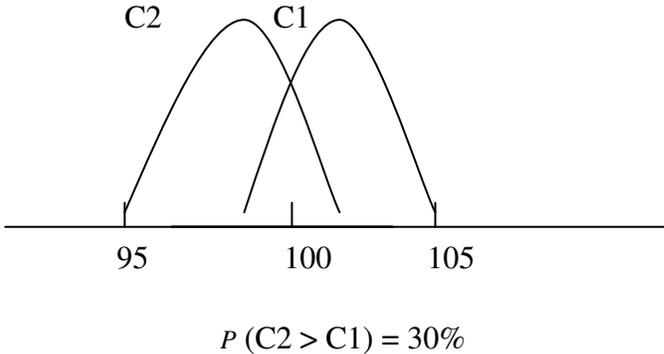
Input: (84) <i>yi-ge lanzi</i>	INT-IND	*DIS-SUBJ	ECOMP-OBJ	ISOM	MAXIND
☞ one basket	*			*	*
☞ two different baskets		*	*		

The first candidate (the cumulative reading of the indefinite object) in Tableau 2 violates the constraint INT-IND, the constraint ISOM and the constraint MAXIND. The second candidate violates the constraints *DIS-SUBJ and ECOMP-OBJ. Because the three highest ranked constraints are tied, both candidates come out as optimal. However, as shown in the first experiment, 87.5% of the adults actually accept a scope independent (one object) reading of *yi-CL N*, while only 41.6%

accept a distributive reading of the numeral subject that goes with a narrow scope reading of the indefinite object. The experimental results in fact show that the sentence is ambiguous between a narrow scope (two object) reading and a scope-independent (one object) reading of the object and the latter reading is preferred to the former (87.5% to 41.6%). In standard OT we could explain this ambiguity in terms of a tie between the relevant constraints, but the interpretation preference would remain unaccounted for. Therefore, I opt for the mechanism of constraint evaluation within the Stochastic OT approach.

As was pointed out in Chapter 2, in Stochastic OT every constraint has a *ranking value* along a continuous ranking scale. A small amount of *noise* is added to this ranking value at evaluation time. The choice of optimal candidates is determined by the rankings of language specific constraint weights (Boersma 1997). If two constraints overlap, both readings are possible while one of them is the preferred interpretation.

Figure 3. *Schematic representation of a continuous ranking scale*



In the example illustrated in Figure 3 above, the probability of $C2 > C1$ is 30%. In these cases, if $C1$ and $C2$ are conflicting constraints, satisfaction of $C1$ is preferred, but satisfaction of $C2$ is still grammatical. The combined weight of a set of cooperating constraints is assumed to equal the maximum of their own weights. This implies that the combined effect of a set of cooperating constraints is slightly stronger than the effect of the strongest constraint in this set. In the

case of Tableau 2, I propose that the combined weight of the constraint *DIS-SUBJ and the constraint ECOMP-OBJ is stronger than the constraint INT-IND. Since the second candidate interpretation violates both constraints, that is *DIS-SUBJ and ECOMP-OBJ, while the first candidate only violates INT-IND, both candidates come out as optimal interpretations, and the first candidate is the preferred one. This analysis thus not only nicely accounts for the two possible interpretations, but it also explains the difference in preference between the two interpretations, as found in the experiment.

The following tableau gives the derivation of the optimal interpretation of the indefinite object of a resultative predicate:

(85) Input sentence form:

Liang-ge xiaoxiong ti-qi le yi-ge lanzi.

two-CL little-bear lift-up PRT one-CL basket

‘Two little bears lifted up a basket.’

Tableau 3. *Liang-CL N---yi-CL N in a bounded condition*

Input: (85)	*DIS-SUBJ	ECOMP-OBJ	ISOM	MAXIND
<i>yi-ge lanzi</i>				
☞ One basket			*	*
Two different baskets	*	*		

In Tableau 3, the second candidate violates the two higher ranked constraints. These violations are fatal and the second candidate loses the competition. The experimental results show that 95.8% of the adults get the non-narrow scope (one object) reading of the object, whereas only 13.9% accept the narrow scope (two object) reading of the object. The strong preference of the non-narrow scope reading is captured by the constraint evaluation as shown in Tableau 3.

In the first experiment, another type of sentence was also tested, namely the type of sentence where a frequency quantifier *liangci* ‘twice’ occurs before or after the indefinite object, as repeated in (86):

- (86) a. *Xiaomao neng liangci dai-kai yi-ge hezi.*
 kitten can twice hit-open one-CL box
 ‘The kitten can open a box twice.’
- b. *Xiaomao liangci dai-kai le yi-ge hezi.*
 kitten twice hit-open PRT one-CL box
 ‘The kitten can open a box twice.’

The experimental results indicated that the different types of sentences (the construction containing *liang-ge* and the construction containing *liangci*) do not exhibit significant differences in interpretation. How can we understand this fact? As a matter of fact, although *liangci* is a frequency quantifier, it resembles the sentence with a subject quantifier, as it c-commands the object, and the sentence is ambiguous between a narrow scope reading and a non-narrow scope reading of the object. In Chinese, a non-narrow scope reading is clearly the preferred reading, and distributivity is avoided. Therefore, we can generalize the constraint *DIS-SUBJ to all types of constructions with multiple quantifiers, including frequency quantifiers and subject quantifiers. Thus, we obtain the following constraint:

- (87) *DIS-Q: Avoid distributive readings of quantifiers.

In the following tableaux, the input sentence as given in (86a) (an intensional context) and (86b) (a bounded condition) contains *liangci* ‘twice’. The constraints that were activated in the case of a subject quantifier are also activated in this context:

Tableau 4. *Liangci*----*yi-CL N* in an intensional condition

Input: (86a)	INT- IND	*DIS-Q	ECOMP -OBJ	ISOM	MAXIND
<i>yi-ge hezi</i>					
☞ one box	*			*	*
☞ two different boxes		*	*		

Tableau 5. *Liangci*----*yi-CL N* in a bounded condition

Input: (86b)	*DIS-Q	ECOMP- OBJ	ISOM	MAXIND
<i>yi-ge hezi</i>				
☞ one box			*	*
two different boxes	*	*		

Since a sentence with the quantificational adverb *liangci* ‘twice’ and an indefinite object quantifier leads to the same results as the sentence with a quantificational subject and an indefinite object, we are not surprised to find that the above analysis is in accordance with the results of the experiment with the type of sentence with a quantificational adverb as well.

In the act-out experiment, sentences containing *liangci* ‘twice’ and the indefinite object were tested in two conditions. In the first condition, *liangci* ‘twice’ preceded the object and in the second condition, *liangci* ‘twice’ occurred in the final position of the sentence; that is after the object. A relevant pair of example sentences is given below:

- (88) a. *Xiaomao neng liangci dai-kai yi-ge hezi.*
 kitten can twice hit-open one-CL box
 ‘The kitten can open a box twice.’

- b. *Xiaomao neng da-kai yi-ge hezi liangci.*
 kitten can hit-open one-CL box twice
 ‘The kitten can open a box twice.’

The act-out experiment employs the same type of test sentences used in the judgement experiment: sentences with a *liangci* ‘twice’ and an indefinite object in an intensional context. The results of the act-out experiment repeat the results of the judgement experiment: the non-narrow scope (one object) reading is preferred over the narrow scope (two object) reading of the object (65.3% via 34.7%). The other type of sentence was used in order to see whether the position of *liangci* ‘twice’ matters for the interpretation of the indefinite object. Tableau 6 represents the constraint evaluation for this type of sentence:

(89) Input sentence form:

- Xiaomao neng tiaojin yi-ge lanzi liangci.*
 kitten can jump-in one-CL basket twice
 ‘The kitten jumped into a basket twice.’

Tableau 6. *Yi-CL N preceding liangci*

Input: (88)	INT-IND	*DIS-Q	ECOMP-OBJ	ISOM	MAXIND
<i>yi-ge lanzi</i>					
☞ one basket	*				*
☞ two different baskets		*	*	*	

In (89), *liangci* is in sentence-final position and it forms a resultative predicate with the verb, as was discussed in Section 5.2.2.6. Therefore, the constraint ECOMP-OBJ is violated by the second candidate since it is the narrow scope interpretation of the object. The second candidate also violates the constraint *DIS-Q and the constraint ISOM. The first candidate violates only one higher ranked constraint, while the second one violates two or even three. Therefore, the first candidate is strongly preferred. The experimental results show that

94.4% of the adults acted out with 1 object-responses, which is the non-narrow scope reading of the object, whereas only 5.6% acted out with 2 object-responses (in accordance with the non-specific, narrow scope reading of the object). The experimental results also show that the change in the position of *liangci* ‘twice’ does have an effect on the interpretation of the indefinite object. In our tableaux, we can see that the violation pattern of the constraint ISOM contributes to this contrast. On the one hand, when *liangci* ‘twice’ precedes the indefinite object, two constraints favouring a non-narrow scope reading are violated, and the combined weight of these two constraints is stronger than the weight of the constraint that favours a narrow scope reading of the object. Thus, two interpretations become optimal, but the non-narrow scope reading is preferred. When the indefinite object precedes *liangci* ‘twice’, on the other hand, three constraints that favor the non-narrow scope reading of the object are violated. Again, together they compete against the constraint INT-IND. Accordingly, the preference in interpretation that results from the pattern with three violated constraints is much stronger than the one that results from the pattern with two. My analysis thus straightforwardly explains the adult data in the experiments. Since the adult data in Chinese can be accounted for with the stochastic OT analysis proposed here, a relevant question would be: can it also be applied to account for the differences between Dutch adults and Chinese adults?

5.6.2 Explaining the difference between Dutch and Chinese

The comparison of the experimental results of Dutch and Chinese adults shows that in both languages they share a high preference (92% vs. 94%) for the non-narrow reading of the indefinite object (1 object-responses) in the high condition (when the indefinite object precedes the frequency quantifier). However, they do differ in the low condition (when the frequency quantifier precedes the indefinite object). In the low condition, Dutch adults excluded the non-narrow reading of the object in 100% of the cases. In contrast, for Chinese adults the indefinite object is ambiguous (65.3% versus 34.7%), and the non-narrow scope reading is the preferred one. In OT, differences between

languages are claimed to result from language specific constraint rankings. On the basis of the experimental results, I assume that the ranking of the relevant constraints in Dutch is different from the ranking in Chinese:

- (90) a. Ranking in Chinese:
 {INT-IND , *DIS-Q} >> ISOM >> MAXIND
- b. Ranking in Dutch:
 ISOM >> {INT-IND , *DIS-Q} >> MAXIND

When *twee keer* ‘twice’ precedes the indefinite object, Dutch adults exclude the non-narrow reading of the indefinite (100%), indicating that the constraint ISOM in Dutch outranks *DIS-Q since the latter constraint prefers a non-narrow (one object) reading of the object. When the indefinite object precedes the frequency quantifier, the adults in Dutch strongly preferred the non-narrow reading of the object (92%), indicating that the constraint ISOM outranks the constraint INT-IND, as the latter constraint prefers the narrow scope reading of the object. Unlike the Chinese data, there is little ambiguity in the Dutch adult data; therefore, I conclude that the higher constraint strictly dominates the lower one.

The constraint ECOMP-OBJ is activated in the Chinese data when the frequency quantifier is in sentence-final position, but this constraint is not activated in the Dutch data, where no resultative predicates are used in the test sentences.

Unlike in Chinese, *twee keer* ‘twice’ in Dutch precedes the main verb in all test sentences (both in *twee keer...een* ‘twice... a’ and in *een...twee keer* ‘a... twice’), while *liangci* ‘twice’ precedes the verb in one case (*liangci...yi* ‘twice ...a’) and is in sentence-final position in the other case (*yi...liangci* ‘a...twice’). According to Larson (2004), in English *twice* is a true quantifier when it precedes the verb, but it is a quantity predicate which cannot induce scope interaction when it is in post-verbal position. As a consequence, a pre-verbal frequency quantifier can have a distributive reading, but when it is post-verbal, it is interpreted as part of the predicate. In Dutch, the

frequency quantifier is pre-verbal; it is used as a quantifier and cannot be interpreted as a part of the predicate (Krämer 2000). Leung (2003) claims that in Chinese a frequency quantifier in post-verbal position forms a resultative predicate. Therefore, the constraint ECOMP-OBJ is only activated in the Chinese sentences. The derivations of the optimal interpretations in the Dutch adult data are given in the following two tableaux:

(91) Input sentence

Je mag twee keer een potje omdraaien.

‘You may turn over a(any) jar twice.’

(should involve one or two jars)

Tableau 7. *Adult data in Dutch of construction ‘twee keer...een’*

Input: (91)	ISOM	INT-IND	* DIS-Q	MAXIND
<i>een potje</i>				
one jar	*	*		*
☞ two different jars			*	

(92) Input sentence:

Je mag een potje twee keer omdraaien.

‘You may turn over a (particular) jar twice.’

(should involve only one jar)

Tableau 8. *Adult data in Dutch of construction een...twee keer 'a ...twice'*

Input: (92)	ISOM	INT-IND	* DIS-Q	MAXIND
<i>een potje</i>				
☞ one jar		*		*
two different jars	*		*	

In Tableau 7, the first candidate (non-narrow reading of the object) violates two higher constraints ISOM and INT-IND and a lower constraint MAXIND. The violation of the two high ranked constraints is fatal. The second candidate (narrow scope reading) wins the competition as it only violates a lower constraint *DIS-Q. This fits the experimental results since 92% of the adult subjects acted out the narrow scope (two object) reading. In Tableau 8, both candidates violate two constraints. The highest ranked constraint ISOM is violated by the second candidate (narrow scope reading), which means that the second candidate loses the competition. The first candidate comes out as the optimal interpretation and this fits the experimental results as well: 100% of the adults performed the act-out task in accordance with a non-narrow scope reading of the objects.

In this section I proposed that Dutch adults have a different constraint ranking from Chinese adults, and I showed that the derivation of their interpretations fits the experimental results. In the following section, we will see whether the child data in my experiments can also be accounted for in an OT analysis.

5.6.3 Child language acquisition

The experimental results showed that the responses of children are different from those of adults, implying that the constraint ranking in child language is different from the one in adult language. The experimental results in Lee (1986) and Fan (2005) showed that young

children are not sensitive to the distributive operator *dou*. In the results of my judgement experiment, Chinese 4-year-olds had more narrow scope readings as compared to adults (78% versus 27%). The non-narrow reading in the adult data wins out against the other candidate reading because the combined weight of the constraints *DIS-Q and ECOMP-OBJ is stronger than the higher ranked constraint INT-IND. Young children are not very sensitive to contextual conditions: there is only a 3% difference between the responses in the intensional condition and those in the bounded condition. Therefore, the constraint INT-IND cannot be ranked high. In Lee (1997), sentences with a numeral subject and a numeral object were tested. The cumulative readings were dominant in adults' responses, but the distributive readings that go with narrow scope readings of the object were favoured overwhelmingly by children. This shows that children are not sensitive to the constraint *DIS-Q. Therefore, I conclude that children rank the constraint MAXIND higher than other constraints in their grammar.

However, this conclusion was challenged by the results of the act-out experiments, especially when compared to the Dutch data, as shown in Table 16 (repeated here for convenience):

Table 16. *Percentage and number of 1-responses in Dutch and Chinese*

Dutch Subjects	Low condition	High condition
4;0--5;6	13%(6)	30%(12)
5;6—7;0	0% (0)	43%(18)
Adults	0%(0)	92%(33)

Chinese subjects	Low condition	High condition
4;0—5;0	38%(27)	67%(48)
6;0—7;0	58%(42)	88%(63)
Adults	65%(47)	94%(68)

From the table above, we learn that young children in Dutch and Chinese have one thing in common: both have more narrow scope

readings than older children and adults. This reinforces the main finding of the judgement experiment. Does it mean that MAXIND ranks highest in the child grammar of both languages? Let us first consider the Dutch case.

In Dutch, children favoured the default reading of indefinites regardless of the word order variation: their non-narrow scope readings of the object pattern with the adult results in the low condition (13% versus 0%) and form a contrast with the adult results in the high condition (30% versus 92%). MAXIND must be higher than ISOM in child language. Since we cannot figure out the ranking between the constraint *DIS-Q and other constraints from the child data, this constraint will be left out for the moment. I assume the following constraint hierarchy to account for the Dutch children's data and the derivation of the optimal interpretation of the input sentence in (94) is given in Tableau 9:

(93) MAXIND >> ISOM >> INT-IND

(94) Input sentence:

Je mag een potje twee keer omdraaien.

'You may turn over a (particular) jar twice.'

(should involve only one jar)

Tableau 9 *Child data in Dutch of construction een...twee keer 'a...twice'*

Input: (94) <i>een potje</i>	MAXIND	ISOM	INT-IND
one jar	*!		*
☞ two different jars		*	

The first candidate in Tableau 9 violates the constraint MAXIND and the constraint INT-IND. The second candidate violates the constraint ISOM. The violation of the highest constraint is fatal. Therefore, the

second candidate is the optimal interpretation, which fits the experimental results.

The children's data in Chinese reveal that children have a preference for non-narrow scope readings in the high condition, although it is not as strong as that of the older children and adults (67% versus 94%). However, if we rank MAXIND higher than other constraints in Chinese child grammar, we cannot account for such a preference. It can be argued that the constraint ISOM outranks MAXIND. Thus we can explain the contrast of young children's responses in the low and high condition (38% versus 67%) straightforwardly. We cannot account, however, for the findings in Fan (2005) and other previous studies showing that children are not sensitive to ISOM until the age of 6. We definitely cannot adhere to the previous claim that specifically for Chinese, the singular indefinite object is initially interpreted with a non-narrow scope reading, as this claim is not supported by the main findings of the experiments. But note that there is another language specific factor: the difference between Chinese and Dutch in the use of frequency quantifiers. The act-out experiment employed test sentences containing *liangci*, which forms a resultative predicate when it is in postverbal position. In an acquisition experiment on resultative predicates conducted by Chen (to appear), children understand non-resultative predicates (such as *zhai* 'pick') as resultative predicates (such as *zhai-xia* 'pick up'). I assume that in Chinese, the constraint ECOMP-OBJ has a weight equal to that of the constraint MAXIND. When these two constraints are activated we obtain ambiguity of indefinite objects. If a lower constraint favours an interpretation which is also favoured by any of the two highest constraints ECOMP-OBJ and MAXIND, then such an interpretation is preferred, due to the combined weights. The constraint hierarchy in child grammar for the interpretation of indefinites is given in (95). Again, since I am not sure that the constraint *DIS-Q is activated in child grammar, this constraint is not included in the ranking. The derivation of the test sentence containing *liangci* 'twice' in the high condition is given in Tableau 10:

(95) MAXIND, ECOMP-OBJ >> ISOM >> INT-IND

(96) Input sentence form:

Xiaomao neng da-kai yi-ge hezi liangci.

kitten can hit-open one-CL box twice

‘The kitten can open a box twice.’

Tableau 10. *Child data in Chinese of construction ‘yi-CL N...liangci’*

Input: (96) <i>yi-ge hezi</i>	MAXIND	ECOMP -OBJ	ISOM	INT-IND
☞ one box	*			*
☞ two different boxes		*	*	

The first candidate in Tableau 10 violates the constraint MAXIND and the constraint INT-IND. The second candidate violates the constraints ECOMP-OBJ and ISOM. Since MAXIND and ECOMP-OBJ are equally important, the indefinite can get two interpretations. The second candidate interpretation violates two highly ranked constraints; it is less preferred since the combined weights of these two constraints are stronger than the weight of one of the highest ranked constraint MAXIND. Therefore, the first candidate (the non-narrow scope reading of the indefinite) is the preferred reading of the object, which is supported by the experimental results.

The question is, of course, how children achieve the adult grammar. I adopt the acquisition theory termed Gradual Learning Algorithm in Stochastic OT (Boersma 1997, 2000; Boersma and Hayes 2001) in which the universal constraints have an initial ranking. Children then adjust their ranking of constraints according to their observations of the adult language. When the optimal candidate derived from the initial ranking is different from the observed data, children will re-rank the constraints in order to get closer to the observed data: all the constraints that favour the observation are promoted by some small predetermined value and all of those that favour the errant hypothesis are demoted by that amount. The

adjustment continues until the observations do not lead to any more significant changes in the constraint ranking discussed. In this way, children attain the adult grammar.

5.7 Conclusion

The results of the experiments discussed in this chapter demonstrate that children initially have a preference for a specific scope relation in the process of language acquisition

Mandarin children, just like Dutch, English and Kannada children, start out with an overall preference for a narrow scope reading of indefinite objects. In child grammar, these narrow scope readings are even possible when the syntactic configuration excludes them for adults. These findings support the claim that, universally, children begin to acquire scope relations with a tendency toward a narrow scope reading for indefinite objects. Word order does have some effect, but in the beginning this effect is not as strong as the default reading of indefinite objects.

Language specific properties (such as the lack of a distinction between *a/an* and *one* in Chinese) do have an effect as early as the age of 4 and 6. This results in differences between Dutch on the one hand, and Chinese on the other hand. There are more non-narrow scope readings in Chinese than in Dutch.

Chinese adults show different behaviour in the interpretation of indefinites compared to Dutch and English adults. Chinese differs from English and Dutch in that *a/an* and *one* is not distinctive. Language specific factors, in particular word order and the presence or absence of numeral content, play a role from early stages on, but these factors only lead to adult-like patterns of interpretation when the initial preference wanes. The acquisition data can be accounted for within an OT framework. The constraint ranking in child language differs from the adult constraint ranking. The development of child language involves the process of adjusting the ranking of universal constraints to match the language specific ranking which they are learning.

Chapter 6

Conclusions

In this final chapter I present the main conclusions of my dissertation. The topic of this study is indefinite objects in Chinese. I studied in particular their marking, their interpretation and their acquisition. I have argued that these three aspects of indefinite objects, which at first sight show rather special language specific properties, can nevertheless all be accounted for in terms of the interaction among universal constraints in an Optimality Theoretic analysis. This theoretical framework posits that constraints on the grammars of specific languages are violable and ranked with respect to each other. I showed that the characteristics of indefinite objects in Chinese are the result of the language specific ranking of general and independently motivated constraints of various nature. In Chapter 2 I have given a short introduction to Optimality Theory, which serves as the theoretical background for the proposed analyses in the rest of the dissertation.

In Chinese, the canonical position of objects is to the right of the verb. Thus, the main sentence order is subject-verb-object (SVO). It is quite common, however, for objects to appear to the left of the verb, that is, in preverbal position (SOV). Objects that have scrambled to the left of the verb are often preceded by the marker *ba*. In this thesis I have argued that *ba* is a differential case marker that is sometimes present and sometimes absent as a case marker on objects, and as such an instance of the cross-linguistic phenomenon of differential object marking. In Chapter 3 I examined differential object marking in Chinese and concluded that the features of animacy and specificity both influence this phenomenon, just like what has been argued for other languages (Aissen 2003). Whereas objects that are human or animate are obligatorily marked, objects that are inanimate are optionally marked with *ba*. This is in line with Aissen (2003) who

argues that typically subjects are animate while objects are not, which would make animate objects ‘atypical’ and therefore in need of case marking. Chinese confirms this general picture of differential object marking, at least as far as the feature of animacy is involved. I pointed out a striking difference between Chinese and the other languages as well, however. That is, with respect to the feature of specificity, the Chinese data show the opposite from the cross-linguistic pattern. Cross-linguistically, we find that definite or specific objects are likely to be case marked, again because specificity is an ‘atypical’ feature of objects (it is typical for subjects) and thus, specific objects need to be case marked in order to distinguish them from subjects. Strikingly, however, in Chinese not the specific but rather the non-specific objects are obligatorily marked with *ba*, while *ba* is optional for specific objects. In order to explain this, I argued that in Chinese, apart from animacy and specificity, a third dimension plays a role in differential object marking, namely word order. I argued that while animacy is aligned with the scale of grammatical function (in the sense that objects that are animate are likely to be case marked in order to distinguish them from typical subjects), specificity is not aligned with grammatical function, but with syntactic position instead. That is, the preverbal position is associated with specific NPs, independently of whether they are subjects or objects. Thus, scrambled objects (irrespective of why they scrambled in the first place) are usually specific objects. Hence, non-specific objects in scrambled position are ‘atypical’ and that is why they need to be case-marked with *ba* in Chinese. This explains why not only human and animate (i.e., high-prominent) but also non-specific (i.e., low-prominent) objects in scrambled position are obligatorily case marked, while objects which are inanimate or specific are optionally marked with *ba* preverbally.

The second aspect of indefinite objects that I have studied in this thesis is their interpretation when they are marked with *ba*. Contrary to the traditional claim that only strong (specific) NPs may occur in a *ba*-construction, I have shown in Chapter 4 that non-specific indefinite NPs in fact do occur in *ba*-constructions as well. Relevant factors influencing the interpretation of indefinite objects in

the *ba*-construction include the lexical properties of the object, its syntactic position, and the type of predicate. More in particular, four constraints were argued to play a role in the interpretive process of indefinite object NPs:

- (i) a constraint that requires lexically indefinite NPs to receive an non-specific interpretation;
- (ii) a constraint that requires NPs in preverbal (scrambled) position to receive a specific interpretation;
- (iii) a constraint which states that objects of bounded predicates receive a specific interpretation;
- (iv) a constraint which states that objects in the scope of intensional predicates receive a non-specific interpretation.

Clearly, for preverbal indefinite objects, the constraints (i) and (ii) are always in conflict. Furthermore, when the predicate of a scrambled indefinite object is bounded, (i) and (iii) are in conflict as well, whereas in an intensional context, (ii) and (iv) are in conflict as well. The constraints I used for my analysis are not new and each of them has been independently motivated, but since they were assumed to be inviolable in previous approaches, they could not be taken together to account for the various interpretations of *ba*-NPs under different circumstances. In Chapter 4, however, I presented an Optimality Theoretical analysis in which the interpretation of the indefinite object in a *ba*-construction is conceived of as the optimal resolution of the interaction among these four universal, but potentially conflicting constraints.

Thirdly, in Chapter 5 I studied the acquisition of one type of indefinite object in Chinese, *viz.* *yi*-CL N. Indefinites are lexically ambiguous between a specific and a non-specific reading. Cross-linguistically, the acquisition studies of indefinites show that the interpretation of indefinite NPs in child language is different from that in adult language. Universally, children tend to interpret indefinite NPs with a non-specific reading which can also be described as a narrow-scope reading in terms of scope relations between quantifiers. However, in previous acquisition studies of *yi*-CL N, it is claimed that Chinese children initially (at least up to the age of 4) have a default non-scopal reading. This is due to the fact that *yi*-CL N is used both as

an indefinite and as a numeral phrase in Chinese and is interpreted with a numeral reading in early stages. This property of *yi*-CL-N is considered to be of utmost importance as it seems to determine the difference between Chinese and English children. In English, the indefinite article is merely an indefinite marker, but in Chinese *yi*-CL-N is initially interpreted as a numeral. The following three questions were addressed in Chapter 5:

- (i) how and when do language specific factors come into play in children's interpretation of *yi*-CL-N?
- (ii) to what extent are patterns of child language acquisition determined by language specific factors?
- (iii) to what extent are they universal?

To answer these questions, I investigated the interpretations of *yi*-CL-N when it interacts with another quantifier in terms of scope readings. I found that the evidence in production contradicts the claim made in previous acquisition studies of *yi*-CL-N. I also found that there are contradictory results in the experimental data in this work. These problems motivate the set-up of my two experiments.

I carried out two experiments concerning the acquisition of the possible interpretations of *yi*-CL N. The first experiment examined adults' and children's interpretations of *yi*-CL-N under two conditions: combined with an intensional verb and in sentences with a bounded predicate (accomplishment predicates in past tense). The second experiment compared adults and children on their interpretation of *yi*-CL-N in two syntactic positions in order to see whether word order plays a role in the interpretation of *yi*-CL N in child language.

My results showed that Chinese children initially interpret indefinites (including numeral expressions) with a non-specific reading or a scope dependent reading, just like Dutch and English children. In the cases where Chinese adults strongly prefer non-narrow scope reading of *yi*-CL N, Chinese children do exhibit a much higher percentage of narrow scope readings of indefinites, *contra* certain claims made in previous studies (Lee 1986; Su 2001; Fan 2005).

The results furthermore showed that a preference for non-narrow readings starts at the age of 6 and that it increases with age.

The bias for non-narrow readings is predominant in all age groups. The different types of quantifiers have no significant effect on the interpretation. In combination with intensional verbs the acceptance of the narrow reading of the object increases. However, this increase is not big enough to constitute a significant difference with the bounded condition.

A comparison between the Dutch and Chinese results shows that there are more non-narrow scope readings in Chinese than in Dutch. I therefore argued that language specific factors, in particular word order and the presence or absence of numerals, play a role from early stages on, but that these factors only lead to adult-like patterns of interpretation when the initial preference wanes.

In the final part of Chapter 5 I have accounted for the acquisition data within the framework of Optimality Theory, and defined the process of acquiring the interpretation of indefinite objects as a development from child language constraint rankings to adult language constraint rankings. Again, I have argued that language specific factors can be accounted for with different rankings of universal constraints.

The general conclusion of this dissertation is that language specific properties of indefinite objects in Chinese can be captured by language specific rankings of universal, conflicting constraints.

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Appendices

Appendix I - The judgement experiment

Test items:

- (1) a. *Xiao-mao neng liang-ci bao-qi yi-ge piqu.*
little-cat can twice hold-up one-CL ball.
'The little cat can pick up a ball twice.'
- b. *Xiao-mao liang-ci baoqi le yi-ge piqu.*
little-cat twice hold-up PRT one-CL ball.
'The little cat picked up a ball twice.'
(A toy cat, four balls of a different color.)
(The little cat held two different balls. It tried four, and succeeded in picking up two of them.)
- (2) a. *Liang-zhi xiao-mao neng tiao-jin yi-ge lanzi.*
two-CL little-cat can jump-into one-CL basket
'Two little cats can jump into a basket.'
- b. *Liang-zhi xiao-mao tiao-jin le yi-ge lanzi.*
two-CL little-cat jump-into PRT one-CL basket
'Two little cats jumped into a basket.'
(Three toy cats of a different color, and four baskets of a different color.)
(Two cats jumped into one basket together. A third cat tried but failed.)
- (3) *Xiao-mao bao-qi le piqu.* (Control item)
little-cat hold-up PRT ball
'The little cat picked up a ball.'
(A toy cat, a spoon, a ball, a hat, a stone.)
(A toy cat lifted a spoon.)
- (4) a. *Liang-zhi xiao-xiong neng ti-qi yi-ge lanzi.*
two-CL little-bear can lift-up one-CL basket
'Two little bears can lift up a basket.'

- b. *Liang-zhi xiao-xiong ti-qi le yi-ge lanzi.*
 two-CL little-bear lift-up PRT one-CL basket
 ‘Two little bears lifted up a basket.’
 (Three toy bears of a different color, and four baskets of a different color.)
 (Two bears lifted two different baskets. Three bears tried, one failed.)
- (5) a. *Xiao-mao neng liang-ci da-kai yi-ge hezi.*
 little-cat can twice hit-open one-CL box
 ‘The little cat can open a box twice.’
- b. *Xiao-mao liang-ci da-kai le yi-ge hezi.*
 little-cat twice hit-open PRT one-CL box.
 ‘The little cat opened a box twice.’
 (A toy cat, four boxes of a different color.)
 (A toy cat opened the same box twice.)
- (6) *Xiao-mao tiao-jin le lanzi.* (Control item)
 little-cat jump-into PRT basket
 ‘The little cat jumped into a basket.’
 (Two baskets of a different color, a stone, a spoon.)
 (The little cat tried, but failed to jump into a basket. Then he picked up a spoon.)
- (7) a. *Liang-zhi xiao-xiong neng zhua-qi yi-gen shenzi.*
 two-CL little-bear can snatch-up one-CL rope
 ‘Two little bears can grip a rope.’
- b. *Liang-zhi xiao-xiong zhua-qi le yi-gen shenzi.*
 two-CL little-bear snatch-up PRT one-CL rope
 ‘Two little bears gripped a rope.’
 (Three toy bears of a different color, four strings of a different color.)
 (Two bears grasped two different strings. First bear succeeded in grasping a string, the second bear failed, the third one succeeded in grasping another string.)

- (8) a. *Xiao-xiong neng liang-ci tiao-guo yi-kuai shitou.*
 little-bear can twice jump-over one-CL stone
 ‘The little bear can jump over a stone twice.’
- b. *Xiao-xiong liang-ci tiao-guo le yi-kuai shitou.*
 little-bear twice jump-over PRT one-CL stone
 ‘The little bear jumped over a stone twice.’
 (A toy bear, four stones of a different color and shape.)
 (A toy bear jumped over the same stone twice.)
- (9) *Xiao-mao neng na-qi shitou.* (Control item)
 little-cat can take-up stone
 ‘The little cat can lift up a stone.’
 (A stone, a hat, a rope, a ball)
 (The little cat tried to lift a stone, but failed. Then it took a hat.)
- (10) a. *Liang-zhi milaoshu neng da-kai yi-ge hezi.*
 two-CL mouse can hit-open one-CL box
 ‘Two mice can open a box.’
- b. *Liang-zhi milaoshu da-kai le yi-ge hezi.*
 two-CL mouse hit-open PRT one-CL box
 ‘Two mice opened a box.’
 (Three toy mice of a different color, and four boxes of a different color)
 (Two mice opened two different boxes. Three mice tried, one failed.)
- (11) a. *Xiao-xiong neng liang-ci tiao-jin yi-ge lanzi.*
 little-bear can twice jump-into one-CL basket
 ‘The little bear can jump into a basket twice.’
- b. *Xiao-xiong liang-ci tiao-jin le yi-ge lanzi.*
 little-bear twice jump-into PRT one-CL basket
 ‘The little bear jumped into a basket twice.’
 (A toy bear, four baskets of a different color.)
 (A toy bear jumped into the same basket twice.)

- (12) *Xiao-xiong neng ti-qi lanzi.* (Control item)
 little-bear can lift-up basket
 ‘The little bear can lift up a basket.’
 (Two baskets of a different color, a ball, a spoon.)
 (Little bear tried to lift the basket, but failed, then, he jumped into it.)
- (13) a. *Liang-zhi xiao-mao neng tiao-guo yi-kuai shitou.*
 two-CL little-cat can jump-over one-CL stone
 ‘Two little cats can jump over a stone.’
- b. *Liang-zhi xiao-mao tiao-guo le yi-kuai shitou.*
 two-CL little-cat jump-over PRT one-CL stone
 ‘Two little cats jumped over a stone.’
 (Three toy cats of a different color, four stones of different color and shape.)
 (Two cats jumped over the same stone respectively. The third cat tried but failed.)
- (14) a. *Xiao-mao neng liang-ci dai-shang yi-ding maozi.*
 little-bear can twice put-on one-CL hat
 ‘The little bear can put on a hat twice.’
- b. *Xiao-mao liang-ci dai-shang le yi-ding maozi.*
 little-bear twice put-on PRT one-CL hat
 ‘The little bear put on a hat twice.’
 (A toy cat, four hats of a different color.)
 (The little cat put on two different hats. It tried four, and succeeded in putting on two of them.)
- (15) *Xiao-xiong neng zhua-qi shenzi.* (Control item)
 little-bear can snatch-up rope
 ‘The little bear can grip a rope.’
 (Two ropes of a different color, a stone, a ball.)
 (The little bear tried to grasp a rope, but failed. Then, he took a ball.)

- (16) a. *Liang-zhi milaoshu neng bao-qi yi-ge piqu.*
 two-CL mouse can hold-up one-CL ball
 ‘Two little cats can hold a ball.’
- b. *Liang-zhi milaoshu bao-qi le yi-ge piqu.*
 two-CL mouse hold-up PRT one-CL ball
 ‘Two mice held a ball.’
 (Three mice of a different color, and four balls of a different color)
 (Two mice held one ball together. The third mouse tried to hold a ball but failed.)
- (17) a. *Xiao-xiong neng liang-ci na-qi yi-ge shaozi.*
 little-bear can twice pick-up one-CL spoon
 ‘The little bear can pick up a spoon twice.’
- b. *Xiao-xiong liang-ci na-qi le yi-ge shaozi.*
 little-bear twice pick-up PRT one-CL spoon
 ‘The little bear picked up a spoon twice.’
 (A toy bear, four spoons of different color.)
 (The little bear picked up two different spoons. It tried four, and succeeded in picking up two of them.)

Appendix II - The act out experiment

Test items:

- (1) a. *Ni keyi liang-ci da-kai yi-ge hezi.*
 you may twice hit-open one-CL box
 ‘You may open a box twice.’
- b. *Ni keyi da-kai yi-ge hezi liang-ci.*
 you may hit-open one-CL box twice
 ‘You may open a box twice.’
 (Four different boxes.)

- (2) *Ni keyi ti-qiu.* (Control item)
 you may kick-ball
 ‘You may kick a ball.’
 (One ball, one toy cat, one basket.)
- (3) a. *Ni keyi liang-ci paida yi-ge piqiu.*
 you may twice bounce one-CL ball
 ‘You may bounce a ball twice.’
- b. *Ni keyi pada yi-ge piqiu liang-ci.*
 you may bounce one-CL ball twice
 ‘You may bounce a ball twice.’
 (Four different balls.)
- (4) a. *Ni keyi liang-ci na-qi yi-ge pingbangqiu.*
 you can twice pick-up one-CL ping-pong-ball
 ‘You may pick up a ping pong ball twice.’
- b. *Ni keyi na-qi yi-ge pingbangqiu liang-ci.*
 you may pick-up one-CL ping-pong-ball twice
 ‘You may pick up a ping pong ball twice.’
 (Five ping pong balls of different color.)
- (5) *Ni keyi na maozi.* (Control item)
 you may take hat
 ‘You may take a hat.’
 (One hat, one toy block, one cup.)
- (6) a. *Ni keyi liang-ci ti-qi yi-ge lanzi.*
 you may twice lift-up one-CL basket
 ‘You may lift a basket twice.’
- b. *Ni keyi ti-qi yi-ge lanzi liang-ci.*
 you may lift-up one-CL basket twice
 ‘You may lift a basket twice.’
 (Four baskets of different color.)

- (7) a. *Ni keyi liang-ci zhua-zhu yi-gen shengzi.*
 you may twice hold-tight one-CL rope
 ‘You may grip a rope twice.’
- b. *Ni keyi zhua-zhu yi-gen shengzi liang-ci.*
 you may hold-tight one-CL rope twice
 ‘You may grip a rope twice.’
 (Five ropes of different color.)
- (8) *Ni keyi zhua-zhu xiao-mao.* (Control item)
 you may hold-tight little-cat
 ‘You may grip a cat.’
 (One toy cat, one toy rat, one basket.)
- (9) a. *Ni keyi liang-ci ti-dao yi-ge laoshu.*
 you may twice kick-down one-CL mouse
 ‘You may kick down a mouse twice.’
- b. *Ni keyi ti-dao yi-ge laoshu liang-ci.*
 you may kick-down one-CL mouse twice
 ‘You may kick down a mouse twice.’
 (Five toy mice of different color.)

Appendix III - The judgement experiment of you

A truth-judgement task was conducted to test the interpretation of *yi-CL N* in object position. Toys were presented to yield either a narrow or non-narrow scope reading of the indefinite. A narrow scope reading of the indefinite was acted out by having two toy cats jump into two baskets; a non-narrow scope reading was acted out by having two cats jump into one basket.

There were six test items for each type of sentence: 3 items for 2-objects and 3 items for 1-object and there were two groups of adult subjects. The first group, consisting of 12 subjects, was exposed to the six items without *you*. The second group, consisting of 15 subjects, was tested on the six items with *you*. The two groups are tested in a separate room in a university. Two experimenters are involved. One

experimenter performs to the subjects, the other collects the results. Test items are recorded and each test item is given after the experimenter manipulates the toys. The subjects are tested five by five. They write *correct* or *wrong* on a paper as a responses to the sentences they hear. The test items are as follows:

- (1) a. *Liang-zhi xiao-mao tiao-jin le yi-ge lanzi.*
two-CL little-cat jump-into PRT one-CL basket
'Two little jumped into a basket.'
- b. *You liang-zhi xiao-mao tiao-jin le yi-ge lanzi.*
have two-CL little-cat jump-into PRT one-CL basket
'Two little cats jumped into a basket.'
(Three toy cats of different color, and four baskets of different color.)
(Two cats jumped into one basket together. A third cat tried but failed.)
- (2) a. *Liang-zhi xiao-xiong ti-qi le yi-ge lanzi.*
two-CL little-bear lift-up PRT one-CL basket
'Two little bears lifted up a basket.'
- b. *You liang-zhi xiao-xiong ti-qi le yi-ge lanzi.*
have two-CL little-bear lift-up PRT one-CL basket
'Two little bears lifted up a basket.'
(Three toy bears of different color, four baskets of different color.)
(Two bears lifted two different baskets. Three bears tried, one failed.)
- (3) a. *Liang-zhi xiao-xiong zhua-qi le yi-gen shenzi.*
two-CL little-bear snatch-up PRT one-CL rope
'Two little bears gripped a rope.'

- b. *You liang-zhi xiao-xiong zhua-qi le yi-gen shenzi.*
 have two-CL little-bear snatch-up PRT one-CL rope
 ‘Two little bears gripped a rope.’
 (Three toy bears of a different color, four strings of a different color.)
 (Two bears grasped two different strings. First bear succeeded in grasping a string, the second bear failed, the third one succeeded in grasping another string.)
- (4) a. *Liang-zhi milaoshu da-kai le yi-ge hezi.*
 two-CL mouse hit-open PRT one-CL box
 ‘Two mice opened a box.’
- b. *You liang-zhi milaoshu da-kai le yi-ge hezi.*
 have two-CL mouse hit-open PRT one-CL box
 ‘Two mice opened a box.’
 (Three toy mice of a different color, four boxes of a different color.)
 (Two mice opened two different boxes. Three mice tried, one failed.)
- (5) a. *Liang-zhi xiao-mao tiao-guo le yi-kuai shitou.*
 two-CL little-cat jump-over PRT one-CL stone
 ‘Two little cats jumped over a stone.’
- b. *You liang-zhi xiao-mao tiao-guo le yi-kuai shitou.*
 have two-CL little-cat jump-over PRT one-CL stone
 ‘Two little cats jumped over a stone.’
 (Three toy cats of a different color, four stones of a different color and shape)
 (Two cats jumped over the same stone respectively. The third cat tried but failed.)
- (6) a. *Liang-zhi milaoshu bao-qi le yi-ge piqiu.*
 two-CL mouse hold-up PRT one-CL ball
 ‘Two mice held a ball.’

- b. *You liang-zhi milaoshu bao-qi le yi-ge piqu.*
 have two-CL mouse hold-up PRT one-CL ball
 ‘Two mice held a ball.’

(Three mice of a different color, four balls of a different color.)

(Two mice held one ball together. The third mouse tried to hold a ball but failed.)

The experimental results are presented as follows:

Age Groups	Without <i>you</i>		With <i>you</i>	
	1-object	2-object	1-object	2-object
Adult	100%(36/36)	5.6%(2/36)	88.9%(40/45)	44.4% (20/45)

Nederlandse samenvatting (Dutch summary)

Het onderwerp van deze dissertatie is het onbepaalde object in het Chinees, meer in het bijzonder de markering, interpretatie en de verwerving ervan. Ik laat zien in dit proefschrift dat de bijzondere eigenschappen van het onbepaalde object in het Chinees verklaard kunnen worden met behulp van een taalspecifieke hiërarchie van algemene en onafhankelijk gemotiveerde (universele) condities van verschillende aard. Optimaliteitstheorie (OT) vormt de theoretische achtergrond van deze dissertatie en wordt geïntroduceerd in hoofdstuk 2. In OT zijn grammaticale regels schendbaar en hiërarchisch geordend ten opzichte van elkaar. Verschillende outputkandidaten worden aan de hand van een verzameling relevante condities met elkaar vergeleken. De kandidaat-output die het best voldoet aan de verschillende eisen van deze verzameling schendbare en potentieel conflictueuze condities, komt uit de bus als de winnaar van de competitie en heet daarom *optimaal*.

In hoofdstuk 3 bestudeer ik de markering van het indefiniete object in het Chinees in preverbale positie. De standaardpositie van een direct object in het Chinees is postverbaal (zie zin (1) hieronder), maar soms kunnen of moeten directe objecten in preverbale positie staan (zie voorbeeldzin (2)). In (2) valt niet alleen op dat het direct object naar de preverbale positie is verhuisd, maar ook dat het gemarkeerd wordt met *ba*. Deze markering is in het geval van een onbepaald object zoals in (2) verplicht: als *ba* hier zou worden weggelaten, wordt de zin ongrammaticaal.

(1) *Ta chi le yi-ge pingguo.*
hij eet PRT een-CL appel
'Hij at een appel.'

(2) *Ta ba yi-ge pingguo chi le.*
hij BA een-CL appel eet PRT
'Hij at een appel.'

In navolging van Huang (1982, 1990) neem ik aan dat de markering van het object door *ba* een vorm van naamvalsmarkering is. Niet voor alle objecten in het Chinees is *ba*-markering verplicht. Objecten in hun standaard (postverbale) positie kunnen nooit gemarkeerd worden met *ba*. Voor objecten in preverbale positie is de markering soms verplicht en soms optioneel. Daarom concludeer ik dat de *ba*-markering van objecten in het Chinees een voorbeeld is van *gedifferentieerde objectmarkering* (DOM), wat inhoudt dat sommige objecten wel naamval krijgen en andere objecten niet, een fenomeen dat zich volgens schattingen voordoet in ongeveer driehonderd talen. In het Chinees heeft de naamvalsmarkering met *ba* voornamelijk een syntactische functie en geen semantisch effect op het object. Ik beschrijf het Chinese DOM-patroon aan de hand van Aissens (2003) optimaliteitstheoretische model waarin atypische objecten wel gemarkeerd worden met naamval en ‘gewone’ (prototypische) objecten niet. Atypische objecten zijn objecten die meer op subjecten lijken, doordat ze bepaald (specifiek) en/of animate (levend) zijn. Geheel tegen het algemene patroon in, echter, worden in het Chinees niet de bepaalde (specifieke) maar juist de onbepaalde (niet-specifieke) objecten in preverbale positie verplicht gemarkeerd met naamval, terwijl markering van bepaalde objecten optioneel is. Om dit verschijnsel te kunnen verklaren beargumenteer ik dat in het Chinees behalve animacy (‘levendheid’) en bepaaldheid (specificiteit) van het object ook de positie van het object een rol speelt. Het blijkt dat een preverbale positie geassocieerd wordt met bepaaldheid, waarbij het niet uitmaakt of de betreffende constituent in die positie het subject of het object van de zin is. Dit verklaart waarom objecten in preverbale positie gewoonlijk specifieke objecten zijn. Onbepaalde objecten in deze positie zijn atypisch en daarom worden zij gemarkeerd met *ba*.

Hoofdstuk 4 behandelt de interpretatie van onbepaalde objecten in preverbale positie in het Chinees. De traditionele claim is dat alleen specifieke objecten mogen voorkomen in preverbale positie. In dit hoofdstuk laat ik echter zien dat ook onbepaalde objecten met een niet-specifieke lezing kunnen voorkomen in *ba*-constructies. Ik bespreek een aantal eerdere analyses van de interpretatie van indefiniete objecten in het Chinees, in het bijzonder de analyse van Li en Thompson (1981) die gericht is op de relatie tussen de syntactische positie van het object en zijn interpretatie en de analyses van Sybesma

(1992) en Liu (1997b) die een relatie veronderstellen tussen het type predicaat en de interpretatie van het object.

Ik laat zien dat de interpretatie van objecten in de *ba*-constructie wordt beïnvloed door een aantal factoren, te weten de lexicaal-semantiche eigenschappen van het object, de syntactische positie en het type predicaat. Vier onafhankelijk gemotiveerde condities blijken hierbij een rol te spelen. Ten eerste is er een conditie op nominale constituenten die beginnen met een onbepaald lidwoord. Deze worden bij voorkeur geïnterpreteerd als verwijzend naar een onbepaalde (niet-specifieke) referent. Ten tweede is er de al eerder genoemde conditie dat preverbale constituenten bij voorkeur een bepaalde (specifieke) interpretatie krijgen. Het behoeft geen betoog dat in het geval van een preverbaal onbepaald object bovenstaande twee condities met elkaar in strijd zijn. Een derde conditie die ook kan botsen met de eerste conditie is een algemene conditie zegt dat het object van een predicaat dat naar een afgeronde gebeurtenis verwijst, eerder een specifieke lezing krijgt. Een voorbeeld van zo'n 'afgerond' predicaat in het Nederlands is *opeten* en inderdaad is de zin *Jan eet de soep op* stukken beter dan *Jan eet soep op*. Tenslotte is er nog een conditie die stelt dat de voorkeurslezing van het object van een predicaat dat een niet-feitelijke lezing krijgt de niet-specifieke (onbepaalde) lezing is. In een zin als *Ik wil een appel* is de voorkeurslezing voor *een appel* niet-specifiek: ik wil graag een appel, maar het doet er niet toe welke. De vier condities die ik gebruik om de Chinese data te verklaren zijn niet nieuw: ze zijn alle al eerder voorgesteld en gebruikt in verschillende benaderingen. Ze zijn echter nog niet eerder opgevat als regels die in principe schendbaar zijn en soms met elkaar in conflict. In mijn optimaliteitstheoretische analyse komt de interpretatie van het indefiniete object in een *ba*-constructie tot stand als de optimale uitkomst van dit samenspel tussen deze vier universele condities.

In hoofdstuk 5 bestudeer ik de verwerving van het onbepaalde object in het Chinees. Soms zijn de verschillende interpretaties van onbepaalde objecten toe te schrijven aan een bereiksambigüiteit tussen het onbepaalde object en een andere uitdrukking van hoeveelheid in de zin. In het Nederlands ontstaan op die manier verschillende

lezingen voor de zinnen *Kun je een potje twee keer omdraaien?* En *Kun je twee keer een potje omdraaien?* (Krämer 2000). Cross-linguïstisch gezien kunnen onbepaalde objecten vaak een specifieke of een non-specifieke lezing krijgen. Er wordt aangenomen dat kinderen universeel de neiging hebben om onbepaalde objecten als niet-specifiek te interpreteren (Krämer 2000; Lidz & Musolino 2002; De Hoop & Krämer 2006). Deze visie noem ik de “Universalist Hypothesis”.

In het Chinees heeft het indefiniete lidwoord *een* dezelfde vorm als het telwoord *één*. Toch wordt in voorgaande studies beweerd dat ook Chinese kinderen in het begin (in ieder geval tot het vierde levensjaar) standaard een niet-specifieke lezing krijgen van een onbepaald object. Dit wordt verklaard uit het feit dat het onbepaalde lidwoord in het Chinees niet te onderscheiden is van het telwoord *één*. In de vroege stadia van de taalverwerving interpreteren kinderen het onbepaalde lidwoord in het Chinees als telwoord. Deze visie noem ik de “Input-Determined Hypothesis”.

Op basis van de twee hierboven geschetste hypothesen kunnen voorspellingen worden gedaan, die in hoofdstuk 5 van deze studie experimenteel getoetst zijn. De resultaten van mijn experimenten laten zien dat Chinese kinderen net als Nederlandse en Engelse kinderen inderdaad beginnen met een niet-specifieke interpretatie van onbepaalde objecten. Een vergelijking tussen de Nederlandse en de Chinese kinderen laat echter ook zien dat Chinese kinderen meer specifieke lezingen krijgen dan hun Nederlandse leeftijdgenoten. Daarom stel ik voor dat taalspecifieke factoren, in het bijzonder de woordvolgorde en de aan- dan wel afwezigheid van een onderscheid tussen onbepaald lidwoord en telwoord, al vanaf de vroege verwervingsstadia een rol spelen. Deze factoren leiden echter pas tot volwassen interpretatiepatronen wanneer de aanvankelijke (universele) voorkeur voor de niet-specifieke lezing van een onbepaald object afneemt. De gevonden data worden geanalyseerd binnen het optimaliteitstheoretische kader, waarbij ik betoog dat de hiërarchie van condities voor kinderen verschilt van die van volwassenen. Bij de ontwikkeling van kindertaal naar volwassen taal

speelt de aanpassing van een initiële hiërarchie naar de taalspecifieke hiërarchie een doorslaggevende rol.

De conclusie van deze dissertatie luidt dat taalspecifieke eigenschappen van onbepaalde objecten in het Chinees verklaard kunnen worden met behulp van een taalspecifieke rangschikking van universele, potentieel met elkaar in strijd zijnde, condities.

Curriculum Vitae

Ning Yang was born on April 8, 1967 in Luo Yang, P.R. China. In 1984, she took part in the National Entry Examinations for Universities and entered the English Department of Beijing Language Institute. Four years later, she obtained her Bachelor Degree in English language and literature, and was employed by this university. She has been teaching English to college students in the English Department. Since 1997, she studied linguistics in the English Department of Beijing Language and Culture University (the former Beijing Language Institute) without quitting her job and obtained her Master degree in Theoretical and Applied Linguistics in 2000. The next year, she was granted the Master Program scholarship offered by the Dutch Royal Academy and China Scholarship Council and studied in the advanced Master Program in the Department of Linguistics at Leiden University. She got her Master of Philosophy diploma in Linguistics from Leiden University in June 2002. Four months later, she became a PhD student in the Linguistic Department of Radboud University of Nijmegen, as a member of the Pionier Project Case cross-linguistically hosted by Helen de Hoop. Currently, Ning Yang is the vice dean of the English Department, College of Foreign languages of Beijing Language and Culture University in Beijing, P. R. China.