

COMMON NOUNS, CLASSIFIERS, AND QUANTIFICATION IN CHINESE

by

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ABSTRACT OF THE DISSERTATION

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This dissertation investigates the internal composition of Chinese noun phrases from the perspective of syntax-semantics interface, as an inquiry into the nature of quantification in Chinese. In particular, we examine the meanings of Chinese common nouns, classifiers and quantificational determiners, bringing to light their contributions to the interpretation and quantificational structure of noun phrases as a whole.

Chapter 1 introduces theoretical assumptions and outlines the organization of the dissertation. Chapter 2 investigates the semantics of Chinese common nouns, and provides empirical support to the Neocarlsonian approach from a cross-linguistic perspective. We argue that Chinese common nouns should be analyzed as basic kind-denoting terms, on a par with English bare nominals. For two well-known differences in interpretation between Chinese and English bare nominals, we show that they are best analyzed as consequences of well-attested cross-linguistic variations between the two languages, and thus do not constitute arguments against the Neocarlsonian approach. In particular, an extra definite reading observed on Chinese bare nominals in object-level contexts is derived from a type-lifting operation that is available for determinerless languages including Chinese. The apparent lack of an indefinite reading on a preverbal

Chinese bare nominal is argued to follow from Chinese-particular factors concerning *pro*-drop and topic-prominence.

In Chapter 3, we examine the syntax and semantics of numeral classifiers, as well as their function in object quantification within Chinese NPs. As Chinese common nouns are all kind-denoting mass nouns that do not correspond to sets of atoms, numeral classifiers are needed to individuate a level for counting and to identify the units out of which quantificational or numeric expressions can be built. This semantic function is captured by the introduction of a meaning definition for the numeral classifier, based on a formal theory proposed in Krifka 1995. Empirical data from Chinese are examined extensively, and syntactic motivations are presented for the semantic account.

Chapter 4 studies characteristics of Chinese quantified NPs that are distinct from those of standard quantifiers. We suggest an analysis of Chinese quantified NPs as generalized quantifiers built up of plural individuals, and develop a compositional approach, with quantifiers contributing quantificational force and distributive operators introducing distributivity. We also show that numeral classifiers continue to play a crucial role in determining the behavior of Chinese quantified NPs with respect to distributivity and domain of quantification.

Chapter 5 extends the scope of investigation to the domain of event quantification. We propose a new three-way typology of natural language common nouns, and claim that common nouns should be distinguished semantically in terms of the *sort* of entities they denote lexically. Cross-linguistic evidence is presented from two typologically distinct languages, including the distribution of nominal and verbal classifiers in Chinese and the selectional restrictions of a variety of predicates in English. We also claim that in a

classifier language like Chinese, while the nominal classifier is needed to count *individuals*, the verbal classifier is used to count *events*, and that the complementary functions of the two classifiers impose a semantic restriction on the sort of entities they each can take as arguments. This is shown to be the key to explaining the distinctive distributions of nominal and verbal classifiers in Chinese.

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Chapter I: Introduction

Recent cross-linguistic studies on languages that are typologically different from English have advanced our understanding of natural language profoundly, and Chinese is no exception in this regard. For several decades, investigation into the linguistic structure of Chinese (in such works as Huang 1982) has contributed illuminating insights about principles of natural language in general and led to important developments of the linguistic theory. However, while most work has focused on empirical and theoretical issues in Chinese syntax, not much attention has been paid to Chinese semantics in the theoretical linguistic literature¹.

This dissertation aims to investigate the syntax-semantics interface in Chinese, by focusing on the interpretation of the various internal components of Chinese nominal phrases. In particular, I will examine the meanings and structures of Chinese common nouns, classifiers and quantificational determiners in detail, with some reference to relevant facts in English, and show how the internal composition of Chinese nominal phrases may bear on the issues of quantification and distributivity. Substantive evidence in terms of observational and descriptive generalizations will be presented, together with suggestions for their explanations and analyses.

In this dissertation, I will adopt the Principles and Parameters approach in the framework of generative grammar, and assume that cross-linguistic variations are expected, but are constrained by general principles of natural language. For the syntax-semantics interface, I will assume that possible interpretations of a linguistic expression

¹ See Sybesma 1992, Liu 1990 and Lin 1996 for some dissertation works on Chinese semantics.

are determined by its logical representations at LF, and that there is a close connection between syntactic structures and semantic representations, along the lines of the Compositionality Principle (Frege 1960). According to the principle, the meaning of an expression is to be derived systematically on the basis of its syntactic structure, as a function of the meanings of its components.

This dissertation is centered on four related topics, to be addressed in the subsequent four chapters. Chapter 2 investigates the semantics of Chinese common nouns, in comparison with that of English bare nominal arguments (i.e. determinerless nominal phrases occurring in argument position), and provides empirical support to an existing approach from a cross-linguistic perspective. Chapter 3 examines the syntax and semantics of numeral classifiers, to account for its crucial role in combining common nouns with numerals and determiners in Chinese NPs. Chapter 4 studies the semantics of Chinese quantified NPs, as well as their intriguing interactions with distributivity operators. And Chapter 5 investigates the semantic and syntactic functions of classifiers in object and event quantification.

In Chapter 2, I will first review two main ideas about the semantics of English bare plurals that have been suggested in the literature - the Neocarlsonian approach and the Ambiguity approach, with a focus on their crucial differences in how the quantificational variation in English bare nominals is derived. Taking *reference to kinds* as the basic meaning of bare nominals, the Neocarlsonian approach attributes the quantificational variability of bare nominals to the properties of the predicational context (and some type-adjusting operations). By contrast, the Ambiguity approach, mostly inspired by Discourse Representation Theory (DRT; Lewis 1975, Kamp 1981 and Heim 1982), treats bare

nominals as being *ambiguous* between kind terms in kind-level contexts and indefinite NPs in object-level contexts, and hence derives the varying quantificational force observed in bare nominals on a par with (weak) indefinites under the classical DRT analysis. As has been convincingly argued by Carlson 1977 (and also Chierchia 1998), a major advantage of the Neocarlsonian approach over the Ambiguity approach has to do with the contrastive behavior of bare nominals and indefinite NPs with respect to scope interaction. Unlike regular indefinites, bare nominals constantly take the narrow scope in the context of other quantifiers. The persistent “scope inertness” is captured under the Neocarlsonian approach as a natural consequence of their uniform kind-level denotation, but is either left unexplained or problematic for the various versions of the Ambiguity approach, which rely crucially on the semantic identity between bare nominals and indefinite NPs in non-kind-level contexts.

Next, I examine the empirical data from Chinese and argue in favor of the Neocarlsonian approach from a cross-linguistic perspective². The argument consists of three parts. In the first part (Section 2.3) I show that Chinese common nouns pattern with English bare nominals in all but one semantic aspects that are characteristic of kind-denoting terms, therefore providing initial motivations for adopting the Neocarlsonian approach in handling Chinese bare common nouns. Scope interaction facts are investigated in particular detail to show that, despite apparent similarity, Chinese bare nominals need to be distinguished from indefinites, hence arguing against the Ambiguity approach. At the end of this part, it is also pointed out that Chinese bare nominals pose two nontrivial challenges for the Neocarlsonian approach, one having to do with the

² The idea that bare nominals in a determinerless language are basic kind-referring terms is not novel. It was first proposed for Hindi and Indonesian by Porterfield and Srivastav 1988.

presence of an extra definite reading (that is missing from English bare nominals), and the other the apparent lack of an indefinite reading in preverbal position

In the second part (the first half of Section 2.4), I show that the two challenges raised by Chinese bare nominals can be resolved without any change to the Neocarlsonian approach, if additional language-particular characteristics are taken into consideration. First, for the extra definite reading observed on Chinese bare nominals, I suggest that it follows from a type-lifting operation on the bare nominal that is argued to be generally available for languages that lack a lexical definite determiner (cf. Chierchia 1998). Secondly, while acknowledging that there is a contrast between postverbal and preverbal NPs in Chinese, I will dispute the popular assumption that indefinites are totally excluded from preverbal positions in Chinese (Li 1997, Cheng and Sybesma 1996, etc.). New empirical evidence will be presented to show that an indefinite reading can become available on a bare NP in preverbal position, once they occur in the context of such things as left-peripheral locatives, temporal phrases, or universal quantifiers. An analysis for the apparent missing indefinite reading is then suggested in terms of a contrast in saliency between the definite reading and the existential reading. In particular, I will argue that there are three crucial Chinese-particular factors that may together have the effect of obscuring the indefinite reading: 1) Unlike English, Chinese allows for an additional definite reading on the bare NP; 2) Chinese is a *pro*-drop language; and 3) Chinese is a *topic-prominent* language. Because these Chinese-particular facts are independent of the semantic denotation of bare nominals, they constitute no real problem for the Neocarlsonian approach.

In the third part (the second half of Section 2.4), I show that the proposed topic-oriented analysis makes interesting predictions not only about the interpretations of bare nominals in Chinese, but also about the interaction between pronoun anaphora and interpretations of topic NPs in general. Empirical evidence from English concerning anaphora to NPs in topic position will be provided to support the second point. Arguments in support of one of my crucial assumptions – the topic-prominent nature of Chinese – will also be presented.

Finally, I will examine an existing alternative approach to Chinese bare nominals that is crucially built on their similarity to regular indefinites, and present arguments against this line of approach.

In Chapter 3, I look closely at the syntax and semantics of Chinese numeral classifiers, in their combination with common nouns and determiners. Given the conclusion that Chinese bare NPs are kind-denoting expressions, classifiers are generally needed to identify the units out of which quantificational or numeric expressions can be built. Essentially adopting a formal theory proposed in Krifka 1995 (and incorporating a sort-shifting mechanism of Chierchia 1998), I will first introduce a meaning definition for the Chinese numeral classifier, under which a classifier (like *ge* in *yi-ge ren* ‘one-CL man’) denotes a function that takes a number individual and yields a function that applies to a kind and yields a measure function that measures the number of instantiations of that kind. This definition makes it possible to derive the meaning of a full-fledged Chinese NP containing a classifier compositionally.

Secondly, I examine a wide array of Chinese data involving numeral classifiers, and present empirical and syntactic evidence for the introduced semantic analysis. This is

motivated by the fact that despite its semantic plausibility, Krifka's 1995 approach is syntactically undermotivated. After a descriptive discussion of the relevant Chinese data, I will propose a minimal structure for Chinese full NPs, assuming a close morpho-syntactic analysis of the combination between the numeral and the classifier. The proposed structure is argued to account for a wider range of data than alternative analyses that have been suggested in the literature, based on evidence such as the close syntactic and semantic affinity between the numeral and the classifier, and the selectional relation between the classifier and the common noun.

Thirdly, I discuss the observation that the classifier can sometimes occur in the absence of the numeral. This seems to cast some doubt on the proposed syntactic analysis of full Chinese NPs, under which the classifier is assumed to be a suffix attached to the numeral stem within the lexicon. I will show, however, that the apparent "stranding" of the classifier is not *arbitrary*, but is subject to special syntactic restrictions. In particular, the numeral classifier can only occur without a hosting numeral when it immediately follows a verb, a demonstrative or a universal quantifier. It will be claimed that such occurrences are constrained by the same set of conditions as some well-known *clitic* expressions in English. This, I argue, makes it plausible to analyze such occurrences of classifiers in terms of "cliticization". Therefore, I conclude that the apparent stranding of the classifier is derived from a *syntactic* operation that is independent of the suggested *morphological* suffix-stem relation between the numeral and the classifier, and hence does not contradict what has been proposed earlier.

Finally, I study the free occurrence of numeral classifiers with modified NPs that are not always interpretable as kind-referring expressions. Such occurrences raise a problem

for my semantic assumption, with Krifka 1995, that the classifier is required in order to turn a kind term into a property-like expression. I will discuss several possible directions towards solving the problem, including one that has been suggested by Krifka himself. I will show that by introducing a new type of entities - *concepts* and treating kinds as a subset of concepts, Krifka 1995 offers a promising direction along which the problem posed by Chinese modified NPs can be solved.

In Chapter 4, I develop a compositional analysis of Chinese quantified NPs in their interaction with distributive operators, and in doing so, highlight differences between the quantificational structures of Chinese and English. First, I will discuss some characteristics of Chinese quantified NPs that are distinct from those of standard quantifiers, including the obligatory occurrence of Chinese quantifiers with an overt distributivity operator *dou* in preverbal positions and their persistent scope dependency on *dou*.

Next, I attempt to answer these questions, based on an analysis of Chinese quantified NPs as generalized quantifiers built up of plural individuals, as shown in (1):

$$(1) \quad \| mei \text{ 'every'} \| \Rightarrow \lambda P \lambda Q [\exists X (\forall x (x \in X \leftrightarrow P(x)) \wedge Q(X))]$$

In effect, I am suggesting a compositional approach, with quantifiers contributing quantificational force and distributive operators introducing distributivity. Chinese quantifiers, therefore, differ from their English counterparts crucially in lacking built-in distributivity. I will show that the proposed analysis not only accounts for the observed variation in quantificational force, but also provides an explanation for why the scope of Chinese quantified NPs is persistently fixed by the distributive (D-)operator *dou*.

A number of interesting consequences of the suggested approach will then be discussed, concerning, for example, distributivity in Chinese universal quantifiers and the semantics of definite plurals. As I will argue, the fact that Chinese numeral classifiers occur in some quantified NPs but not others plays a crucial role in determining the behaviors of these quantifiers with respect to distributivity and domain of quantification. I will also address the intriguing observation that while Chinese quantified NPs always occur with the overt D-operator *dou* in preverbal position, they occur without *dou* in postverbal position, and attempt to suggest an explanation for the asymmetrical fact.

Finally, the suggested approach to Chinese quantified NPs will be compared with two alternative accounts in the literature. The first one is Lin 1998, from whom I adopt the essential semantics for the D-operator *dou* and the determiner *dabufen* ‘most’. But my analysis crucially differs from Lin’s in the treatment of universal *mei* ‘every’ and the status of the classifier. While Lin does not make any reference to the classifier, its semantic contribution is essential for me. This contrast leads to rather different predictions about quantification and distributivity. The second alternative to be discussed is suggested in Lee 1986, who proposes a variable-based approach to Chinese quantified NPs along the lines of Lewis 1975. I will show that such a non-quantificational approach fails to account for a number of facts about Chinese quantifiers, including their quantificational variability, exclusive dependency on *dou*, and their long-distance association with *dou*. All these facts argue against treating quantified NPs as pure variables, on a par with Wh-indefinites.

In Chapter 5, I extend the scope of investigation to the verbal domain, by focusing on the syntax and semantics of classifiers in object and event quantification. It has been a

long tradition in Chinese literature to divide classifiers into two different types – “*nominal* classifiers” and “*verbal* classifiers”, with each referring to classifiers used in quantified expressions in the corresponding domain (nominal or verbal). I will start the chapter by making two central claims, with one concerning the semantic distinction between nominal and verbal classifiers, and the other concerning the lexical semantic variation among common nouns in general. In particular, I claim that in a classifier language like Chinese, while the nominal classifier is needed to count *individuals* (or individual instantiations of kinds), the verbal classifier is used to count *events*. I also claim that natural language common nouns should be distinguished in terms of their ability to lexically denote entities of the *individual* sort or *event* sort, hence leading to a new three-way typology (cf. (2)). The intuitive idea tying the two claims together is as follows: because natural language common nouns vary in the *sort* of entities they denote lexically, they are expected to occur with a (verbal or adverbial) predicate if and only if they can contribute the right sort of arguments for the predicate, either lexically or compositionally.

(2) A three-way typology of natural language common nouns:

N-Class-1: individual-denoting only (e.g. *car, book, table ...*)

N-Class-2: both individual- and event-denoting (e.g. *movie, party, game ...*)

N-Class-3: event-denoting only (e.g. *event, sale, flight, rehearsal ...*)

Next, I will present empirical evidence from two typologically different languages, including the distribution of nominal and verbal classifiers in Chinese and the selectional restrictions of a variety of predicates in English. A large portion of this chapter will then be devoted to developing a syntax-semantics interface account for the distinct

distributions of the three noun classes in the context of nominal and verbal classifiers in Chinese. I will first consider the case of nominal classifiers, and argue that the fact that only Class-3 nouns cannot occur with nominal classifiers follows naturally from my claim in (2) that these nouns are precisely the ones that do not have a lexical denotation of an individual.

In my discussion of verbal classifiers, I begin by observing an interesting fact that replacing a nominal classifier with a verbal classifier in a Chinese sentence leads to a completely different domain of quantification. In particular, while the use of a nominal classifier gives rise to quantification over individuals, the use of a verbal classifier leads to quantification over events. After showing that existing accounts based on a parallel treatment of the two classifiers run into problems with the observed data, I then propose a new compositional approach, in terms of a VP-shell structure (in the sense of Larson 1987), to account for the occurrence of verbal classifiers in postverbal position. A number of arguments from the perspective of the syntax-semantics interface will be given to motivate the proposed structure.

The occurrence of Chinese verbal classifiers in preverbal position will also be examined, in comparison with that of nominal classifiers in similar contexts. Formal derivations will be presented, based on suggested syntactic structures for Chinese sentences involving the two types of classifiers. I will end my discussion of Chinese data with a look at an interesting consequence of the proposed analysis, which concerns the distribution of stative and eventive verbal predicates in Chinese.

Finally, I will attempt to give a semantic account for the observed English facts based on conclusions reached from previous sections, and present further data from English to support the account.

Chapter II: Semantics of Chinese Common Nouns

2.1 Introduction

This chapter investigates the semantics of Chinese common nouns, in comparison with that of English bare nominals (including bare plurals and mass nouns). On the one hand, like English bare nominals, Chinese common nouns can freely occur in a “determinerless” form in argument position (hence the term “bare nominal arguments”), and display quantificational variability, ranging from species-like interpretations in kind-level contexts to generic and existential interpretations in object-level contexts. On the other, Chinese bare nominals diverge from English bare nominals in two important contexts. First, in stage-level contexts, Chinese bare nominals occurring at preverbal positions tend to lack an indefinite reading that is readily available to English bare nominals. Secondly, in object-level contexts, Chinese bare nominals exhibit an extra definite reading that is absent from English bare nominals.

On the semantics of English bare nominal arguments, two main kinds of ideas have been proposed in the literature. The first takes *reference to kinds* as the basic meaning of bare nominals, and attributes their quantificational variability to the properties of the predicational context (and some type-adjusting operations). The second approach treats bare nominals as being *ambiguous* between kind terms in kind-level contexts and properties in object-level contexts.

Recently, the debate between the two approaches has been extended to the analysis of Chinese bare nominals. While Krifka 1995 and Chierchia 1998 have presented *theoretical* motivations for analyzing bare nominal arguments in a determinerless

language like Chinese as basic kind-denoting terms, Li 1997 has argued, on *syntactic* grounds, for an alternative approach, treating bare nominals as denoting properties on a par with regular indefinites.

In such a context, a formal in-depth study of the *semantic* properties of Chinese bare nominals becomes particularly important, which, to my knowledge, is still missing in the literature. The goal of this chapter, then, is to fill this gap and present empirical cross-linguistic evidence from Chinese in support of the kind-oriented approach. In particular, I will show that Chinese bare nominals are best analyzed as reference to kinds, and that their apparent lack of an indefinite reading in some stage-level contexts *as well as* their extra definite reading found in object-level contexts are natural consequences of language-particular facts about Chinese.

Before proceeding to an examination of Chinese bare nominals, I first review the key differences between the two main approaches to bare nominals, paying particular attention to how the quantificational variability of these NPs is handled.

2.2 Analysis of English bare nominals

Since the seminal work of Carlson 1977, English bare plurals (and mass nouns) have become widely known for their ability to occur in argument position without a determiner or modifier, and furthermore display a context-sensitive variability in quantificational force. As shown in (1-2) below, English bare plurals and mass nouns typically give rise to species-oriented interpretations in the argument position of a kind-level predicate, to generic readings in the context of an individual-level predicate and to existential readings in the context of a stage-level predicate:

- | | | | |
|-----|----|-----------------------------------|---------------------|
| (1) | a. | Dogs are extinct/rare/widespread. | = ‘the dog species’ |
| | b. | Dogs are mammals. | = ‘all dogs’ |
| | c. | Dogs are intelligent. | = ‘most dogs’ |
| | d. | I saw dogs (yesterday). | = ‘some dog(s)’ |
| (2) | a. | Snow is common/rare in this area. | = ‘the snow kind’ |
| | b. | Snow is colorless. | = ‘snow in general’ |
| | c. | I saw snow yesterday. | = ‘some snow’ |

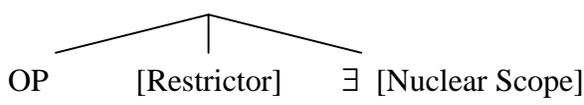
This intriguing array of interpretations has led to the proposal of two major kinds of theories about the semantics of English bare nominals in the literature – the kind-oriented, Neocarlsonian approach (Carlson 1977, 1989, Chierchia 1982b, 1998, etc.) and the Ambiguity approach (Krifka 1988, Wilkinson 1991, Diesing 1992, Kratzer 1995, etc.).

As part of Carlson’s original proposal, English bare nominals must have kind-level denotations, because they can combine with predicates like *extinct* and *common* that take only kind-denoting arguments (as in (1a) and (2a) above). While this claim is maintained by both approaches in accounting for the kind-level interpretations of bare arguments, they differ significantly in how the generic and existential interpretations of bare arguments are derived.

As illustrated in (1b-d) and (2b-c) above, a typical behavior of bare arguments is that they give rise to context-sensitive interpretations. In particular, they display generic interpretations in individual-level contexts and existential interpretations in stage-level contexts. This is highly reminiscent of the context-sensitive behavior of (singular) indefinites, as shown in (3).

- (3) a. A dog is (usually) intelligent. = ‘all/most dogs’
 b. I saw a dog (yesterday). = ‘some dog’

On the basis of this parallel behavior in quantificational variability effects, the Ambiguity approach posits a parallel semantics for bare arguments and singular indefinites in object-level contexts³. While maintaining their kind-level denotation in their combination with kind-selecting predicates, the Ambiguity approach posits a second meaning for bare arguments, in which they denote predicates introducing variables that can be bound by NP external operators, on a par with (weak) indefinites under the classical DRT analysis (as proposed in Lewis 1975, Kamp 1981 and Heim 1982). Under such an approach, bare arguments, like indefinites, will get universal or existential force whenever they are mapped into the *restriction* or the *nuclear scope* of a tripartite structure, as shown by the general schema in (4a) below.

- (4) a. 
 b. GEN x [dogs/dog (x)] ∃ [intelligent'(x)]
 c. ∃ x [dogs/dog(x) & saw'(x)(i)]

In (4b) - the logical representation of sentence (1c), for example, the bare plural *dogs* gets universal force, because it is mapped into the restriction of a tripartite structure, subject to quantification by a generic operator. In (4c) – the logical form of sentence (1d),

³ Note that different proposals have been made in the literature as to exactly how this idea should be explored. For the current purpose, my discussion will focus on the main theme that is common to most variants of the Ambiguity approach.

however, the bare plural acquires existential force, as it is mapped into the nuclear scope, subject to existential closure.

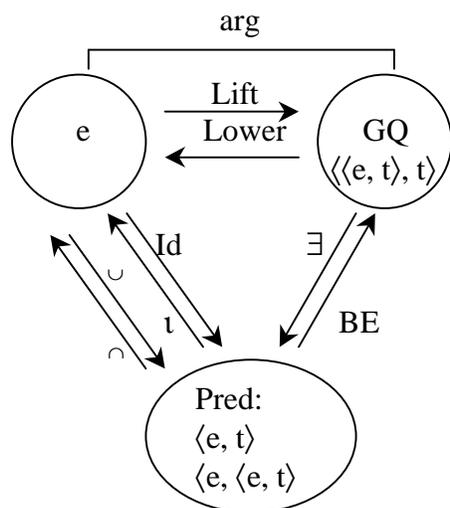
The Neocarlsonian approach, on the other hand, takes the kind-level reference to be the *only* denotation for bare arguments, and derives the observed non-kind-level interpretations via *compositional semantics*. First, to occur in argument position of a kind-level predicate, English bare nominals, in Chierchia's 1998 version of the theory, can shift from their predicative terms to kind terms (cf. (5b)), via a nominalizing operator $\hat{\cdot}$ as defined in (5a).

- (5) a. For any property P and world/situation s, $\hat{P} = \lambda s \iota P_s$ (Chierchia 1998: 351)
 b. extinct ($\hat{\cdot}$ dogs) - *the kind reading in (1a)*

Note that the nominalizing operator $\hat{\cdot}$ here is a modified version of the operation in Chierchia 1984. The general paradigm of type-shifting devices was introduced in Partee 1987 as cross-linguistically available⁴. This is shown in (6) (a slightly updated form of Partee's system given in Chierchia 1998):

⁴ The use of the nominalizing operator $\hat{\cdot}$ is available for predicates that lend themselves to an interpretation in terms of kinds. That is, common nouns such as "slices of that cake" cannot undergo $\hat{\cdot}$.

(6) Type shifting in general



- $Lift: e \rightarrow GQ$ $Lift(j) = \lambda PP(j)$
- $Lower: GQ \rightarrow e$ $Lower(\lambda PP(j)) = j$
- $\exists: \langle e, t \rangle \rightarrow GQ$ $\exists X = \lambda P \exists x [X(y) \wedge P(y)]$
- $BE: GQ \rightarrow \langle e, t \rangle$ $\lambda P \lambda x [\{x\} \in P]$
- $Id: e \rightarrow \langle e, t \rangle$ $Id(x) = \lambda x [x = y]$

In an episodic context, however, an existential reading is observed of bare nominals as in (1d) and (2c). This, according to Chierchia, is due to resolution of a sortal mismatch between an object-level predicate and a kind-denoting argument via a sort adjusting operator called DKP as defined in (7a). As shown in (7b), the sort of the predicate is automatically adjusted by introducing a *local* existential quantification over instantiations.

- (7) a. Derived Kind Predication (DKP): (Chierchia 1998: 364)

If P applies to objects and k denotes a kind, then $P(k) = \exists x [{}^{\cup}k(x) \wedge P(x)]$

- b. $saw(I, {}^{\cap}dogs) \Leftrightarrow (\text{via DKP}) \exists x [{}^{\cup}{}^{\cap}dogs(x) \wedge saw(I, x)]$

- the existential reading in (1d)

While in a stage-level context the argument is mapped into the nuclear scope, in an individual-level context it is mapped into the restriction of the generic operator. As the existential quantification due to DKP can be overridden by any operator with higher scope (cf. Chierchia 1992), the bare nominals are then predicted to get generic quantificational force in a generic context, as shown in (8):

$$(8) \quad \text{Gn} [\exists x [\text{dogs}(x)]] \exists [\text{intelligent}(x)] = \text{Gn } x [\text{dogs}(x)] [\text{intelligent}(x)]$$

- the generic reading in (1c)

By positing DKP as an automatic adjustment triggered by a sortal mismatch, not a lexical operation on predicates (also see Carlson 1989), the Neocarlsonian approach succeeds in drawing on the strength of the classic DRT analysis of quantificational variability.

Meanwhile, by maintaining a uniform kind-level denotation for bare arguments, the Neocarlsonian approach inherits an important advantage over the Ambiguity approach from Carlson's original theory. This has to do with the contrastive behavior of bare nominals and regular indefinites with respect to scope interaction – a key argument given by Carlson 1977 against attributing any inherent quantificational force to bare nominals. Let's consider the following examples adapted from Carlson:

- (9) a. Miles wants to meet a policeman. *- opaque and transparent*
 b. Miles wants to meet policemen. *- opaque only*
- (10) a. John killed a rabbit for two hours. *- wide scope for a rabbit*
 b. John killed rabbits for two hours. *- narrow scope for rabbits*
- (11) a. Mary does not like a dentist. *- narrow and wide scope for a dentist*
 b. Mary does not like dentists. *- narrow scope only for dentists*

In each of the above examples, while the regular indefinite can have higher scope over another operator, the existential reading of a bare plural always takes narrow scope in relation to another operator, regardless of their relative positions in the sentence. In the presence of an opacity-inducing predicate in (9a-b), for instance, the object indefinite singular exhibits a clear ambiguity that is absent from the bare plural. While (9a) is compatible with there being a particular policeman that Miles has in mind, (9a) is not. In the context of an adverbial operator in (10), while the indefinite only takes wide scope over the adverbial *for two hours*, leading to an implausible reading where repeated killing of the same rabbit took place, the bare plural only takes narrow scope, allowing for the plausible reading where more than one rabbit were killed in the duration of two hours.

As argued in Chierchia 1998, this persistent “scopelessness” of bare nominals is a natural consequence of their uniform kind-level denotation, as the proposed DKP in the Neocarlsonian approach is a strictly *local* sort adjusting operation that applies when kind-denoting terms such as bare plurals occur in an object-selecting argument position. However, under the Ambiguity approach, such “scope inertness” of bare nominals is not straightforwardly predicted, as it crucially relies on the semantic similarity between bare nominals and indefinite NPs in non-kind-level contexts⁵.

In the subsequent sections, I will examine the facts about Chinese bare nominals in some detail, and show that the Neocarlsonian approach captures a wider range of facts about Chinese bare nominals than the alternative approach.

⁵ As discussed in Dayal 2001, the Ambiguity approach along the lines of Diesing 1992 and Kratzer 1995 provides possible explanations for the scope facts in (9) and (11), but runs into problems with facts involving adverbs (as in (10)). See Dayal 2001 for details.

2.3 Semantics of Chinese bare nominals

2.3.1 The semantic parallel between Chinese and English bare nominals

In Chinese, a non-inflectional language, all common nouns can appear in their *bare* forms in argument position, and moreover display a pattern of quantificational variability very similar to that of English bare nominals. For example, like English bare plurals and mass nouns, Chinese bare NPs also take kind-level predicates (cf. (12a)) and object-level predicates (cf. (12b-c)), and occur in episodic contexts (cf. (12d)).

- (12) a. Gou juezhong le.
 dog extinct Asp
 ‘Dogs are extinct.’ = ‘the dog kind’
- b. Gou shi burudongwu.
 dog be mammal
 ‘Dogs are mammals.’ = ‘all dogs’
- c. Gou hen jiling.
 dog very smart
 i. ‘Dogs are intelligent.’ = ‘most dogs’
 ii. ‘The dog(s) is/are intelligent.’ = ‘the dog(s)’
- d. Wo kanjian gou le.
 I see dog Asp
 i. ‘I saw some dog(s).’ = ‘some dogs’
 ii. ‘I saw the dog(s).’ = ‘the dog(s)’

In fact, the parallel between the Chinese and English bare nominals becomes increasingly evident as we examine their semantic properties more closely.

The table in (13) below summarizes the results of a comparative study I have conducted between Chinese bare nominals (such as *gou* ‘dog’) on the one hand, and two types of English kind-denoting terms on the other – English bare plurals (such as *dogs*) and definite singulars (such as *the dog*). The study is based on an array of facts argued to be diagnostic of kind-denoting terms in Carlson’s original theory.

(13) A comparison between Chinese bare nominals and English kind-denoting terms:

	<i>the dog</i>	<i>dogs</i>	<i>gou</i>
Occurrence with Class-I kind-level predicates like <i>extinct</i>	√	√	√
Occurrence with Class-II kind-level predicates like <i>common</i>	×	√	√
∀-reading with Class-I individual-level predicates	√	√	√
∀-reading with Class-II indi.-level predicates without context	×	√	√
∃-reading at a subject position in episodic contexts	×	√	(?)
∃-reading at an object position in episodic contexts	×	√	√
Opaque reading in the context of <i>look for</i> , etc.	×	√	√
Narrow scope reading in the context of another quantifier	×	√	√
Occurrence in existential constructions	×	√	√
High degree of kind-term productivity	×	√	√

There are two reasons that has motivated my inclusion of English definite singulars in the study: First, English definite singulars are also known to have kind-level denotations and have been referred to in the literature as English “singular kinds” (cf. Dayal 1992, 2000). Secondly, due to the absence of number marking in Chinese bare nominals, it would be interesting to see to which of the two English kind terms Chinese bare nominals show a greater resemblance.

As should be obvious from the above table, Chinese bare nominals pattern with English bare plurals in all but one semantic characteristics (see Subsection 2.4.1 for details on how to derive the various readings). First of all, while bare plurals readily combine with any kind-level predicates, definite singulars only take a subset of such predicates – here referred to as “Class-I kind-level predicates” in (14i-ii). In this respect, Chinese bare nominals behave exactly like English bare plurals.

(14) i. Class-I kind-level predicates:

- a. Dogs are extinct.
- b. The dog is extinct.
- c. Gou juezhong -le.
dog extinct -Asp
‘Dogs are extinct.’

ii. Class-II kind-level predicates:

- a. Dogs come in different sizes / are widespread.
- b. *?The dog comes in different sizes / is widespread.
- c. Gou daxiao geyi / hen pubian.
dog size different very widespread

Secondly, in the context of an individual-level predicate, Chinese bare nominals pattern with English bare plurals in consistently forcing a generic reading, whereas the behavior of English definite singulars is varied. As shown in the examples in (15ii) (adapted from Dayal 1992), English definite singulars, unlike bare nominals, do not always obtain a generic reading when they combine with (what I call) “Class-II individual-level predicates”:

- (15) i. Class-I individual-level predicates:
- a. Dogs are mammals / intelligent. - *Generic reading available*
 - b. The dog is a mammal / intelligent. - *Generic reading available*
 - c. Gou shi burudongwu/hen congming. - *Generic reading available*
 dog be mammal very smart
- ii. Class-II individual-level predicates:
- a. Red bottles have a long neck. - *Generic reading readily available*
 - b. The red bottle has a long neck. - *Generic reading not readily available*
 - c. Hong pingzi bozi chang. - *Generic reading readily available*
 red bottle neck long
 ‘Red bottles have a long neck.’

It is true that in the context of an individual-level predicate, the availability of a generic reading on the part of the English definite singular is *discourse*-dependent, as suggested in Dayal 1992. But, what’s important to the current discussion is that no context is needed for Chinese bare nominals in getting general interpretations (as in (15ic) and (15iic)), and that they are in this respect just like English bare plurals.

Further evidence for such a difference between English bare plurals and definite singulars can be found if we consider contexts in which generic readings arise solely due to “inductive generalization” (in Greenberg’s 1998 term). As shown by the following examples (due to Edwin Williams) discussed in Dayal 2000, unlike bare plurals, English definite singulars are *incompatible* with inductive generalizations.

- (16) a. Rutgers professors seem to be born on weekdays. - *generic statement*
- b. The Rutgers professor seems to be born on a weekday. - **generic statement*

- (20) a. Smart dogs are common.
 b. ?*The smart dog is common.
 c. Congming-de gou hen changjian.
 smart-DE dog very common
 ‘Smart dogs are very common.’

In (20a-c), for example, English bare plurals and Chinese bare nouns, when modified with adnominal modifiers, lend themselves more easily to a kind-level denotation than English definite singulars in the context of a kind-level predicate.

In sum, the comparative study sketched above suggests a clear semantic parallel between Chinese bare nominals and English bare plurals⁸, and therefore motivates a parallel semantic approach to the two bare NPs. Next, let’s consider the two alternative approaches to bare nominals in the context of the Chinese data.

2.3.2 A problem with the Ambiguity approach

As mentioned earlier, a key argument against the Ambiguity approach has to do with the persistent “scopelessness” of English bare nominals. One question of particular interest, then, is whether the scope interactions of Chinese bare nominals also favor the Neocarlsonian approach over the Ambiguity approach.

The answer I’d like to suggest is *yes*. Let’s begin by considering, in greater detail, the occurrence of bare nominals in the context of opacity-inducing predicates. As shown by the contrast between (21a-b), a Chinese bare nominal does not seem to behave exactly

⁸ As discussed in Chierchia 1996, Chinese common nouns also share many characteristics in common with English mass nouns, including their inability to bear plural marker and their incompatibility with numeral expressions. The mass-like characteristics of Chinese common nouns are certainly compatible with what I am attempting to argue here, since it has been argued

like an English bare plural in scope interaction. In particular, aside from having an opaque reading expected of a kind term in such a context, the Chinese bare nominal also denotes a doctor whose identity is known in the discourse.

- (21) a. John is looking for doctors. - *opaque reading only*
- b. Yuehan zai-zhao yisheng.
John be-looking-for doctor
- i. 'John is looking for doctors.' - *opaque reading*
- ii. 'John is looking for the doctor(s).' - *"transparent" reading (?)*

The second reading in (21b) could easily be taken as evidence of a transparent reading, as it is reminiscent of the interpretation of an indefinite NP, which displays both an opaque and a transparent reading in such a context:

- (22) John is looking for a doctor.
- i. 'John is looking for any doctor.' - *opaque reading*
- ii. 'John is looking for a (specific) doctor.' - *transparent reading*

A closer examination, however, reveals that the second reading in (21b) is best analyzed as a definite reading, not a transparent specific reading.

- (21) b. Yuehan zai-zhao yisheng.
John be-looking-for doctor
- i. 'John is looking for doctors.' - *opaque reading*
- ii. 'John is looking for the doctor(s).' - *definite reading*

Since Fodor and Sag's 1982 famous work on the scope of indefinite NPs, many have argued, against Fodor and Sag, for semantic distinctions between definite expressions and

that mass terms and kind-denoting terms are semantically very close concepts (Carlson 1977, Chierchia 1996, etc.).

specific NPs (Ruys 1992, Abush 1994, Reinhart 1997, etc.). While definite NPs are rigid designators that can only take the highest scope relative to other scope operators, indefinite NPs are capable of having “intermediate readings”, under which they take island escaping scope without having widest sentential scope, as shown in the following examples from Reinhart 1997 and Ruys 1992:

- (23) a. Most linguists have looked at every analysis that solves *some problem*.
 b. Every professor_i will rejoice if *a student of his_i* cheats on the exam.

Sentence (23a), for example, under its most natural reading⁹ entails that for most linguists there is a problem such that he/she has looked at every analysis that solves that problem. This intermediate reading clearly shows that the scope of the indefinite *some problem* does not have to be sentential when it escapes the complex NP-island.

By contrast, a definite NP invariably takes the maximal scope in the context of other quantifiers. (24), for instance, can only be understood to be about a unique problem for which all possible solutions have been reviewed by most linguists.

- (24) Most linguists have looked at every analysis that solves *that/the problem*.

In Chinese, the same exact contrast can be found between a specific NP and a definite expression. As shown in (25a-b), while the specific NP allows for an intermediate reading, the definite takes maximal sentential scope *only*.

- (25) a. Dabufen yuyanxuejia dou kan-guo mei-ge
 most linguist all look-Asp every-CL
 [jiejue *mouyige wenti* -de] fenxifangfa.
 solve certain problem –DE analysis

‘Most linguists have looked at every analysis that solves *a certain problem*.’

⁹ The narrow scope is reported to run counter to our knowledge of the world (Reinhart 1997).

- b. Dabufen yuyanxuejia dou kan-guo mei-ge
 most linguist all look-Asp every-CL
 [jiejue *nei-ge wenti -de*] fenxifangfa.
 solve that-CL problem -DE analysis

‘Most linguists have looked at every analysis that solves *that problem*.’

Furthermore, as shown in (26), the fact that the bare nominal *wenti* ‘problem’ occurring in the same context lacks an intermediate reading suggests that bare nominals in Chinese need to be distinguished from specific indefinites.

- (26) Dabufen yuyanxuejia dou kan-guo mei-ge [jiejue *wenti -de*] fenxifangfa.
 most linguist all look-Asp every-CL solve problem -DE analysis
- i. ‘Most linguists have looked at every analysis that solves problems.’
 - ii. ‘Most linguists have looked at every analysis that solves *the problem*.’

The bare nominal *wenti* ‘problem’ in (26) can be understood to denote either ‘anything that is a problem’ under the narrow scope reading, or ‘a unique problem that is known to both the speaker and the listener’ under the maximal scope reading. This ambiguity indicates that Chinese bare nominals could be ambiguous between a kind interpretation and a definite interpretation in such a context.

It is therefore my conclusion that despite their apparent similarity, Chinese bare nominals are to be distinguished from specific indefinites. Setting aside the additional definite reading for the moment, Chinese bare nominals behave essentially like English bare plurals in scope interaction. This gives us motivations for adopting the Neocarlsonian approach in my account of Chinese bare nominals.

The second, somewhat related problem has to do with interpretations of Chinese bare nominals in preverbal position of episodic contexts. As shown by the contrast between (28) and (29), while an English bare plural gets an indefinite reading in such a context, a Chinese bare nominal does not readily allow for such a reading. The preferred reading is a definite one, with the bare NP referring to some salient dog or dogs in the discourse.

- (28) a. Dogs are barking. = ‘some dogs’
 b. Snow is falling. = ‘some snow’
- (29) Gou zai-jiao.
 dog be-barking
 ‘The dog(s) is/are barking.’ = ‘the dog(s)’
 ?? ‘Dogs are barking.’ = ‘some dogs’

In fact, it has been a long-standing observation in the Chinese literature that bare nominals tend to favor a definite reading in preverbal position and an indefinite reading in postverbal position, a generalization commonly referred to as the “subject-object asymmetry” in the interpretation of Chinese bare nominals (cf. Chao 1968, Li and Thompson 1981, etc).

Recall that in Section 2.2 I discussed why an existential reading is expected of a kind-denoting term in an episodic context (also see derivations in Subsection 2.4.1). The above generalization, then, raises a serious challenge of an opposite nature if I want to maintain the Neocarlsonian approach to Chinese bare nominals, for this time I need to explain the missing of an expected reading.

In the next section, I will focus on these two challenges, and show that they do *not* constitute evidence against analyzing Chinese bare NPs as kinds under the Neocarlsonian Approach. The main claim to be advanced is that the above contrasts between Chinese

and English bare nominals are natural consequences of language-particular factors about Chinese, rather than any intrinsic semantic distinction between the NPs themselves. I will begin by addressing the first challenge – the definite reading of Chinese bare nominals.

2.4 Defending the Neocarlsonian Approach

2.4.1 The definite reading of Chinese bare nominals

The table in (30) illustrates how the observed readings of Chinese and English bare nominals can be derived, assuming their unambiguous kind-level denotations under the Neocarlsonian approach (cf. Chierchia 1998):

(30) Deriving the interpretations of Chinese and English bare nominals:

Reading	<i>Chinese</i>	<i>English</i>
Kind	$\text{extinct}(\text{DOG}^{10})$ (12a)	$\text{extinct}(\text{dogs})$ (1a)
Generic	$\text{Gn } x [\text{DOG}(x)][\text{intelligent}(x)]$ (12c)	$\text{Gn } x [\text{dogs}(x)][\text{intelligent}(x)]$ (1c)
Definite	$\text{intelligent}(\iota \text{DOG}(x))$ (12c) $\text{saw}(\text{I}, \iota \text{DOG}(x))$ (12d)	(unavailable due to existence of definite determiners)
Indefinite	$\exists x [\text{DOG}(x) \wedge \text{saw}(\text{I}, x)]$ (12d)	$\exists x [\text{dogs}(x) \wedge \text{saw}(\text{I}, x)]$ (1d)

It should be obvious from this table that there is a sharp contrast between the two bare nominals with respect to the *definite* reading. Unlike English bare plurals, Chinese bare nominals have an extra definite reading whenever they occur in a generic or episodic context. This, I suggest, crucially has to do with a well-known fact that unlike English, Chinese lacks a lexical definite determiner. As discussed in Chierchia 1998, languages which lack a lexical definite determiner generally have the option of using ι to repair

¹⁰ I use the capitalized ‘DOG’ for the meaning of Chinese common nouns to distinguish their nominative meaning from the predicate meaning ‘dogs’ that is basic for English common nouns.

type-mismatch (between a kind term and an individual-taking predicate). Therefore, bare nominals in these languages, including Chinese, are expected to have a definite interpretation in the context of any individual-level predicate.

2.4.2 Evidence for indefinite readings in subject position

Despite a popular assumption in the literature (Cheng and Sybesma 1996, Li 1997, etc.) that indefinites are excluded from subject positions in Chinese, I now present evidence showing that this may not be the case. First, indefinite readings become immediately available on preverbal bare NPs, once they occur in the context of left-peripheral *locatives*, as shown in (31):

- (31) Waimian / Yuanchu gou zai-jiao.
 outside far-away dog be-barking
 i. ‘Outside/Far away, dogs are barking.’
 ii. ‘Outside/Far away, the dog(s) is/are barking.’

Secondly, indefinite readings seem to ‘peek out’ in the context of left-peripheral temporal phrases or adverbs, in addition to a definite reading, as shown in (32):

- (32) a. Jintian jingcha zhua ren le.
 today cop arrest man Asp
 i. ‘Today cops arrested some people.’
 ii. ‘Today the cop(s) arrested some people.’
 b. Haoxiang jingcha zhua ren le.
 apparently cop arrest man Asp
 i. ‘Apparently cops arrested some people.’
 ii. ‘Apparently the cop(s) arrested some people.’

Thirdly, as shown in (33), if we put our earlier example sentence (29) in the context of a universal quantifier ‘in everyone’s backyard’, the subject bare NP ‘dog’ unambiguously gets an indefinite reading:

- (33) Gou zai meigeren-de houyuan-li jiao. (" > \$)
 dog at everyone-DE backyard-inside bark
 ‘Dogs are barking in everyone’s backyard.’
 # ‘The dog is barking in everyone’s backyard.’

Here again, (33) illustrates a ‘peeking-out’ effect, suggesting that what we are dealing with here is really a matter of *saliency*, rather than *grammaticality*. That is, in an episodic context, a subject bare NP actually has both a definite and an indefinite reading, with the indefinite one being less salient (but nonetheless present). When the context is such that it makes a definite reading pragmatically odd, the indefinite reading - a less salient one - gets to ‘peek out’ as the only possible interpretation. As shown in the English translations in (33), here clearly we have a context where a definite NP ‘the dog’ cannot possibly be barking simultaneously in different places. So is the definite reading of the Chinese bare NP also blocked from occurring in such a context.

Finally, as shown in (34) below, the Chinese predicate *you* ‘be available’,¹¹ imposes an indefiniteness requirement on the subject. Therefore, when a bare NP occurs in its context, the indefinite reading becomes the only one available with the definite reading blocked, as shown in (35).

- (34) Liang-ge ren / *Mali / *Nei-ge ren you le.
 two-CL man Mary that-CL man be-available Asp
 ‘Two men are available. / Mary/That man is available.’

- (35) Gou you le.
 dog be-available Asp
 ‘Dogs are available.’

2.4.3 Accounting for the saliency difference

Having argued that, contrary to traditional assumptions, an existential reading is, in fact, available on a subject bare NP, I hereby suggest that there are three Chinese-particular factors that may together have the effect of obscuring this indefinite reading: 1) Chinese allows for an additional definite reading on the bare NP; 2) Chinese allows *pro*-drop; and 3) Chinese is a *topic-prominent* language¹².

First, as I discussed in Subsection 2.4.1, Chinese bare nominals may have a definite reading in any individual-level context, as Chinese lacks lexical definite determiners and therefore allows the option of using the t operator to repair type-mismatch, giving rise to a definite interpretation.

Secondly, because Chinese is a *pro*-drop language, our earlier example (25) (repeated below in (36)) is, in fact, ambiguous between two alternative structures, as shown in (37):

- (36) Gou zai-jiao.
 dog be-barking
 i. ‘The dog(s) is/are barking.’
 ii. ‘Dogs are barking.’

¹¹ Note that the English predicate *be available* does not have the same requirement, as shown in (i): (i) A dog / Mary / That man is available.

¹² As has recently come to my attention, Lee 1986 also mentions a similar approach based on the latter two facts. But he adopts an alternative syntactic account without exploring the former in any detail.

- (37) Structure-1: [_{TOPP} [IP Gou zai-jiao]] - *definite & indefinite readings*
 Structure-2: [_{TOPP} Gou_i [IP *pro*_i zai-jiao]] - *definite readings only*

Under the two structural options, the preverbal bare NP *gou* ‘dog’ could either occur in subject position (in Structure-1), or alternatively take the base-generated topic position, with a *pro* occurring at the subject position co-indexed with the topic (in Structure-2).

It is my claim that each of the above structures gives rise to rather distinct interpretation possibilities, as indicated by the contrast in readings in (37). The question about missing existential readings for preverbal bare NPs can now be posed somewhat differently: “Why is an existential reading unavailable for bare NPs in topic position (but not for those in subject position)?”

There is, in fact, a natural explanation for this. Cross-linguistic evidence has shown that while subjects need not be definite, topics must always be *definite* or *generic* (see discussions in Li and Thompson 1976, Chafe 1976, Chu 1982, etc. for detailed discussions on this). The following English paradigm, for example, is suggestive of the fact that while definite and generic NPs can occur in topic positions, indefinite NPs generally cannot:

- (38) a. As for that book, I like it. - *definite topics*
 b. As for books, I like them. - *generic topics*
 c. *As for a book, I like it. - **indefinite topics*

In the current situation, then, this definiteness constraint on topics prevents bare nominals from having existential readings at a topic position, hence the lack of ambiguity in the second case of (37).

Last but not least, I suggest that the second structure in (37), with the presence of an overt topic, is a *preferred* parse for (36). This has to do with the fact that Chinese is a *topic-prominent* language (see Subsection 2.4.6 for evidence), and hence sentences construed with an overt topic are generally preferred to sentences without one. Consequently, Chinese speakers have a tendency to associate an overt topic with any sentence they hear whenever they can. This should explain why for a sentence like (36) above, the second structural alternative (as in (37)) and its associated interpretations are more salient than the first.

2.4.4 Predictions of the suggested account

The suggested account makes a number of interesting predictions about Chinese bare nominals at a preverbal position. First, if sentence (36) occurs in a context where the topic position is already taken by peripheral elements, then the indefinite reading should become as salient as the definite one. This is exactly what happens in (31).

Secondly, it is predicted that in a context where the definite reading is blocked, the indefinite reading of a bare NP should become the only one available. This is indeed borne out by (33) and (35) above.

Thirdly, as base-generated topics always occur before subjects, the different degree of saliency should obtain at subject positions, but not at object positions. This is again true, because as we have witnessed in Example (12d) in Subsection 2.3.1, in object position we get the indefinite reading for a bare NP just as easily as the definite reading.

Finally, under the assumption that in Chinese, a sentence may inherit a discourse topic from previous sentences (cf. Huang 1982), it is predicted that in such a context the indefinite reading should become more easily detectable. This is borne out by (39) below,

Note, however, that the case in English and the one in Chinese are not identical, with one involving a derived topic and the other a base-generated topic. And I suggest that base-generated and derived topics should be distinguished from each other both syntactically and semantically.

As illustrated by the contrast in grammaticality in (41a-b), while an indefinite NP is able to occur at a derived topic position, it is barred from a base-generated position. This suggests that base-generated topics, but not derived topics, are subject to a definiteness constraint (see Chapter 5 for more on this).

- (41) a. Three students, I know.
 b. * As for three students, I know them¹³.

Against this background, let's consider an interesting fact involving Chinese bare nominals. As shown in (42), while the indefinite reading for the bare NP *yisheng* 'doctor' is available at the moved topic position in the (a)-sentence, it is not available at the base-generated topic position in the (b)-sentence.

- (42) a. *Yisheng, Yuehan zhaodao le.*
 doctor John find Asp
 i. 'Doctors, John found.' - *indefinite*
 ii. 'The doctor(s), John found (him/them).' - *definite*
- b. *Yisheng, Yuehan zhaodao-le tamen.*
 doctor John find-Asp they
 *'Doctors, John found (some).' - **indefinite*
 'As for the doctors, John found them.' - *definite*

¹³ We should be careful to focus on the weak or non-specific reading.

This contrast in the interpretation of Chinese bare nominals, I suggest, should be explained in terms of the semantic distinction between base-generated and moved topics discussed above. As the two sentences minimally differ in the presence of a pronoun at the object position, we can plausibly parse the sentences as follows:

- (43) a. i. [_{IP} Yisheng, [_{IP} Yuehan zhaodao le e]].
 doctor John find Asp
- ii. [_{TOPP} Yisheng, [_{IP} Yuehan zhaodao le *pro*]].
 doctor John find Asp
- b. [_{TOPP} Yisheng, [_{IP} Yuehan zhaodao le tamen]].
 doctor John find Asp they

As shown in (43), while the bare nominal *yisheng* in the (b)-sentence can only occur in a base-generated topic position, the (a)-sentence also has the option of taking a moved topic position (indicated in (43ai) as an IP-adjoined position following Lasnik and Saito 1992). As a result, the existential reading of the bare nominal is allowed at the IP-adjoined position in the (a)-sentence, but blocked from the Topic position in the (b)-sentence. Note that the structure in (43aii) would also trivially block the indefinite reading of the bare nominal, allowing for the definite reading option only.

Finally, let's consider a further implication of the suggested analysis concerning pronoun anaphora. Carlson 1977 discusses an interesting phenomenon in English where a *generically* interpreted bare plural can serve as antecedent for a pronoun under *existential* interpretations, as shown in (44a-b) (Carlson 1977: his (74a) and (76a)). For example, (44a) means that Mary hates *all* raccoons due to the fact that *some* of them stole her sweet corn.

- (44) a. Mary hates *raccoons* because *they* stole her sweet corn.

- b. Martha told me that *beans* can't grow in this climate, but *they* grew well for me last year.

What these examples suggest for our earlier example in (42b) is that potentially there could be a third possibility, besides the definite reading discussed above. That is, the bare nominal *yisheng* 'doctor' could have a generic reading, serving as antecedent for the pronoun *tamen* 'they' with an existential reading. As mentioned in Subsection 2.4.3, generic NPs are also possible in base-generated topic position, besides definite NPs. The question is why should this third alternative be blocked in (42b), given its unambiguous interpretation.

The explanation I'd like to offer here has to do with the *distance* between the bare nominal (the antecedent) and the pronoun. In order for the anaphora relation between a generic antecedent and an existential pronoun to hold, the two NPs have to occur in separate clauses, because this is the only way the two NPs can end up in distinct contexts and hence be interpreted differently. This is made possible in (44a) because the antecedent bare NP *raccoons* occurs in the context of an individual-level predicate *hate* whereas the pronoun *they* occurs in an episodic context. By contrast, in (42b) the antecedent and the pronoun both occur (locally to each other) in the same episodic context, forcing the bare NP to be interpreted either as an indefinite or definite NP. The first option is, of course, impossible due to the definiteness constraint on base-generated topics, hence giving rise to the unambiguous definite interpretation of the bare nominal.

Further evidence for the suggested account can be found in English sentences involving bare plurals at base-generated positions.

- (45) a. As for doctors, I like them - *generic*
 b.* As for doctors, I visited them yesterday. - **indefinite*

As shown in (45), the (a)-sentence is well-formed because the bare nominal under its generic reading is allowed at the base-generated topic position, serving as antecedent for the pronoun interpreted also generically. The (b)-sentence, on the other hand, is ill-formed because the English bare nominal can only get an existential reading in the episodic context, unlike its Chinese counterpart, and are thus blocked from the topic position due to the definiteness constraint.

2.4.6 Chinese as a topic-prominent language

In their influential cross-linguistic work, Li and Thompson 1976 challenges the universality of the notion of *subject* by proposing the subject-topic dichotomy as a new typology of language. They claim that languages should be typologically differentiated in terms of topic- or subject-prominence (as in (46)), and that Chinese is a topic-prominent language, where the notion of topic is more fundamental than that of subject.

(46)	<u>Subject-Prominent Languages</u>	<u>Topic-Prominent Languages</u>
	Indo-European	Chinese
	Niger-Congo	Lahu (Lolo-Burmese)
	Finno-Ugric	Lisu (Lolo-Burmese)
	Semitic	...
	Dyirbal (Australian)	
	Indonesian	
	Malagasy	
	...	
	<u>Subject-prominent and</u>	<u>Neither Subject-Prominent</u>
	<u>Topic-prominent languages</u>	<u>nor Topic-Prominent Languages</u>
	Japanese	Tagalog
	Korean	Illocano

In this subsection, I briefly introduce three of the key arguments developed by Li and Thompson (L&T) in support of the above claim, based on facts concerning “double subject” phenomenon, dummy subjects, and lack of passive sentences (see L&T for more detail discussions on this and the references cited there).

First, it is observed by (L&T: 468) that the so-called “double subject” constructions (as in (47a-b)) are pervasive in Topic-prominent (Tp) languages, but are often unacceptable in Subject-prominent (Sp) languages.

- (47) a. Nei-ke shu yezi da. - *Chinese* (L&T: their (23))
that-CL tree leaf big

Lit: ‘That tree (topic), the leaves are big.’

- b. Sakana wa, tai ga oisii. - *Japanese* (L&T: their (21))
 fish topic red-snapper subject delicious

Lit: 'Fish (topic), red snapper is delicious.'

According to L&T, such sentences are really *topic-comment* structures, with the comment itself being a full sentence that contains a subject. This is because unlike a regular subject, the topic in either sentence of (47) has no selectional relationship with the main verb in that sentence, and moreover, no argument can be given that these sentences could be derived by any kind of "movement" rule from some other sentence type. The fact that all Tp languages have sentences of this type, while no pure Sp languages do, then, supports L&T's claim that the two languages need to be distinguished in terms of a topic-subject distinction.

Secondly, according to L&T, "dummy" subjects, such as English *it* and *there* (in (48) below), may be found in a Sp language, but not in a Tp language. This is because in Sp languages, a subject is significant and always required whether or not it plays a real semantic role.

(48) a. It is raining.

b. There is a cat in the garden.

In a pure Tp language like Mandarin Chinese and Lisu, however, the notion of subject does not play a prominent role, and there is no need for "dummy" subject. Expletives are often missing in these languages, as shown in (49):

(49) a. Keneng zhe-chang zhanzheng jiu-yao jieshu le. (L&T: their (19))
 perhaps this-CL war soon-will end Asp

'It is possible that this war will soon end.'

- b. You yi-zhi mao zai huayuan-li. (L&T: their (20))
 exist one-CL cat at garden-inside

‘There is a cat in the garden.’

A third important difference has to do with the occurrence of the passive construction. As reported in L&T, while Sp language users make common use of the passive construction, in Tp languages, passivization either does not occur at all (e.g. Lahu, Lisu), or appears as a marginal construction and is rarely used in speech (e.g. Mandarin Chinese), or else it carries a special meaning (e.g. the “adversity” passive in Japanese).

This distinction in passivization, according to L&T, is a direct consequence of the different roles played by subjects in Sp and Tp languages. In Sp languages, the notion of subject is such a basic one that if an NP other than the one designated by the main verb as its subject takes the subject position, the verb must be marked to signal this “non-normal” subject choice. In Tp languages, on the other hand, it is the topic, not the subject, that plays a more prominent role in sentence construction. As any noun phrase can take the topic position without having to register anything on the verb, the passive construction is expected to occur not as frequently in Tp languages as it is in Sp languages.

Let’s consider the sentences in (50) for a minute.

- (50) a. Nei-ben shu, Mali du-guo. - *active construction*
 that-CL book Mary read-Asp
 ‘That book, Mary read.’
- b. Nei-ben shu bei Mali du-guo. - *passive construction*
 that-CL book by Mary read-Asp
 ‘That book was read by Mary.’

These are two sentences that are almost identical in meaning, but very different in syntactic structure. While the a-sentence is an active construction that involves an object noun phrase taking a topic position, the b-sentence is a passive construction that involves the object noun phrase taking the subject position. It does seem true, at least to me, that active sentences like (50a) are more natural and tend to be used more often in speech. A plausible explanation for this preference, along the line of L&T, could be that these active sentences not only are less marked morpho-syntactically than their passive counterparts like (50b), and they also invoke the occurrence of a topic, which plays a significant role in sentence construction in Tp languages.

2.5 An alternative approach

2.5.1 Li 1997

In this section, let's consider an alternative approach to Chinese bare plurals that has been suggested in the literature. Aimed at arguing for a full DP structure for Chinese referential noun phrases, Li 1997 focuses on the distribution of regular indefinites, and extends the approach to bare nominals as well. She makes two main observations: First, Chinese indefinites have two distinct interpretations - a *quantity* interpretation and a non-quantity *referential* interpretation. As shown in (51a-b) below, while the former can occur in any position of a sentence, the latter cannot naturally occur in subject or topic positions:

- (51) a. Yi-ge nuhai gou le. - *quantity expression*
 one-CL girl enough Asp
 ‘One girl is enough.’

- b. ??Yi-ge nuhai hen xihuan Zhangsan. - *referential expression*
 one-CL girl very like Zhangsan
 ‘A girl likes Zhangsan very much.’

Secondly, there are exceptional contexts, in which indefinites may be allowed to occur in subject position. These contexts include: the presence of 1) a base-generated topic, 2) negation, and 3) *dou* ‘all’, as shown in (52a-c):

- (52) a. Zhangsan, yi-ge nuhai hen xihuan ta. (Li 1997: her (8a))
 Zhangsan one-CL girl very like him
 ‘Zhangsan, a girl likes him.’
- b. Ta (yijing) santian/sanci bu lai/chang le. (Li 1997: her (7b))
 he already three-day/three-time not come/sing Asp
 ‘He did not come/sing for three days/three times (already).’
- c. Liang-ge nuhai dou xihuan Zhangsan.
 two-CL girl all like Zhangsan
 ‘The two girls both like Zhangsan.’

Following Longobardi’s 1994 approach to Italian bare NPs, Li suggests a government-based approach to account for the above facts. She posits a null determiner in the DP structure for referential expressions, as shown in (53a-b) (Li 1997: her (3a-b)):

- (53) a. [_{NumP} san ge xuesheng] - *quantity readings*
 three CL student
- b. [_{DP} D [_{NumP} san ge xuesheng]] - *referential readings*
 three CL student

According to Li, regular indefinites only occur in positions where the empty D is licensed by a lexical governor. They are generally barred from subject positions because

subjects are not lexically governed (though objects are) in Chinese. In the exceptional contexts discussed above, however, the subject position becomes lexically governed, due to the presence of lexical governors such as a topic, negation and *dou*. And in all the above aspects, according to Li, the indefinite interpretation of Chinese bare NPs behaves exactly like regular indefinites, because they share the same syntactic structures with the latter, and hence are subject to the same licensing conditions on empty categories.

2.5.2 Problems with Li's 1997 government-based approach

In this subsection, I discuss a number of problems with Li's government-based approach. The first problem, as pointed out in Dayal 1999, has to do with the consequences of how Li derives the various readings for Chinese bare NPs. In Chinese, bare NPs are allowed to occur in any position of a sentence, except that some readings are easier to get than others in preverbal subject position. For example, generic readings are always available for bare nominals at a subject position of a generic sentence. According to Li, the generic interpretation is due to an N-to-D movement by the head noun, as shown in (54b):

- (54) a. Gou hen jiling.
 dog very smart
 i. 'Dogs are intelligent.'
- b. [_{DP} gou_i [_{NP} t_i]] hen jiling.
 ↑ |

In this Li is drawing on Longobardi's 1994 proposal about Italian NPs. However, there are real differences between Chinese and Italian in this regard. According to Longobardi, Italian bare NPs are only allowed to occur in governed positions, regardless

of their readings. They do not involve any N-to-D movement, requiring the empty head in D to be governed by the verb. This, then, rules out Italian bare NPs in preverbal subject position in any predicational or aspectual context. By contrast, Chinese bare NPs are always possible in subject position, though they tend to get indefinite readings less easily than others (such as definite and generic readings). This difference between Italian and Chinese bare nominals therefore weakens the analogy Li tries to draw between the two languages.

The more serious problem has to do with how to block existential readings while allowing other readings in some contexts. As pointed out by Dayal, in order to obtain a generic interpretation under the suggested N-to-D movement, Li would need binding of an individual variable (*gou* ‘dog’ in this case) by a generic operator, under a view of bare nominals as indefinites in the Ambiguity approach discussed in Section 2.2. Of course, this movement leads to a D position filled with a lexical word *gou* ‘dog’, which no longer needs any licensing - a desirable result so far. But then the problem is if an N-to-D movement allows binding by a generic operator, it should also allow binding by an existential operator. That is, in an existential binding context, a similar N-to-D movement should be able to sidestep the licensing requirement and yield an indefinite reading via existential closure. As a result, Li’s approach would have two completely different mechanisms yielding existential readings in Chinese bare NPs, with one sensitive to syntactic licensing and the other not. Without any observable distinction between the two mechanisms, it is not clear how the effects of the first can be detected.

Secondly, Li’s account is geared to explain a subject-object asymmetry in the distribution of regular indefinites. But at least as far as the indefinite reading of Chinese

bare NPs is concerned, I have argued that the so-called subject-object asymmetry is best understood as reflecting a matter of saliency, rather than grammatical availability. We have seen evidence that an indefinite reading is, in fact, available whenever a bare NP occurs at a subject position of an episodic sentence, regardless of whether the sentence contains a topic, negation or *dou*.

The next problem raises a general question about the relevance of the notion of proper government in our case, namely, “Can a topic, negation or *dou* really serve as a lexical licenser in satisfying the proper government condition?”

Following Aoun, Hornstein, Lightfoot and Weinberg 1987, Li 1997 assumes that the lexical government requirement of ECP is a PF condition, and hence subjects are not properly governed in Chinese, as shown in (55a-c) (Aoun et al: their (42a-c)):

- (55) a. John_s[dui_s[Bill hen xihuan Mary]] hen shangxin.
 John to Bill very like Mary very sorry
 ‘John is sorry that Bill likes Mary.’
- b. ? Mary_i, John [dui [Bill hen xihuan e_i]] hen shangxin¹⁴.
 ‘Mary, John is sorry that Bill likes.’
- c. * Bill_i, John [dui [e_i hen xihuan Mary]] hen shangxin.
 ‘Bill, John is sorry likes Mary.’

However, a comparison between (56) and (57a-c) below illustrates that even in the presence of a base-generated topic, negation or *dou* - contexts which Li considers exceptional, the subject position is still not properly governed under the PF lexical government condition, contrary to what is predicted by Li. This raises the question as to

¹⁴ As reported by Aoun et al, (55b) is less than felicitous, possibly due to a Subjacency violation (cf. Li 1985), whereas (55c) is thoroughly unacceptable, due to an ECP violation.

how *relevant* the notion of proper government really is in determining the distribution of indefinite NPs.

- (56) a. John [dui [_{TOPP} zuotian, _s[Bill jian-guo Mary]]] hen gaoxing.
 John to yesterday Bill meet-Asp Mary very happy
 ‘John is happy (that) yesterday Bill met with Mary.’
- (57) a. * Bill_i, John [dui [_{TOPP} zuotian _s[e_i jian-guo Mary]]] hen gaoxing.
 Bill John to yesterday meet-Asp Mary very happy
 Lit: ‘Bill_i, John is happy (that) yesterday, e_i met with Mary.’
- b. * Bill_i, John [dui _s[e_i mei jian-guo Mary]]] hen gaoxing.
 Bill John to not meet-Asp Mary very happy
 Lit: ‘Bill_i, John is happy (that) e_i did not meet with Mary.’
- c. * [Bill he Sam]_i, John [dui _s[e_i dou jian-guo Mary]]] hen gaoxing.
 Bill and Sam John to all meet-Asp Mary very happy
 Lit: ‘[Bill and Sam]_i, John is happy (that) e_i both met with Mary.’

Finally, a problem with a government-based approach has to do with covert licensors. Recall in our earlier example (39) (repeated below), a covert topic (possibly a small *pro*) also seems to be able to license an indefinite NP in subject position.

- (39) a. Waimian chao-de hen. Gou zai-jiao.
 outside noisy-DE very dog be-barking
 i ‘Outside, it is very noisy. Dogs are barking.’
 ii ‘Outside, it is very noisy. The dog is barking’.
- b. [_{TOPP} Waimian_i [_{IP} chao-de hen]]. [_{TOPP} *pro*_i [_{IP} Gou zai-jiao]].
 outside noisy-DE very dog be-barking

A question that remains for such an approach is “How can a PF condition be satisfied by a covert element?”

2.6 Conclusion

In this chapter, I have examined the semantics of Chinese common nouns, and presented arguments in favor of the Neocarlsonian approach over the Ambiguity approach. In particular, I have argued for analyzing both Chinese and English bare nominals as introducing reference to kinds, to capture the striking semantic parallel between the two. I also examined a number of non-trivial differences between Chinese and English bare nominal arguments, and argued for an approach based on important cross-linguistic variations between the two languages in general. Interesting consequences of the proposed account are discussed, concerning the interpretation of Chinese bare nominals and pronoun anaphora to topic NPs in both English and Chinese. Finally, I reviewed an alternative government-based approach to Chinese bare nominals suggested in Li 1997, and concluded that while it offers an interesting alternative perspective on the distribution of Chinese indefinite NPs, there are real problems with the approach that remain unexplained.

Chapter III: Numeral Classifiers in Chinese

3.1 Introduction

In Chapter 2, I have presented evidence from Chinese in support of the Neocarlsonian approach and concluded that Chinese common nouns are unambiguous kind-referring terms. As they are all mass nouns that do not correspond to sets of atoms, numeral classifiers (or measure phrases) are needed to individuate a level for counting and to identify the units from which quantificational or numeric expressions can be built (cf. Chierchia 1996). In this chapter, I will investigate the syntax and semantics of Chinese numeral classifiers in their occurrence with common nouns, numerals and quantifiers¹⁵.

In Section 3.2, I discuss Krifka 1995, focusing on his semantic proposal about Chinese classifiers. I show that while it offers a plausible account for the combination of classifiers with kind-denoting bare NPs, Krifka's account, as presented in his paper, is nevertheless undermotivated *empirically* and *syntactically*. In Section 3.3, I then present empirical and syntactic evidence from Chinese to support Krifka's semantic approach. I also propose a new syntactic account for Chinese NPs involving classifiers, and address potential challenges in favor of the proposed account (in Section 3.4). Finally in Section 3.5, I will examine a problem posed by the occurrence of numeral classifiers with common nouns that are modified by adjuncts like relative clauses and adjectival phrases, and discuss possible solutions to the problem.

¹⁵ While the study of classifiers in this chapter is confined to quantification over *objects* in nominal phrases, I will discuss, in Chapter 5, the role of classifiers in quantification over *events*.

3.2 Semantic assumptions: Krifka 1995

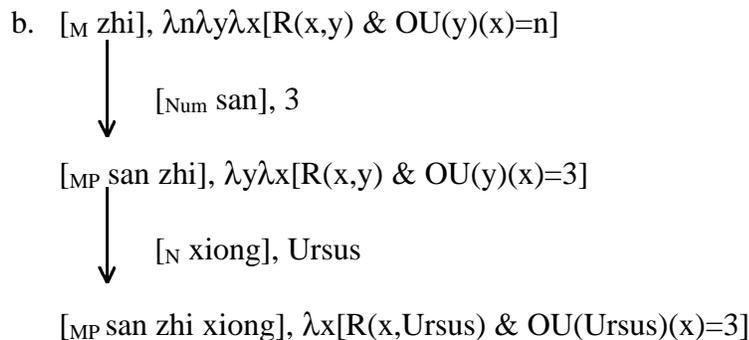
Although the importance of classifier/measure phrases in the study of noun phrases has long been recognized in the literature, the semantics of these phrases has not yet received due attention. It is still an open question as to how noun phrases with classifier/measure phrases should be formally represented. Stein 1981, Krifka 1995 and Chierchia 1996 are among the few people who have suggested some answers to this question, based on independent assumptions.

Throughout this thesis, I will adopt Krifka's basic proposal about the semantics of Chinese numeral classifiers for two reasons: First, as I discuss next, Krifka's account shares the same basic assumption as the Neocarlsonian approach about the semantic nature of Chinese bare nominal, and provides a plausible semantic account for NPs involving classifiers. Secondly, as detailed evidence will be presented in Section 3.3, Krifka's semantic approach is motivated on both empirical and syntactic grounds.

Krifka (1995: 399) begins his discussion with an explicit assumption that the basic denotation of Chinese bare NPs is that of a kind, based on the fact that every language which allows for bare NPs at all seems to use the same form to refer to kinds¹⁶, and the fact that kinds seem to be "ontologically prior to specimens" (see also Chierchia 1998 on this). Under this basic assumption, Krifka proposes a formal theory that derives the various readings of Chinese NP's containing a classifier, as illustrated in (1a-b) below:

- (1) a. san -zhi xiong (Krifka 1995: his (1d))
 three-CL bear
 'three bears' (object)

¹⁶ An exception can be found in Hebrew, which has bare singulars, but for kind reference the presence of a lexical determiner *ha* is required (cf. Dayal 2000).



In (1b), $R(x, k)$ is a realization relation that relates a kind k to its instantiations. OU (for ‘object unit’) is a function which, when applied to a kind, yields a measure function that measures the number of instantiations of that kind¹⁷. Therefore, the denotation of a numeral classifier, according to Krifka, is a function that takes a number individual and yields a function that applies to a kind and yields a measure function that measures the number of instantiations of that kind (cf. (1b))¹⁸. As shown in the final representation in (1b), Krika thus derives the meaning of a nominal phrase like *san-zhi xiong* ‘three bears’

¹⁷ As discussed in Krifka 1995, there are actually three different types of classifiers, including classifiers that apply to a specified number of 1) individual instantiations of Ursus, 2) groups of Ursus, or 3) subspecies of Ursus, as exemplified in (i-iii), respectively.

(i) *san-zhi xiong*
 three-CL^{object} bear
 ‘three individual bears’

(ii) *san-qun xiong*
 three-CL^{herd} bear
 ‘three herds of bears’

(iii) *san-zhong xiong*
 three-CL^{kind} bear
 ‘three kinds of bears’

The OU function obviously is relevant only to classifiers illustrated in the first case. While my semantic discussion in this chapter focuses on this type of classifiers only, in Chapter 4 I will also discuss example sentences whose final interpretations are sensitive to the distinctions among the different types of classifiers.

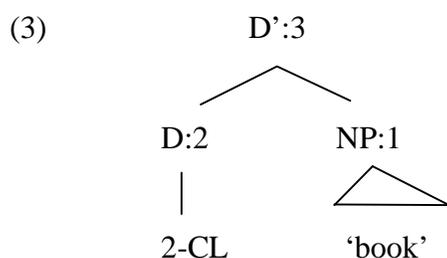
¹⁸ This is a simplified version of Krifka 1995, whose original account assumes an intensional semantic representation with a set of possible worlds I .

to be a set of three objects that are instantiations of the bear-kind. This, of course, is an intuitively plausible meaning representation.

For the sake of consistency (with the LF representations assumed in Chapter 2), in this dissertation I will assume the definition in (2) below for the denotation of the numeral classifier¹⁹.

$$(2) \quad \|\text{classifier}\| = \lambda n \lambda y^K \lambda x^i [\cup y(x) \wedge CL'(x)=n], \text{ where } n \text{ is number.}$$

The basic idea is still that of Krifka 1995, but it incorporates the \cup -operator of Chierchia 1998 (cf. Chapter 2). And as shown in (3), the meaning of a Chinese NP can still be derived in much the same way²⁰:



1	BOOK	e^k
2	$\lambda y^K \lambda x^i [\cup y(x) \wedge CL'(x)=2]$	$\langle e^k \langle e^i t \rangle \rangle$
3	$\lambda x^i [\cup \text{BOOK}(x) \wedge CL'(x)=2]$	$\langle e^i t \rangle$

¹⁹ The notation CL' is adopted from Kurafuji 1999 (in place of OU in Krifka 1995), as the former has an advantage of being able to generalize to all numeral classifiers (cf. Footnote 17 of this chapter).

²⁰ An alternative way of capturing the same basic idea was suggested in Kurafuji (1999: 48-49). Instead of assuming a built-in sort-shifting operator in the semantics of the classifier (as in (2) above), he assumes the definition in (i) for a classifier:

$$(i) \quad \|\text{classifier}\| = \lambda n \lambda P \lambda x [P(x) \wedge CL'(x)=n]$$

As a result, the classifier looks for a predicate, triggering the type-lifting operation (via the \cup -operator) lifting the common noun from e to $\langle et \rangle$ (see Kurafuji 1999 for detail).

It should be pointed out, however, that given its pure semantic nature, the Krifka's approach (I'm adopting here) appears to be syntactically undermotivated. Though his approach makes a crucial assumption of two syntactic rules (as given in (4i), no argument is presented in the paper in support of the rules:

- (4) i. Syntactic rules²¹: (Krifka 1995: 400)
- a. $MP \rightarrow \text{Num } M$
 - b. $NP \rightarrow MP \text{ } N$
- ii. Corresponding semantic rules:
- a. $\| [MP[_{\text{Num}}\alpha][_M\beta]] \| = \| [_M\beta] \| (\| [_{\text{Num}}\alpha] \|)$
 - b. $\| [_{NP}[_{MP}\alpha][_N\beta]] \| = \| [_{MP}\alpha] \| (\| [_N\beta] \|)$

In the next section, then, I will present evidence to show that, minor problems notwithstanding, the basic bracketing essential for Krifka's semantic approach is valid on empirical and syntactic grounds. I begin with an introduction to basic empirical facts concerning Chinese nominal phrases, paying special attention to the syntactic behavior of the classifier, for classifiers play a pivotal role in the structure of Chinese NPs.

3.3 Empirical and syntactic motivations

3.3.1 The basic data

First, it is a well-documented fact about modern Chinese that classifiers are obligatory²² when a common noun combines with a numeral, a universal quantifier or a demonstrative (Chao 1968, Tang 1990, etc.), as illustrated in (5).

²¹ MP, Num and M stand for 'measure phrase', 'number word' and 'measure word', respectively.

²² In archaic Chinese, or in colloquial, poetic and idiomatic expressions in Mandarin Chinese, classifiers may be omitted.

- (5) a. yi *(-zhi) xie
 one -CL shoe
 ‘one shoe’
- b. na *(-ge) ren
 that -CL man
 ‘that person’
- c. mei *(-ge) pengyou
 every -CL friend
 ‘every friend’

Secondly, a full NP in Chinese may contain one or more of the following elements, in addition to a common noun: a quantificational determiner, a demonstrative, a numeral, and a classifier²³. As indicated in the NP sequence in (6), the relative order among these elements is strictly fixed, even though the relative order among nominal modifiers (typically marked by *-de*) within a Chinese NP is known to be rather flexible.

- (6) **Dem**(onstrative)/**Quant**(ifier)²⁴ + **Num**(eral)-**CL**(assifier) + **N**(oun)

Here, it is important to note the use of the two notational symbols in the above sequence: “+” and “-”. While “-” is used to indicate strict adjacency where two elements have to be immediately next to each other, “+” is used to indicate weaker affinity where some optional elements can be inserted.

²³ For the sake of simplicity, I ignore adjectival modifiers and relative clauses for now, and will return to these nominal modifiers in Section 3.5.

²⁴ Note that the quantifiers occurring in this position are limited to universal quantificational determiners *mei* ‘every’ and *ge* ‘each’, a fact to which I will return in Chapter 4. Also note that the symbol “/” here indicates disjunction. In other words, either [Dem] or [Quant] can appear before [Num], but not both.

In (6), therefore, I use the symbol “-” between the numeral and the classifier, to capture the fact that the two elements are closely tied with each other, and that they together form a syntactic unit that can never be separated (cf. Tang 1990). I will henceforth refer to this combination as “the [Num-CL] complex”. By contrast, I use the symbol “+” between the demonstrative/quantifier and the numeral, as well as between the classifier and the head noun, in order to capture the fact that both pairs of elements can be separated by adnominal modifiers such as adjectival phrases (with optional adverbs). As illustrated in the following examples, while an adjectival nominal modifier can intervene between a demonstrative and a numeral (in (7b)), it cannot separate a numeral from a classifier (in (7c)).

- (7) a. na wu -ben [houhou -de] shu
 that five-CL thick-DE book
 ‘the five books, which are thick’
- b. na [houhou-de] wu-ben shu²⁵
 that thick-DE five-CL book
 ‘the five thick books’
- c.* na wu [houhou-de] -ben shu
 that five thick-DE -CL book

And the claim that the order given in (6) is strictly fixed among the prenominal elements can be supported by the following examples:

- (8) a. na wu -ben shu
 that five-CL book
 ‘those five books’

- b.* wu -ben na shu
five-CL that book
- c.* wu na -ben shu
five that-CL book
- d.* na -ben wu shu
that-CL five book
- e.* shu na wu -ben
book that five-CL

Moreover, no element indicated in the sequence in (6) can appear more than once²⁶, as shown in (9):

- (9) a.* zhe na -ge ren
this that -CL man
- b.* na -ge -ge ren
that -CL -CL man
- c.* yi yi -ge ren
one one -CL man
- d.* yi -ge ren ren
one -CL man man

(10) further shows that with the exception of the classifier, all the elements in (6), including the common noun, are optional and may be omitted from a Chinese NP.

²⁵ As indicated in the translations, there is a meaning contrast between (7a) and (7b), often referred to as the distinction between ‘descriptive’ and ‘restrictive’ nominal modifiers (see Huang 1982 and Krifka 1995 for detailed discussions and possible explanations).

²⁶ An apparent exception is illustrated by example (i), where two numerals occur within one NP. But as the English translation shows, the two neighboring numerals should be treated as forming one unit.

- i. yi liang -ge ren
one two -CL man
‘one or two men’

- (10) a. Nei (yi) -ben (shu) hen gui.
 that one -CL book very expensive
 ‘That book is expensive.’
- b. (Nei) yi -ben (shu) hen gui.
 that one-CL book very expensive
 ‘One book is expensive.’
- c. *Nei yi (-ben) shu hen gui.
 that one -CL book very expensive

However, the option of omission is subject to one condition, namely, the classifier cannot be left “stranded”. For example, in the absence of a numeral, either a demonstrative or a quantifier becomes obligatory in the context of a classifier, as illustrated in (11a-b) below. I will postpone a detailed discussion on this point until Section 3.4.

- (11) a. *(Nei)-ben shu hen gui.
 that -CL book very expensive
- b. * (Mei) -ben shu dou hen gui.
 every -CL book all very expensive

Finally, as noted in Tang 1990, there are selectional restrictions between the head noun and the classifier in the Chinese NP. There is no classifier that can combine with every noun, and there is no noun that can combine with every classifier, even though the correspondence between the classifier and the noun is by no means one-to-one, as shown in (12):

- (12) a. yi -ge / -wei xuesheng
 one-CL -CL student
 ‘a student’

- b. liang -ge / -fen baodao
 two -CL -CL report
 ‘two reports’
- c. san -tiao / *-ge shengzi
 three -CL^{shape} -CL^{general} rope
 ‘three ropes’

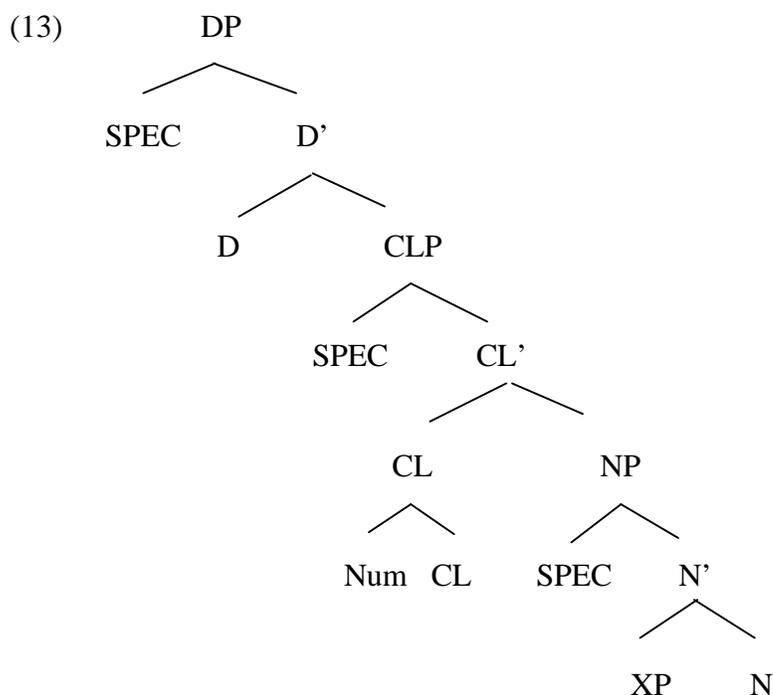
Before we move on to discuss possible analyses of the facts observed above, it should be pointed out that numeral classifiers in Chinese actually have a dual semantic function: *quantifying* and *classifying* (in Greenberg’s 1977 terms). In (12c), for example, the classifier *-tiao* not only individuates a unit for counting (ropes), but also provides a semantic classification of the head noun, by indicating that the object *shengzi* ‘rope’ takes a long narrow shape. As is expected from the second function, the same classifier also combines with other nouns that have a similar lexical feature (such as *she* ‘snake’ and *he* ‘river’), but not with nouns that have a contrastive feature with respect to shape (such as *hezi* ‘box’ and *chezi* ‘car’).

As another example, the classifier *ge* in (12a-c), often called a “general classifier” in the literature, is a numeral classifier that occurs with a biggest majority of common nouns. Since the classifying function of *ge* does not concern shape, the classifier is thus expected not to occur with common nouns that have a lexically specified feature with respect to shape, with the latter being reserved for special shape classifiers like *tiao*, as shown in (12c) above.

The reader should note that the present dissertation is primarily concerned with the quantifying use of Chinese numeral classifiers, and the use of the general classifier *ge* will be studied most of the time in our investigation as representing classifiers in general.

3.3.2 Tang 1990

In her 1990 dissertation, Tang proposed a syntactic structure for Chinese NPs, in which she posits an independent Classifier Phrase (CLP), with the combination of a numeral and a classifier occurring at the head position:



As shown in (13), one thing Tang's structure²⁷ has in common with Krifka's rules in (4) is that both take the classifier to be an independent word occupying a head position.

I want to show, however, two reasons why this may not be the case. The first piece of evidence comes from phonology. It is well known that cross-linguistically, *stress* may serve as a decisive factor in distinguishing words of functional categories from those of lexical categories (cf. Selkirk 1994). In English, for example, while functional words may alternate between stressed and unstressed forms in different phrasal contexts, lexical words appear invariably in stressed forms. Though the stressed-vs.-unstressed distinction

²⁷ Note that the structure in (13) also seems to violate the "Doubly Filled Head" constraint.

also obtains in Mandarin Chinese, the dividing line is not so clear-cut between functional and lexical words as it is between suffixes and independent words (cf. Wang 1973, Liu and Shi 1988, Yang 1995). Since the stress pattern in Chinese is rather complicated in this respect, partly due to the additional tonal feature, a descriptive generalization summarizing the majority of the data can be stated as follows:

- (14) There are only two classes of words in Chinese that are uniformly unstressed²⁸:
- i. Suffixes: including nominalization suffixes such as *-zi*, *-er*, *-tou*; “plurality suffix” *-men*, locative suffixes such as *-shang* ‘up’, *-li* ‘in/into’, *-xia* ‘down’, etc.
 - ii. Phrase-final particles: including modal particles *a*, *ma*, *ba*, *ni*, *le*; aspectual particles *zhe*, *le*, *guo*; and structural particles *de*.

Turning back to the case of Chinese classifiers, though they are categorized in most traditional grammar books as “lexical words”, the fact that classifiers are *never* stressed in Chinese, just like typical suffixes and phrase-final particles, strongly suggests that they may be suffixes as well.

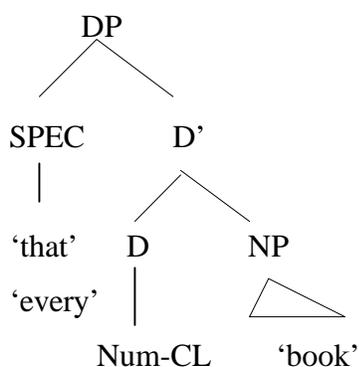
Secondly, as we have witnessed in (11)-(12) earlier, the classifier can never occur in isolation and is morpho-syntactically dependent on the preceding word, be it a numeral, a quantifier, or a demonstrative. This further distinguishes the classifier from an ordinary independent word (cf. Zwicky 1985).

²⁸ Unstressed words in Chinese are typically, though not necessarily, marked with neutral tone.

3.3.3 The proposal: a morpho-syntactic account of the classifier

In order to capture the close affinity between the numeral and the classifier, and keep the essential syntactic bracketing intact for Krifka's semantic approach, I posit the following morpho-syntactic structure for a Chinese full NP with a classifier, where the combination of the numeral and the classifier is treated as a morphological complex, rather than two independent words:

(15) A minimal structure for Chinese NPs:



The proposed structure is motivated on a number of grounds. First, in comparison with the alternative structures, the proposed structure is “minimal” in that it is based on the standard DP structure assumed for most languages. In absence of independent evidence for non-standard nodes such as CLP (in (13)) or MP in Krifka's rules in (4), I think that the minimal structure is more desirable.

Secondly, in my approach, I take the combination between the numeral and the classifier to be a complex head derived morphologically within the lexicon, instead of having them as two separate syntactic heads. This explains why the two elements always behave like a unit syntactically. The fact that the classifier can never occur in isolation is also expected, for as a suffix, the classifier [-CL] needs to be supported by some kind of word stem.

Thirdly, under the proposed structure, all the relevant facts summarized in the sequence in (6) are captured in a fairly straightforward way, including the fixed order among the various prenominal elements, the fact that the demonstrative and the quantifier alternate in the same position, and the fact that no element occurs more than once within a noun phrase.

Fourthly, given a common assumption that Chinese lack definite/indefinite articles altogether, it is plausible to assume that the D-head position in a Chinese noun phrase is now available for other elements to occur. By positing the classifier as part of the D-head, the proposed structure explains why the classifier is obligatory whenever the numeral is present. A question that remains open at this point is how to explain the fact that the numeral can be sometimes omitted while the classifier is always obligatory, if both are parts of the D-head. Section 3.4 will be devoted to finding an answer to this question.

Finally, the selectional relation between the common noun and the classifier within a noun phrase (as observed in (12)) is also captured by the proposed structure, in terms of a head-complement relation between the classifier and the noun.

In sum, I have proposed the syntactic structure in (15) for Chinese NPs, because it is minimal, conforms to standard assumptions about the DP structure, and accounts for more facts about Chinese classifiers than alternative structures suggested in the literature. What's more important for the current discussion, the proposed structure provides the needed support for the syntactic bracketing assumed by Krifka's compositional approach to Chinese NPs involving classifiers.

3.4 A challenge: the apparent stranding of classifiers in Chinese

In this section, I address a mystery in the relation between the numeral and the classifier in Chinese NPs. On the one hand, they show a very close affiliation and behave like a unit morphologically and syntactically. This has led us to treat the combination of the two as a [Num-CL] complex taking up the D-head in (15). But on the other hand, unlike the classifier which is always obligatory in a full NP, the numeral can be omitted when a demonstrative or a quantifier is around. The question is how to explain the optionality of the numeral and the apparent “stranding” of the classifier if they both are to be analyzed as parts of a D-head (under the proposed structure). To approach this question, I begin by examining the relevant data in detail, and identifying the kind of contexts in which the omission of the numeral is licensed.

3.4.1 Contexts that license the omission of the numeral

Recall my earlier conclusion that as a suffix, the classifier cannot be “stranded”, and thus has to be attached to a preceding host word, which, in most cases, is a numeral. But we have also observed that whenever a demonstrative or a quantifier is present, the numeral can be optionally omitted, resulting in a [Dem/Quant-CL+N] sequence, as shown in (16a-b) below:

- (16) a. Nei (yi)-ben shu hen gui.
 that one-CL book very expensive
 ‘That book is expensive.’
- b. Mei (yi)-ben shu dou hen gui.
 every one-CL book all very expensive
 ‘Every book is expensive.’

A second type of context in which the numeral may be omitted is when the NP containing a classifier occurs immediately after a verb, leading to an apparent [V-CL+N] sequence:

- (17) Yuehan mai-le (yi) -ben shu.
 John buy-Asp one -CL book
 ‘John bought a book.’

If we are to maintain the proposed structure in (15) and analyze the classifier as a suffix that attaches to the numeral within the lexicon, then the apparent “stranding” of the classifier in the above contexts certainly calls for an explanation.

3.4.2 Contexts that block the omission

Before I attempt an analysis, it should be also noted that there are contexts strictly banning the omission of the numeral from a Chinese noun phrase. At sentence initial positions, for example, a full NP containing a classifier can never occur without a numeral:

- (18) *(Yi) -ben shu bu gou.
 one -CL book not enough
 ‘One book is not enough.’

Furthermore, at a postverbal position the omission of the numeral from a full NP is blocked whenever the NP is separated from the verb by another element. In a double object construction like (19), for example, the direct object NP, being too far away from the verb, does not allow the omission of the numeral.

- (19) Yuehan song-le yi-ge pengyou *(yi) -ben shu²⁹.
 John give-Asp one-CL friend one -CL book
 ‘John gave a friend a book.’

This is in clear contrast to (20a-b), where an indirect or a direct object NP, occurring right after the verb, does make the occurrence of the numeral optional.

- (20) a. Yuehan song-le (yi)-ge pengyou yi -ben shu.
 John give-Asp one-CL friend one -CL book
 ‘John gave a friend a book.’
- b. Yuehan song-le (yi)-ben shu gei yi-ge pengyou.
 John give-Asp one-CL book to one-CL friend
 ‘John gave a book to a friend.’

Likewise, in a sentence involving conjoined NP objects such as (21), the second conjunct NP *yi-zhi bi* ‘a pen’, being separated from the verb by another object NP, does not allow the omission of the numeral, either.

²⁹ (19) sounds better when the object NP *yi-ge pengyou* ‘a friend’ is replaced with a pronoun like *ta* ‘her’. However, the examples in (i-ii) below clearly indicates that an explanation in terms of distance between the verb and the NP is still needed. The only thing that seems to be able to stand in between the two is a monosyllabic pronoun, which might have the option of cliticizing onto the verb. A proper name (even if it is monosyllabic) or two conjoined pronouns, however, seem to lack such an option, as shown below:

- (i) Yuehan song -le tamen ?*(yi) -ben shu.
 John give -Asp them one -CL book
 ‘John gave them a book.’
- (ii) Yuehan song -le Lee *(yi) -ben shu
 John give -Asp Lee one -CL book
 ‘John gave a book to Lee.’
- (iii) Yuehan song -le ta he wo *(yi) -ben shu
 John give -Asp her and I one -CL book
 ‘John gave a book to her and me.’

- (21) Yuehan mai-le yi -ben shu he *(yi)-zhi bi³⁰.
 John buy-Asp one-CL book and one -CL pen
 ‘John bought a book and a pen.’

Finally, (22) shows that within a full NP, if the demonstrative (or a quantifier) is separated from the [Num-CL] complex by another modifier, the omission of the numeral becomes illegal:

- (22) Na [houhou-de] *(yi)-ben shu hen gui.
 that thick -DE one-CL book very expensive
 ‘That very thick book is expensive.’

To sum up the results so far, I have observed that in Chinese a numeral may be optionally omitted from the [Num-CL] complex, if and only if 1) there is another hosting word (a demonstrative, a quantifier, or a verb) preceding the complex, and moreover 2) a strict locality condition is satisfied between the hosting word and the complex.

3.4.3 The proposed analysis

Before I proceed to propose an analysis for the restricted omission of the numeral, one thing worth noting is the interpretation of the Chinese NP after the omission of the numeral. Tang 1990, among others, has observed that the interpretation for a full NP in the form of [Dem-CL+N] can only be understood to be *singular*, whereas a full NP with a numeral can be interpreted to be either singular or plural, as shown in (23):

³⁰ One might object by saying that (21) is bad because coordination requires the two conjuncts to be syntactically parallel. But example (i) shows that even when the omission of the numeral actually helps to satisfy the parallel condition, it is still blocked if the adjacency condition is not satisfied.

- (i) Yuehan mai-le -ben shu he *(yi) -zhi bi.
 John buy-Asp -CL book and one -CL pen
 ‘John bought a book and a pen.’

- (23) a. Nei liang-ben shu hen gui.
 that³¹ two -CL book very expensive
 ‘Those two books are expensive.’
- b. Nei-ben shu hen gui.
 that-CL book very expensive
 ‘That book is expensive.’
- * ‘Those books are expensive.’

As shown in (24), the above number contrast also holds in post-verbal contexts³²:

³¹ As mentioned at the beginning of Chapter 2, Chinese is a non-inflectional language, where no plurality marking is present on common nouns or determiners.

³² A number contrast of this sort could also be observed when the [Num-CL] complex occurs after the universal determiner *mei* ‘every’, as shown in (i-ii) below. That is, the numeral is always understood to be *yi* ‘one’ when it is not overtly marked:

- (i) Mei liang-ben shu yao san-kuai qian.
 every two -CL book cost three-dollar money
 Lit: ‘Every two books cost three dollars.’
- (ii) Mei -ben shu dou yao san-kuai qian.
 every-CL book all cost three-dollar money
 ‘Every book costs three dollars.’

It should be noted, however, that the two occurrences of *mei* ‘every’ in the above examples differ in many significant ways. As clearly illustrated in (iii) below, in postverbal position where a syntactic NP is expected, only a singular *mei*-NP is allowed to occur. This suggests the possibility that only singular *mei*-NPs are really NPs, while the occurrence of *mei* with plural NPs involves a more complex structure.

- (iii) Ta du-guo mei yi / *liang / *san -ben shu.
 He read-Asp every one two three -CL book
 ‘He read every book / *every two books / *every three books.’

Moreover, the occurrence of *mei* with plural NPs does not depend on the presence of the D-operator *dou* (cf. (i) above), and requires two arguments to quantify over (cf. the contrast between (i) and (iv) below). These are in clear contrast to what can be observed of singular *mei*-NPs, as shown in (v) below.

- (iv) *Mei liang -ben shu yao qian.
 every two -CL book cost money
 ‘*Every two books cost money’

- (24) a. Yuehan mai-le liang-ben shu.
 John buy-Asp two -CL book
 ‘John bought two books.’
- b. Yuehan mai-le -ben shu.
 John buy-Asp -CL book
 ‘John bought a book/*books.’

Therefore, as a descriptive generalization, I suggest that the only numeral that can be optionally omitted from the [Num-CL] complex is *yi* ‘one’. The puzzle, then, becomes how to account for the omission of *yi* ‘one’ from the [*yi*-CL] complex. Here, I suggest two possibilities.

As a first hypothesis, we could assume that after the omission of *yi* ‘one’, the [*yi*-CL] complex becomes [\emptyset -CL], where \emptyset is a covert element which is syntactically and semantically present. So, whenever we see a [Dem-CL+N] or [V-CL+N] sequence, it is really [Dem+ \emptyset -CL+N] or [V+ \emptyset -CL+N] underlyingly. In this sense, the classifier is still a suffix attached to a numeral stem, only that the numeral could also be covert whenever it is *yi* ‘one’. This restriction to singular number reminds us of a familiar syntactic object *pro*, whose distribution is also subject to a “recoverability” condition.

-
- (v) Mei (yi)-ben shu dou yao qian.
 every one-CL book all cost money
 ‘Every book costs (some) money.’

In Chapter 4, I will investigate the characteristics of Chinese quantified NPs including *mei*-NPs. While a detailed examination of the occurrence of *mei* with plural NPs falls outside the scope of the current study, the above examples present enough motivation for treating this occurrence differently from that in singular *mei*-NPs. Liu (1997: 108), for example, has suggested analyzing to the first occurrence of *mei* as a two-place predicate that functions as a distributive operator. Another possibility, as suggested to me by Maria Bittner (personal communication), is to explore the parallel between the adverb-like *mei* and English binominal *each* (as discussed in Safir and Stowell 1987).

This hypothesis, however, leaves open the question as to why the distribution of this sequence should be subject to the above restrictions. In particular, why should the classifier still need a host word if it already has a covert stem to attach to? With this in mind, let's turn to an arguably more plausible hypothesis.

Recall that phonologically the classifier is never stressed, and syntactically it can never stand on its own. I have concluded from these observations that the classifier is unlikely to be an independent word, whether it occurs in the [Num-CL] complex, or in the [Dem-CL] and [V-CL] sequences. Apart from being a suffix, there is actually another alternative for the classifier, that is, being a *clitic*.

The hypothesis I'd like to suggest is the following. There are two major contexts in which a classifier can occur: either as a lexical suffix directly attached to a numeral, forming what I call the [Num-CL] complex within the lexicon, or else *cliticized* to the preceding host word, in the absence of a numeral. As a clitic, such a classifier is semantically equivalent to a ['one'-CL] complex, and freely alternates with the complex in a variety of contexts. If we adopt the standard notation '=' for clitics, the occurrence of a clitic classifier may include strings such as [Dem=CL+N], [Quant=CL+N], and [V=CL+N].

In the remainder of this section, I will present a number of arguments to show why the classifier should be treated as a suffix in its occurrence within the [Num-CL] complex, but as a clitic in other occurrences. First of all, as we have observed earlier, in the presence of a numeral the only position at which the classifier can occur is immediately after the numeral, while in the absence of the numeral the classifier is allowed to appear in a wider range of contexts, which do not seem to fall under any

common natural class. In order to maintain the same lexical origin for the classifier in both cases and meanwhile explain this sharp contrast in distribution, we can assume a derivational story whereby the classifier in the second case, but not the first, has undergone a further syntactic process, namely cliticization.

Interestingly, the above syntactic contrast between the two occurrences of a classifier is very reminiscent of a characteristic distinction between clitics and affixes in general, as discussed in Zwicky and Pullum 1983:

- (25) “Clitics can exhibit a low degree of selection with respect to their hosts, while affixes exhibit a high degree of selection with respect to their stems.”
(Zwicky and Pullum 1983: 503)

Among the examples they use to illustrate this distinction are English contracted auxiliaries like *-s/-ve* and the negative formative *n't*, as shown in (26-27): (Zwicky and Pullum 1983: 504-507)

- (26) a. The person I was talking to's going to be angry with me.
b. The ball you hit's just broken my dining room window.
c. Any answer not entirely right's going to be marked as an error.
- (27) a. I try not/*tryn't to pay attention.
b. Well, for her not/*heren't to understand is the last straw.
c. Would the police have not/*haven't been informed?

So while the clitic =s is happy to be attached to a variety of syntactic words, the suffixation of *n't* is limited only to verbs that have some auxiliary properties, including *be*, *do*, *can*, and *will*.

This contrast is precisely what we observed to hold between Chinese classifiers in the two kinds of contexts. Therefore, I claim that while classifiers occurring in the [Num-CL]

complex as suffixes are more selective of their stems in that they only combine with numerals, clitic classifiers can attach to a variety of syntactic host words.

Secondly, the fact that in absence of a numeral, the classifier always needs another host word to precede it is also predicted under my hypothesis. To use familiar examples in English again, let's consider the class of English contracted auxiliaries such as *-ve* (have), *-re* (are), and *-s* 'is/has', argued to be clitics in Zwicky and Pullum 1983. As shown in (28), the clitic cannot occur in sentence-initial position, or in absence of a preceding host word³³.

- (28) a. She'll finish by tomorrow.
 a'* 'll finish by tomorrow.
 b. And will she finish by tomorrow?
 b'* And 'll she finish by tomorrow?
 c. I will go and so will she.
 c'* I will go and so 'll she.

Just as the subject clitic in English always needs to be strictly adjacent to its host word (in (29)), so are the classifiers in the [Dem=CL], [Quant=CL], [V=CL] and [you=CL] sequences in Chinese as we observed earlier.

- (29) a. She has done that and will do that again.
 a'* She has done that and 'll do that again.

³³ Another similarity can be observed between the English subject clitic and the Chinese classifier. As shown in (i), the English subject clitic can be supported by a pronoun, but not a name. And (ii) shows that when two pronouns are conjoined, they cannot support a subject clitic anymore. These facts, together with a similar observation made in Footnote 29 about the distribution of the Chinese classifier, may have non-trivial implications for cliticization in general. In any case, this lends further support to my account in terms of cliticization.

(i) She'll /*Mary'll come today.
 (ii) *She and he'll come today.

b. She has had enough.

b'* She has 'd enough.

What's more, my hypothesis makes an interesting prediction for the Chinese classifier. For an English sentence such as *He's going to the party*, a standard assumption is that while 's is cliticized to the subject and phonologically attached to the subject, syntactically 's still forms a unit with the verb *going*, and is dependent on the verb, much more so than the word *is*. The strong syntactic dependency is especially evident in topicalization facts such as (30) and VP ellipsis facts such as (31) below. Unlike the word *is*, the subject clitic -s cannot occur without the verb *going* immediately following it.

(30) a. Going to the party, I believe he is. - topicalization

b.* Going to the party, I believe he's.

(31) a. They are going and he is (going), too. - VP ellipsis

b. They're going and he's *(going), too.

If Chinese classifiers in contexts other than the [Num-CL] complex are indeed clitics, they are predicted to display a similar dependency on the following noun. As shown in (32-33), this prediction is borne out. While the [Num-CL] complex (in the a-sentences) can occur with or without the common noun following it, the clitic classifier *-ben* (in the b-sentences) cannot occur without the following noun.

(32) a. Shu, ta mai-le yi-ben.

book he buy -Asp one-CL

'As for books, he bought one.'

b.* Shu, ta mai -le =ben.

book he buy -Asp=CL

'As for books, he bought one.'

- (33) a. Ta mai -le yi -ben shu.
 he buy -Asp one-CL book
 Wo ye mai -le yi -ben (shu).
 I also buy -Asp one-CL book
 ‘He bought one book, and I bought one, too.’
- b. Ta mai -le yi -ben shu.
 he buy -Asp one-CL book
 Wo ye mai -le =ben *(shu).
 I also buy -Asp =CL book
 ‘He bought one book, and I bought one, too.’

3.5 Modified NPs and classifiers

In this section, I discuss a potential problem posed by the occurrence of numeral classifiers with modified common nouns, and review some possible solutions to the problem, one of which has been suggested in the literature.

3.5.1 The problem

So far I have assumed, with Krifka 1995, that the common nouns in Chinese classifier constructions are kind-denoting terms, and it is only by the application of a classifier phrase that object-referring NPs are derived. The situation, however, is not this simple. As we see next, the NPs that can be arguments of numeral classifiers are not limited to those having kind-level references.

- (34) a. san-ge [Mali-de] xuesheng
 three-CL Mary-DE student
 ‘three students of Mary’s’

- b. yi-ge [qinfen-de] xuesheng
 one-CL hardworking-DE student
 ‘a diligent student’
- c. yi-ge [Yuehan xihuan de] xuesheng
 one-CL John like DE student
 ‘a student who is liked by John’

As illustrated in (34), the [Num-CL] complex in Chinese can freely combine with noun phrases that are modified by adjuncts that are quantificational or numeric. These modifiers may range from possessives and adjectival phrases to relative clauses and prepositional phrases, which are typically marked by the subordination particle *de* ‘DE’ in Chinese.

As discussed in Carlson (1977: 194-200), kind-denoting NPs, when modified by adjuncts like relative clauses or possessives, may lose the ability to denote natural kinds. As shown in (35a-c), unlike bare plurals, modified plural NPs do not readily combine with kind-level predicates such as *be common*:

- (35) a. Books are common.
 b. ?Mary’s books are common.
 c. ??Books she buys are common.

Likewise in Chinese, modified NPs do not combine with a kind-level predicate as easily as bare NPs, as shown in (36).

- (36) a. Shu hen changjian. - bare NP
 book very common
 ‘Books are very common.’

- b. ?Mali -de shu hen changjian. - *modified NP*
 Mary-DE book very common
 ‘Mary’s books are very common.’
- c. ??Ta mai-de shu hen changjian. - *modified NP*
 he buy-DE book very common
 ‘Books he bought are very common.’

If we want to maintain our basic assumption that Chinese NPs obtain an object-level denotation only after the application of classifiers, the question remains how to account for the above distribution facts concerning the free occurrence of classifiers with modified NPs.

One possible way-out could be to argue that even after adnominal modifications, it is still possible for many kind-referring terms (such as English bare plurals) to denote kind, as shown in (37).

- (37) a. Mary’s friends are widespread. - *possessive modifier*
 b. Hard-working students are more likely to succeed. - *adjectival modifier*
 c. Students who are late for class are a nuisance. - *relative clause*

(37a), for example, involves a modified NP *Mary’s friends* that combines with a typical kind-selecting predicate *widespread*, yielding a kind-oriented reading.

As suggested in Carlson 1977, the fact that some bare plurals, after adnominal modification, can still yield kind-oriented readings while others cannot may have to do with the kind of “conceptual scheme” we are dealing with, rather than grammatical factors.

- (38) a. #Alligators in the next room are often intelligent/common. (Carlson 1977: 197)
 b. Alligators in the New York sewer system are often intelligent/common.

As shown by Carlson's examples in (38a-b), modified NPs with almost identical grammatical forms can end up having very distinctive interpretations, given the appropriate conceptual schema. (38a) sounds very strange, as it is very hard to interpret an NP like *alligators in the next room* as reference to kinds. (38b) may also sound a bit strange at first, but it becomes significantly better, if with some imagination, we think of all the alligators in the New York sewer system "not as those that just HAPPENED to be there at a given time, but constituted almost a race of alligators, those descended (say) from baby alligators originally bought by New Yorkers as pets and flushed down the toilets" (Carlson 1977: 197). What this shows, then, is that the possibility of interpreting modified NPs as reference to kinds may have more to do with conceptual or pragmatic factors (e.g. "how do we view the objects of the world"), than grammatical factors (e.g. "how are the modified NPs grammatically composed of").

Furthermore, evidence can be found suggesting that modified NPs should be distinguished from typical object-referring noun phrases such as pronouns and definites, even though they are not as kind-denoting as bare NPs. As shown in (39a-c), unlike bare nominals, pronouns and definite NPs are not allowed to occur in predicate position unless the utterance is accompanied with a pointing gesture. Thus, the ability to stand alone at both argument and predicate positions seems to be a characteristic property of kind-denoting terms, not of object-denoting terms.

- (39) a. Yuehan shi xuesheng. - *good with or without a gesture*
 John be student
 'John is (a) student.'

- b. Yuehan shi ta. - *bad without an accompanying pointing gesture*
 John be he
 ‘John is him.’
- c. Yuehan shi na-ge xuesheng. - *bad without an accompanying pointing gesture*
 John be that-CL student
 ‘John is that student.’

As shown by examples like (40a-c), modified NPs clearly pattern with kind-denoting bare nominals in this aspect.

- (40) a. Ta shi [Mali-de] xuesheng. - *good with or without a pointing gesture*
 he be Mary-DE student
 ‘He is a student of Mary.’
- b. Ta shi [qinfen-de] xuesheng. - *good with or without a pointing gesture*
 he be diligent-DE student
 ‘He is a diligent student.’
- c. Ta shi [Yuehan xihuan de] xuesheng. - *good with or without a pointing gesture*
 he be John like DE student
 ‘He is a student liked by John.’

Although what we have discussed so far provides some arguments for maintaining the kind-referring status for bare NPs after adnominal modification, there are real facts that resist such a line of approach. Consider, for example, the contrast between (41a) and (41b), focusing on the meaning contributions of the two adnominal modifiers enclosed by the square brackets:

- (41) a. Wo mai-le liang-ben [Yuehan xihuan de] shu.
 I buy-ASP two-CL John like DE book
 ‘I bought two books John likes.’

- b. Wo mai-le liang-ben [Yuehan qunian xie de] shu.
 I buy-Asp two-CL John last-year write DE book
 ‘I bought two books John wrote last year.’

Although syntactically both are in the form of a relative clause, semantically the two modifiers have distinctive properties. The relative clause in (41a) has a generic tense, and its combination with the common noun *shu* ‘book’ could still be construed with a kind-level denotation, as in ‘books of a certain kind or of certain characteristic’. The relative clause in (41b), on the other hand, has an episodic tense, and its combination with the common noun ‘books that were written by John last year’ cannot possibly be construed as referring to a kind. The meaning contrast between the two modified NPs becomes more evident, once they are placed in a kind-level context, as in (42a-b):

- (42) a. [Yuehan xihuan de] shu hen changjian.
 John like DE book very common
 ‘Books that John likes are common.’
- b.* [Yuehan qunian xie de] shu hen changjian.
 John last-year write DE book very common
 Lit: ‘*Books that John wrote last year are common.’

In Chinese, such sentences involving the combination of a classifier with non-kind-denoting modified NPs are fairly common (cf. (43)), and they are as acceptable and productive as those involving the occurrence of a classifier with bare NPs.

- (43) a. yi-bu [Yuehan zai-zao de] fangzi
 one-CL John be-build DE house
 ‘a house John is building’

- b. liang-ge [Mali gang jiao-guo de] xuesheng
 two-CL Mary recent teach-Asp DE student
 ‘two students Mary taught recently’

The puzzle, therefore, remains why numeral classifiers should be allowed to occur with modified NPs that do not refer to kinds.

3.5.2 Krifka 1995

A better solution than the ones discussed above has been suggested by Krifka himself. In his discussion about *descriptive-vs.-restrictive* adjuncts in Chinese nominal phrases, Krifka 1995 introduces a new type of entities: *concepts*, which differ from kinds in several important ways.

First, while concepts are also abstract entities related to real objects, they are more general a notion (than kinds) in the sense that they could be construed from scratch and do not have to be well established in the background knowledge of the speaker and the listener. Take the modified noun phrase *lao xiong* ‘old bear’ for example. To handle the modification of the kind-denoting *xiong* by the adjective *lao*, Krifka introduces an operator σ which applies to a given predicate, and yields the concept whose realizations are the entities to which the predicate applies.

$$(44) \quad \sigma(\mathbf{P}) = \lambda y \forall i \forall x [\mathbf{RT}_i(\mathbf{x}, y) \leftrightarrow \mathbf{P}_i(\mathbf{x})] \quad (\text{Krifka 1995: 404})$$

As defined in (44), if \mathbf{P} is a property of objects, then $\sigma(\mathbf{P})$ refers to the concept which has the objects in the extension of \mathbf{P} as its realizations. Therefore, concepts are distinguished from objects in being abstract entities (akin to kinds).

Also, modified noun phrases such as those in (45a-d) can all refer to some concepts construed from scratch, even though they fail to correspond to any well-established kinds in the background knowledge shared by the speaker and listener.

- (45) a. old gentlemen
 b. old gentlemen wearing blue suits
 c. old gentlemen wearing blue suits at the party
 d. old gentlemen wearing blue suits at the party last night

Secondly, concepts as defined in (44) “may stand in a subconcept relation, but not necessarily in a taxonomic relation” (Krifka 1995: 402). For example, *a gentleman wearing blue suits (at a party)* is a gentleman, but it is not a subspecies of gentleman³⁴.

Thirdly, kinds form a subset of the more comprehensive sets of concepts. Let **KIND** be the set of kinds and **CONCEPT** the set of concepts, then **KIND** \subseteq **CONCEPT**. In order to integrate the relation **R** into this enlarged framework, Krifka redefines **R** as a relation which connects an object with a concept as in (46):

- (46) For every possible world i , (Krifka 1995: 403)
- a) $R_i \subseteq \mathbf{OBJECT} \times \mathbf{CONCEPT}$, where **OBJECT** is the set of objects;
 b) $S_i \subseteq \mathbf{CONCEPT} \times \mathbf{CONCEPT}$, where **S** is the subconcept relation

Following from these definitions is a general rule as given in (47), which states that every object that belongs to a concept belongs to its superconcepts as well.

- (47) $R_i(\mathbf{x},\mathbf{y}) \ \& \ S_i(\mathbf{y},\mathbf{z}) \ \rightarrow \ R_i(\mathbf{x},\mathbf{z})$ (Krifka 1995: 403)

³⁴ This distinction between kinds and concepts, as pointed out by Krifka, is akin to the distinction between “conventional” kinds and “formal” kinds developed by Pelletier and Schubert (1989: 382).

Now let's consider how Krifka's new notion of "concept" may help to explain the earlier facts about modified NPs in Chinese. If we assume concepts, instead of kinds, to be the type of entities that the [Num-CL] complex really takes as arguments, then we can derive, as in (48a), the meaning of the complex to be a function that applies to a concept, and yields a set of objects that contains exactly three atoms that belong to that concept³⁵:

(48) a. Revised meaning of the [Num-CL] complex: (using concepts)

$$\| \text{san-ben 'three'-CL} \| \Rightarrow \lambda y^c \lambda x^i [\cup y(x) \wedge \text{CL}'(x)=3] \quad e^c \langle et \rangle$$

cf. b. Original meaning of the [Num-CL] complex: (using kinds)

$$\| \text{san-ben 'three'-CL} \| \Rightarrow \lambda y^k \lambda x^i [\cup y(x) \wedge \text{CL}'(x)=3] \quad e^k \langle et \rangle$$

By introducing the more general notion of concepts, the revised semantics, together with an appropriate generalization of the relevant operations, now offers an explanation for why the numeral classifier should be able to occur with NP arguments that are not kind-referring.

Secondly, as concepts, unlike kinds, can be construed literally from scratch and do not have to be well established, it is expected that the occurrence between the classifier and concept-denoting NP arguments should be highly productive and free of exceptions. This prediction is certainly borne out, as shown in (49a-d), where a numeral classifier freely combines with noun phrases modified by any kind or any number of adnominal adjuncts.

(49) a. yi-wei [lao] xiansheng
 one-CL old gentlemen
 'an old gentleman'

³⁵ We assume that \cup can be adjusted to incorporate an ontology with concepts.

- b. yi-wei [chuan lan xizhuang de] lao xiansheng
 one-CL wear blue suit DE old gentlemen
 ‘an old gentleman wearing a blue suit’
- c. yi-wei [wuhui-shang chuan lan xizhuang de] lao xiansheng
 one-CL party-at wear blue suit DE old gentlemen
 ‘an old gentleman wearing a blue suit at the party’
- d. yi-wei [zuowan wuhui-shang chuan lan xizhuang de] lao xiansheng
 one-CL last-night party-at wear blue suit DE old gentlemen
 ‘an old gentleman wearing a blue suit at the party last night’

Thirdly, because the set of kinds is only a subset of concepts (as discussed earlier), the revised semantics in (48a) will still allow for the classifier to take NP arguments that do refer to kinds, in the same way as the original semantics in (48b) did.

Finally, as concepts are abstract entities that are distinct from objects, the revised semantics will rule out the occurrence of classifiers with strictly object-referring terms - those that do not have corresponding concepts (such as pronouns and regular definites). As shown in (50), such occurrences are indeed ill-formed in Chinese³⁶.

- (50) a.* liang-wei ta / tamen
 two-CL he they
- b.* yi-wei na-wei xiansheng
 one-CL that-CL gentleman

³⁶ As predicted by the revised semantic approach, multiple numeral classifiers can never occur in a single noun phrase, because the application of one classifier to a common noun already yields an object-denoting term, something that can no longer combine with a second classifier (cf. (i) and (50b)).

(i)* yi-wei [na-wei xiansheng]
 one-CL that-CL gentleman

In sum, Krifka's introduction of "concepts" into his original kind-based approach offers a welcome solution to the problem posed by Chinese modified NPs. Not only is the new notion *general* enough to allow for a large variety of non-object-denoting NPs to combine with the classifier, it is also *restrictive* enough to prevent classifiers from taking NP arguments that have object-level references only.

3.6 Summary

In this chapter, I have examined the syntax and semantics of numeral classifiers, in their combinations with common nouns and determiners in full Chinese NPs. Adopting the basic idea of a formal theory proposed in Krifka 1995, I first introduced a meaning definition for the numeral classifier and its combination with a numeral, with the latter denotes a function that applies to a kind term and yields a measure function that measures the number of instantiations of that kind. This definition allows us to derive the meaning of a quantified or numeric Chinese NP compositionally. I then examined Chinese data extensively concerning a variety of nominal phrases with numeral classifiers, and presented empirical and syntactic evidence motivating the semantic analysis introduced by Krifka 1995. I proposed a minimal structure for Chinese NPs, assuming a morpho-syntactic relation between the numeral and the classifier. The proposed structure was argued to account for a wider range of data than alternative analyses in the literature.

I also discussed a potential problem for the proposed structure, raised by the observation that numeral classifiers sometimes occur in the absence of the numeral. I showed, however, that the apparent "stranding" of the classifier is not arbitrary, but is subject to special syntactic restrictions. In particular, I concluded that the numeral classifier can only occur without a hosting numeral when it occurs strictly local to a verb,

a demonstrative or a universal quantifier. This, I suggested, is derived from a *syntactic* operation that is independent of the *morphological* suffix-stem relation between the numeral and the classifier, and hence does not constitute a real problem for the proposed analysis. Finally, I studied the free occurrence of numeral classifiers with modified NPs that are not always interpretable as kind-referring expressions. Several possible directions towards explaining the occurrence were discussed, and the one suggested by Krifka himself was argued to be most promising.

Chapter IV: Chinese Quantified NPs & Distributivity

4.1 Introduction

In this chapter, I investigate the semantics of Chinese quantificational expressions in the nominal domain, with particular reference to their interaction with distributivity. In light of what we have discussed so far, Chinese common nouns are basically kind-denoting terms of type $\langle e \rangle$, and hence cannot directly combine with a numeral, in clear contrast to object-denoting common nouns in English. By requiring the presence of numeral classifiers to help identify the units out of which a quantificational or numeric expression can be built, Chinese nominal phrases generally involve a fuller structure than their English counterparts. Before exploring the significance of the role of classifiers in the interpretation of Chinese NPs, I will first examine the semantics of Chinese quantified NPs.

Barwise and Cooper 1981, in their seminal work extending the approach of Montague 1973, claim that all NPs should be analyzed as *generalized quantifiers* over the individual domain. It is predicted, in a stronger form, that all languages should have nominal phrases that are “essentially quantificational”, denoting sets of sets of individuals. This is supported by many languages including English, which are known to make use of two distinct means of quantificational expressions, *D-quantifiers* and *A-quantifiers* (following the terminology in Partee et al 1987). As noted in Partee (1995: 544), “‘D’ is mnemonic for Determiner, ‘A’ for the cluster of Adverbs, Auxiliaries, Affixes, and Argument-structure Adjusters, all of which can be thought of as alternative ways of introducing quantification in a more ‘constructional’ way (Carlson 1983)”. While D-quantification is

associated with NPs, A-quantification is typically associated with VPs, as shown in (1a-b):

- (1) a. [_{DP} *Most* [_{NP} quadratic equations]] have two different solutions. - *D-quantifier*
 b. A quadratic equation [_{VP} *usually* [_{VP} has two different solution]].- *A-quantifier*

However, converging evidence from recent cross-linguistic research also indicates that while all languages have *A-quantification*, some languages may lack *D-quantification*. Straits Salish (Jelinek 1995), Mohawk (Baker 1995), Navajo and Lakhota (Faltz 1995), for example, have been independently argued to fall under the second category, and the unique structural properties of “pronominal argument languages”³⁷ (cf. Jelinek 1984) are among the major factors argued to be responsible.

The quantificational structure in Mandarin Chinese is of both empirical and theoretical interest to this typological study. A popular suggestion in recent literature (Lee 1986, Baker 1995, Li 1997, etc.) has been that Chinese may lack purely quantificational NPs, based on characteristics of Chinese quantified NPs that are quite different from those of standard D-quantifiers. If the suggestion were true, it would be important to determine from what language-particular properties this should follow, given the fact that Chinese does not qualify as a “pronominal argument language”³⁸ (cf. Jelinek 1984). If the suggestion turns out to be false, however, the task becomes how to

³⁷ A “pronominal argument language”, according to Jelinek (1984, 1989), is a language in which the relations among different parts of a sentence are established by *pronominal coreference* rather than by direct complementation. Examples of such languages include Mohawk, Mayali and Asurini, and are sometimes also referred to as “non-configurational languages” (cf. Hale 1983, Jelinek 1984, Baker 1995, etc.).

³⁸ As a typical characteristic of pronominal nominal languages like Warlpiri, nominals do not have fixed positions in the clause corresponding to their grammatical functions, thus leading to the relatively free word order of the language (Jelinek 1984). In Chinese, however, “the lack of case marking makes it necessary for nominals, when present, to appear in an order that reflects

account for apparently non-quantifier-like characteristics of Chinese quantified NPs, some of which are shared by quantified NPs in languages such as Japanese and Indonesian.

In this chapter, I will argue for the second hypothesis, namely that Chinese is like English in having quantificational expressions of both kinds, D-quantifiers as well as A-quantifiers. I will first discuss some characteristics of Chinese quantifiers that are distinct from those of standard D-quantifiers (in Section 4.2), and argue for an analysis of these NPs as generalized quantifiers built up over plural individuals (in Section 4.3). In effect, I will suggest a compositional approach with quantifiers contributing quantificational force and distributive operators introducing distributivity.

It should be pointed out that the proposed approach is inspired by, and in many ways similar to Lin's 1998 account, but a crucial difference has to do with the status of the classifier. While Lin does not make any reference to the classifier, its semantic contribution is essential for me. This should become obvious when I discuss two major consequences of the proposed approach, one having to do with distributivity in Chinese universal quantifiers (Section 4.4) and the other with the semantics of definite plurals (Section 4.5). In Section 4.6, I address a problem posed by the occurrence of Chinese quantified NPs in postverbal contexts, and suggest an account deriving their distribution in both postverbal and preverbal positions. Finally, a comparative study between the present account and alternative accounts (including Lin's) will be presented in Section 4.7.

their grammatical functions" (Jelinek 1984: 73) (also see Huang 1982 for a detailed discussion on the notion of configurationality and its relevance to the sentential structure of Chinese).

4.2 The problem

To begin with, let's consider two rather puzzling facts concerning the distribution and scope interaction of Chinese quantified NPs. First, Chinese quantifiers in preverbal position have to occur with *dou* 'all'³⁹, as shown in (2).

- (2) Mei-ge / Dabufen-de / Suoyou⁴⁰-de xuesheng *(dou) lai-le.
 every-CL most-DE all-DE student all come-Asp
 'Every / Most / All student(s) came.'

This is surprising, because standard quantifiers such as English QPs can and must occur without *all*, as shown in (3).

- (3) Every / Most / All student(s) (*all) came.

Dou 'all' can also occur optionally with plural definites, and semantically functions as an overt distributive (D-)operator (cf. Liu 1990, Lin 1998). This is illustrated by the contrast in (4a-b), where a distributive reading on the subject NP is possible only when *dou* also occurs in the sentence.

- (4) a. Yuehan he Mali mai-le yi-ben shu. - *distributive reading impossible*
 John and Mary buy-Asp 1-CL book
 'John and Mary (together) bought a book.'
- b. Yuehan he Mali dou mai-le yi-ben shu. - *distributive reading possible*
 John and Mary all buy-Asp 1-CL book
 'John and Mary (each) bought a book.'

³⁹ Not all quantifiers require the occurrence of *dou*. One such exception is *henduo* 'many', possibly due to its lexical ambiguity between a cardinal and a quantificational reading.

⁴⁰ Though both are glossed as 'all', *suoyou* is a determiner while *dou* is an adverb.

Such a D-operator is generally assumed to be covertly available in an English sentence involving plural subjects such as (5). So the sentence is ambiguous between a collective and a distributive reading.

- (5) John and Mary wrote a book.
- i. John and Mary together wrote a book. - *collective*
 - ii. John and Mary each wrote a book. - *distributive*

Another fact about Chinese quantified NPs has to do with their *scope interaction* with other quantifiers. At first glance, examples (6a-b) seem to suggest that the scope of a quantifier is determined by its own surface position, as the universal appears to scope higher when *mei* ‘every’ occurs before the existential NP in (6a), and vice versa in (6b).

- (6) a. Mei-yi-ben shu dou you yi-ge ren mai-le⁴¹. " >\$
 every-1-CL book all have 1-CL man buy-Asp
 ‘Every book is such that someone bought it.’
- b. You yi-ge ren mei-yi-ben shu dou mai-le. \$ >"
 have 1-CL man every-1-CL book all buy-Asp
 ‘Someone is such that he bought every book.’

However, the sentence in (7) makes it clear that what really fixes the scope of the quantifier is the D-operator *dou*, not the quantifier itself, because the universal has lower scope than the existential NP, even though *mei* appears before the existential NP.

- (7) Mei-yi-ben shu you yi-ge ren dou mai-le. \$ >"
 every-1-CL book have 1-CL man all buy-Asp
 ‘Someone is such that he bought every book.’

⁴¹ (6a-b) are adapted from Lin (1998: his (69a-b)), with negation omitted here for the sake of simplicity.

Given the above characteristics of Chinese quantified NPs, it has been suggested in recent literature that these NPs are *not* quantificational by nature, but have gained their apparent quantificational force from external operators like *dou*. Lee 1986, for example, proposes a variable-based approach along the lines of Lewis 1975. Lin 1998 also suggests a non-quantificational account for some Chinese quantifiers such as *mei* ‘every’. I will discuss both approaches in some detail and comment on them in Section 4.7.

What we have seen so far certainly raises a lot of questions about Chinese quantified NPs, and in this chapter, I would like to address the following three: 1) Why are Chinese quantifiers compatible with *dou*, while English quantifiers are not with *all*? 2) Where does the variation in quantificational force among Chinese D-quantifiers come from? And 3) why should scope of Chinese quantifiers be determined by the position of *dou*?

4.3 The analysis

To begin with, I propose that *all* Chinese quantified NPs should be analyzed as generalized quantifiers built up from plural individuals, whose internal compositions vary from one to another, as shown by the denotations of quantifying determiners in (8a-c) below. The determiner *mei* ‘every’, for example, denotes a function from a property P to a generalized quantifier introducing the *maximal* sum individual X such that its atomic parts each has the property P and the sum X is contained in the set of Q-denoting individuals.

- (8) a. $\| mei \text{ ‘every’} \| = \lambda P \lambda Q [\exists X (\forall x (x \in X \leftrightarrow P(x)) \wedge Q(X))]$
 b. $\| suoyou \text{ ‘all’} \| = \lambda P \lambda Q [\exists X (\forall Y (Y \subseteq X \leftrightarrow P(Y)) \wedge Q(X))]$
 c. $\| dabufen \text{ ‘most’} \|$ (following Yabushita 1989, Lin 1998)
 $= \lambda P \lambda Q [\exists Z \exists X (\forall Y (Y \subseteq X \leftrightarrow P(Y)) \wedge Z \subseteq X \wedge Q(Z) \wedge |Z| > |X| - |Z|)]$

Here, while assuming a similar denotation for *dabufen* ‘most’ as Lin 1998 (who follows a proposal by Yabushita 1989), my analysis departs from that of Lin’s crucially in the analysis of the universal quantifying determiner *mei* ‘every’. Unlike Lin who treats *mei*-NPs semantically on a par with definite plurals and attributes their universal force solely to *dou*, I analyze *mei* as a generalized quantifier, in exact parallel to other Chinese quantifiers (see Section 4.7 for more on this).

Given the proposed semantics, let’s now consider the three questions raised at the end of the last section. First, Chinese quantified NPs are all built up from plural individuals (i.e. X in the formulas in (8)), and thus they are predicted to be able to combine with *dou*, for the same reason why English plural NPs can combine with *all* in a standard quantificational approach⁴². By contrast, English quantifiers are inherently distributive, and do not make available any plural individual for *all* to be associated with, as illustrated in (3) earlier.

Secondly, under my analysis, although Chinese quantifiers all introduce plural individuals, these generalized quantifiers crucially differ from each other with respect to their internal structures. This, I claim, is what gives rise to the variation in their quantificational force. For example, while *dabufen*-NPs introduce *majority* sum individuals with a certain property, *mei*-NPs introduce the *greatest* of such sums. As a result, the quantificational force we get for *dabufen*-NPs is “most”, and for *mei*-NPs it is “universal”.

As for the third question, let’s take *mei* as an example to see how the quantifier interaction facts may be derived under the current analysis. Recall my earlier examples in (6a-b) (repeated below). Schematically they are represented in (9a-b), where the scope of

a quantifier is always determined by *dou*, regardless of the surface position of the quantifier itself.

- (6) a. Mei-yi-ben shu dou you yi-ge ren mai-le. " >\$
 every-1-CL book all have 1-CL man buy-Asp
 'Every book is such that someone bought it.'
- b. Mei-yi-ben shu you yi-ge ren dou mai-le. \$ >"
 every-1-CL book have 1-CL man all buy-Asp
 'Someone is such that he bought every book.'



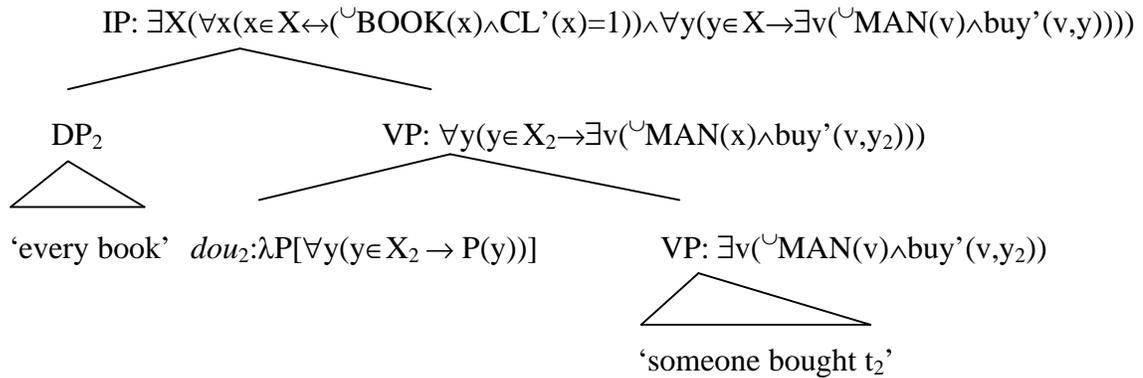
First of all, let's flesh out the meaning of the quantified NP. Following the Neocarlsonian approach to Chinese common nouns as kinds and classifiers as individuating instantiations of kinds that we defended in the previous two chapters, the complement of *mei*, i.e. *yi-ben shu* '1-CL book', denotes the set of individuals that are instantiations of the book-kind (cf. Chapter 3). When this combines with *mei*, we get the denotation in (10), which is the set of properties of being the greatest sum of books. Note again that in the formula, CL' corresponds to OU in Krifka's original theory, which stands for 'Object-Unit'.

- (10) $\| mei-yi-ben shu \| = \lambda Q[\exists X(\forall x(x \in X \leftrightarrow (\cup \text{BOOK}(x) \wedge \text{CL}'(x)=1)) \wedge Q(X))]$
 every-1-CL book

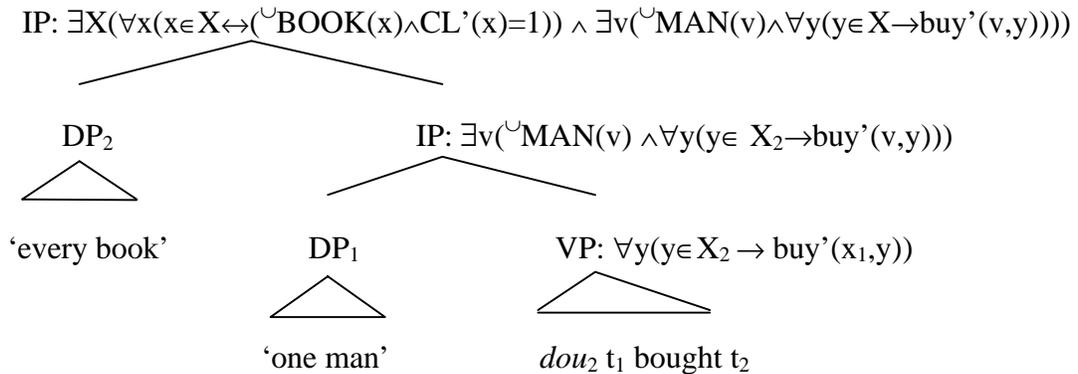
⁴² But see Brisson 1998 for a proposal of a non-quantificational approach to *all*.

The final meaning for (8a-b) can then be derived as in (11a-b), respectively.

(11) a.



b.



As indicated in the logical forms in (12a-b) below (taken from the final representations derived in (11a-b)), both sentences in (8) introduce a maximal sum of books X . While every book in that sum is bought by the same person in (8b), it is bought by someone possibly different in (8a).

(12) The final meanings for (8a-b):

a. $\exists X(\forall x(x \in X \leftrightarrow (\cup \text{BOOK}(x) \wedge \text{CL}'(x) = 1)) \wedge \forall y(y \in X \rightarrow \exists v(\cup \text{MAN}(v) \wedge \text{buy}'(v, y))))$

($\$max >$ "book" $\$man$)

$$\text{b. } \exists X(\forall x(x \in X \leftrightarrow (\cup \text{BOOK}(x) \wedge \text{CL}'(x)=1))) \wedge \exists v(\cup \text{MAN}(v) \wedge \forall y(y \in X \rightarrow \text{buy}'(v,y)))$$

(\$max > \$man > " book)

The scope effects are, therefore, explained by the proposal that the *mei*-NP functions as a quantifier contributing the universal force, while distributivity is introduced by *dou*. Although the final meaning of a Chinese *mei*-sentence appears similar to that of an English *every*-sentence, it is built up rather differently.

Note that for the derivation in (11b) above, I have modified the standard meaning for the D-operator *dou* so that it contains a free variable X_2 , as shown in (13) below. And to make sure that the free variable gets bound only by its appropriate antecedent, we can appeal to coindexation, which triggers λ -abstraction over the free variable in *dou*. One advantage of this semantics is that it allows for the derivation of non-local associations between *dou* and its antecedent. As shown in (11b), ‘every book’ and *dou* are separated by another intervening noun phrase. So the free variable X_2 in *dou* should be bound after the subject trace x_1 gets bound.

$$(13) \quad \| \text{dou} \| = \lambda P[\forall y(y \in X_2 \rightarrow P(y))]$$

$$\text{cf. } D \Rightarrow \lambda P \lambda X[\forall y(y \in X \rightarrow P(y))] \quad (\text{Link 1987})$$

Now, it should be fairly clear how this approach can be extended to other quantifiers in Chinese. Under the assumption that all quantified NPs introduce a plural individual, and distributivity comes in only when they combine with *dou*, it is predicted that all Chinese quantifiers should behave identically in terms of scope interactions. This is indeed true, as shown in (14a-b) and (15a-b).

$$(14) \quad \text{a. Dabufen-de shu dou you yi-ge ren mai-le.} \quad \text{most} > \$$$

most-DE book all have 1-CL man buy-Asp

‘Most books are such that for each one of them, someone bought it.’

- b. Dabufen-de shu you yi-ge ren dou mai-le. $\$ > most$
 most-DE book have 1-CL man all buy-Asp
 ‘Someone is such that he bought most books.’
- (15) a. Suoyou-de shu dou you yi-ge ren mai-le. $all > \$$
 all-DE book all have 1-CL man buy-Asp
 ‘All books are such that for each one of them, someone bought it.’
- b. Suoyou-de shu you yi-ge ren dou mai-le. $\$ > all$
 all-DE book have 1-CL man all buy-Asp
 ‘Someone is such that he bought all (the) books.’

Summing up the results so far, I have shown that the scope interaction facts do not entail lack of quantificational force in Chinese quantifiers, but follow from the suggested relation between these quantifiers and the D-operator *dou*. The answers I have given here to the earlier three questions would also be available, modulo differences in detail, in Lin’s 1998 approach to some quantifiers such as *dabufen* ‘most’. In Section 4.4 and Section 4.5, however, I will look at some facts where our approaches make different predictions.

4.4 Contrast in distributivity: *mei*-NPs vs. *suoyou*-NPs

Recall that under the current analysis, the two universal quantifiers *mei*-NPs and *suoyou*-NPs are defined very similarly, as shown in (8a-b) (repeated below). This is fine as far as their scope interactions are concerned, because as we have seen in the last section, the patterns are very similar.

- (8) a. $\| mei \text{ ‘every’} \| = \lambda P \lambda Q [\exists X (\forall x (x \in X \leftrightarrow P(x)) \wedge Q(X))]$
 b. $\| suoyou \text{ ‘all’} \| = \lambda P \lambda Q [\exists X (\forall Y (Y \subseteq X \leftrightarrow P(Y)) \wedge Q(X))]$

However, further examples show that the two quantifiers behave differently in terms of distributivity. For example, in a context where *suoyou* ‘all’ allows for both distributive and collective readings, *mei* ‘every’ forces distributive readings, as illustrated in (16).

- (16) a. Mei-yi-ge ren dou kang-zhe yi-ge xiangzi. - *distributive only*
 every-1-CL man all carry-Asp 1-CL box
 ‘Every person was carrying a box.’
- b. Suoyou-de ren dou kang-zhe yi-ge xiangzi. - *distributive/collective*
 all-DE man all carry-Asp 1-CL box
- i. ‘All the people were carrying a box (together).’
- ii. ‘All the people were carrying a box (each).’

Suppose there is a group of five people and a number of big boxes in the discourse. (16a) can be uttered felicitously only in a situation where each one of these people is carrying a box, whereas (16b) is also compatible with a situation where the five people are carrying the same big box (together), hence allowing for both distributive and collective readings.

To account for this contrast in distributivity, I suggest that the difference comes, not from any inherent meaning distinction between the two quantifiers, but from the fact that while the Chinese determiner *suoyou*, like *dabufen* ‘most’, only combines with a bare nominal, the determiner *mei* combines with a full-fledged NP that contains a numeral-classifier complex. And the fact that the numeral in a *mei*-NP is always understood to be *yi* ‘one’, whether it is overt or covert, in effect forces the strict distributivity in the final interpretation of Chinese *mei*-NPs. Let’s now consider this idea in some detail.

First, in order to derive the ambiguity in (16b), I follow Lin 1998 to assume a generalized D-operator meaning for *dou*, that is, a D-operator sensitive to contextual

covers in the sense of Schwarzschild 1996⁴³, except that the variable X_2 is still left free, as shown in (17).

$$(17) \quad \| dou \| = \lambda P[\forall y((y \in \|cov\| \wedge \|cov\| \subseteq X_2) \rightarrow P(y))] \quad (\text{adapted from Lin 1998})$$

Therefore, the final interpretations for (16a-b) can be derived as in (18a-b).

$$(18) \quad \begin{aligned} \text{a. } & \exists X(\forall x(x \in X \leftrightarrow (\cup \text{MAN}(x) \wedge \text{CL}'(x)=1)) \\ & \wedge \forall u((u \in \|cov\| \wedge \|cov\| \subseteq X) \rightarrow \exists v(\cup \text{BOX}(v) \wedge \text{carry}'(u, v)))) \\ \text{b. } & \exists X(\forall Y(Y \subseteq X \leftrightarrow \cup \text{MAN}(Y)) \\ & \wedge \forall u((u \in \|cov\| \wedge \|cov\| \subseteq X) \rightarrow \exists v(\cup \text{BOX}(v) \wedge \text{carry}'(u, v)))) \end{aligned}$$

Let's now consider what readings may be available for each of these sentences, depending on the value of the covers that are made salient by the context. As shown in (18b), the *suoyou*-sentence is predicted to be ambiguous, because mentioning the bare noun *ren* 'man' allows the context to make salient not only the cover containing individual men, but also a single-cell cover containing all the individuals as a group. Therefore, in a situation like (19), where a, b, c are the only three men in the context, the sentence will allow for (at least) Cov-1 and Cov-2 to be picked up by the D-operator *dou*. Given the right discourse, the mixed Cov-3 is also a potentially possible cover to be made salient.

⁴³ The notion of a generalized D-operator is first introduced by Gillon 1987, and then formally developed by Schwarzschild (1991, 1996) to handle intermediate-level readings (with respect to distributivity), as illustrated in (i):

(i) The men wrote operas. (Gillon 1987: 211)

As pointed out by Gillon, in a situation where *the men* refers to Mozart, Handel, Gilbert, and Sullivan, the above sentence can be uttered truthfully, on a reading that is neither strictly collective nor strictly distributive, because the four men did not work on any opera together, nor did Sullivan or Gilbert write an opera on his own. Such intermediate readings pose problems for the traditional notion of D-operators, which can only handle strictly collective or distributive readings. See the cited works for more details on this issue.

(19) Cov-1 = {{a}, {b}, {c}}

Cov-2 = {{a b c}}

Cov-3 = {{a b}, {c}}...

in a situation where || *ren* 'man' || = {a, b, c}.

In the *mei*-sentence, however, an additional numeral-classifier complex is explicitly mentioned, whose semantic function is to individuate the level of quantification (as discussed in Chapter 3) and in effect *constrain* the choice of covers. As the *yi*-classifier complex in the *mei*-NP makes salient only one-membered sets, a cover like Cov-2 or Cov-3 that has cells of multiple cardinality could not also be salient. As a result, any reading that is not strictly distributive is impossible.

The proposed analysis, therefore, shows compositionally how the above contrast between a *mei*-sentence and a *suoyou*-sentence can be derived. A puzzle still remains, though, as for why, among the quantifying determiners we have discussed so far, *mei* should be the only one that takes a numeral-classifier argument. I do not intend to suggest an explanation here, but would like to point out another fact that could well be correlated with the above fact. That is, among the quantifiers examined so far, the *mei*-NP is also the only quantifier in Chinese that is strictly distributive in the context of *dou*. If the two facts are indeed correlated, it should lend some support to my hypothesis that the strict distributivity in the *mei*-NP crucially has to do with the semantic function of the numeral-classifier complex contained in the NP.

4.5 Individual-level & set-level classifiers

Another interesting consequence of the current account concerns the distinction between individual-level and set-level classifiers. As shown by the contrast between (20a) and (20b), which differ merely in the choice of classifier in the *mei*-NP, it is clear that the classifier plays a crucial role in dictating the level of distribution by *dou*.

- (20) a. Mei-yi-tao shu dou you yi-ge ren mai-le.
 every-1-CL^{set} book all have 1-CL man buy-Asp
 ‘For every set of books, there is someone who bought that set.’
- b. Mei-yi-ben shu dou you yi-ge ren mai-le.
 every-1-CL^{copy} book all have 1-CL man buy-Asp
 ‘For every book, there is someone who bought that book.’

So (20a) can be uttered felicitously in a situation where there are many *sets* of books and for each set there is someone who bought that set. But in (20b), we are talking about *individual* books being bought by someone possibly different. As shown in the formulas in (21), the current account derives this contrast, by allowing the classifier to contribute to the meaning of the universal NP. Here, CL^{set} and CL^{copy} correspond to ‘Set-Unit’ and ‘Object-Unit’ (along the lines of Krifka 1995).

- (21) a. $\exists X(\forall x(x \in X \leftrightarrow (\cup \text{BOOK}(x) \wedge \text{CL}^{\text{set}}(x) = 1)) \wedge \forall u(u \in X \rightarrow \exists v(\cup \text{MAN}(v) \wedge \text{buy}'(v, u))))$
 b. $\exists X(\forall x(x \in X \leftrightarrow (\cup \text{BOOK}(x) \wedge \text{CL}^{\text{copy}}(x) = 1)) \wedge \forall u[u \in X \rightarrow \exists v(\cup \text{MAN}(v) \wedge \text{buy}'(v, u))])$

Recall that a crucial difference between Lin’s 1998 approach and mine has to do with the status of the classifier. It should be evident by now that the numeral-classifier complex makes significant semantic contributions, both in dictating the level of distribution here and in constraining the choice of Cov earlier (in Section 4.4) and. This could not be handled by Lin’s approach.

So far the universal quantifier *mei* seems rather like a definite determiner. But in point of fact there is a crucial meaning difference between the two. When they are combined with a set-level classifier, it becomes obvious that the two determiners give rise to distinct interpretations with respect to distributivity, as shown in (22a). This sentence minimally differs from (20a) in the choice of determiner, between a demonstrative in (22a) and *mei* in (20a).

- (22) a. Nei-yi-tao shu dou you yi-ge ren mai-le.
 that-1-CL^{set} book all have 1-CL man buy-Asp
 ‘For every book in that set, there is someone who bought that book.’
- b. $\forall u(u \leq tX. (\cup \text{BOOK}(X) \wedge \text{CL}^{\text{set}}(X)=1) \rightarrow \exists v(\cup \text{MAN}(v) \wedge \text{buy}'(v, u)))$

Take a situation with ten books, with each half making up a set. (20a) requires that for each set x , x be bought by someone, while (22a) says that one of the sets is the unique set of books that is salient in the context, and each book in that set is bought by someone. Intuitively, we want the universal *mei* to have the effect of blocking the D-operator *dou* from looking into the unit denoted by the classifier, while the demonstrative *nei* seems completely transparent in that capacity. This is predicted by the current analysis.

4.6 Occurrence of Chinese quantified NPs with D-operators

We have seen earlier that when a quantifier occurs preverbally, *dou* is required (cf. (23b)). But as shown in (23a), there is no such requirement when a quantifier occurs postverbally⁴⁴. In this section, I will suggest an account that derives the distribution of Chinese quantifiers at both preverbal and postverbal positions.

⁴⁴ Lin 1998 did not consider the postverbal occurrence of Chinese quantifiers, due to the marginality of some of the sentences containing postverbal quantifiers such as (i).

- (23) a. Wo renshi (zheli) mei-ge / dabufen-de / suoyou-de xuesheng.
 I know here every-CL most-DE all-DE student
 ‘I know every / most / all student(s) (here).’
- cf. b. Mei-ge / Dabufen-de / Suoyou-de xuesheng *(dou) lai-le.
 every-CL most-DE all-DE student all come-Asp
 ‘Every / Most / All student(s) came.’

4.6.1 D-on-V & D-on-VP

Laserson 1998, among others (Partee and Rooth 1983, Keenan and Faltz 1985, Brisson 1998, etc.), suggests that a D-operator on plural arguments can occur at both the VP- and V-level. As shown below, (24a) is ambiguous because the covert D-on-VP distributes the VP *built a raft* over the plural subject *the boys*, and (24b) is ambiguous because the covert D-on-V distributes the verb *kiss* over the object *the three girls*.

- (24) a. The boys built a raft. *Covert D-on-VP*
 i. The boys built a raft together.
 ii. The boys each built a raft.
- b. That boy kissed the three girls. *Covert D-on-V*
 i. That boy kissed the three girls together as a group.
 ii. That boy kissed the three girls individually.

-
- (i) ?? Wo kan-le mei-yi-ben shu. (Lin 1998: his (29a))
 I read-Asp every-1-CL book
 ‘I read every book.’

However, I will include these sentences in my account, for two reasons: 1) As is discussed in Lee 1986, these sentences are not ungrammatical, and 2) secondly, there are many Chinese sentences with postverbal quantifiers that are just as natural as the ones without them. While I leave the marginality of examples like (i) as an open question for future study, all the examples I consider in this section are both grammatical and natural.

Recall my earlier discussion on (3a-b) (repeated below) that Chinese *dou* is an overt D-operator, without which distributive readings are impossible.

- (3) a. Yuehan he Mali mai-le yi-ben shu. *distributive reading impossible*
 John and Mary buy-Asp 1-CL book
 ‘John and Mary (together) bought a book.’
- b. Yuehan he Mali dou mai-le yi-ben shu. *distributive reading possible*
 John and Mary all buy-Asp 1-CL book
 ‘John and Mary (each) bought a book.’

So the contrast shows that Chinese lacks a covert D-operator at the VP level, and *dou* is needed in order to express distributivity on plural subjects.

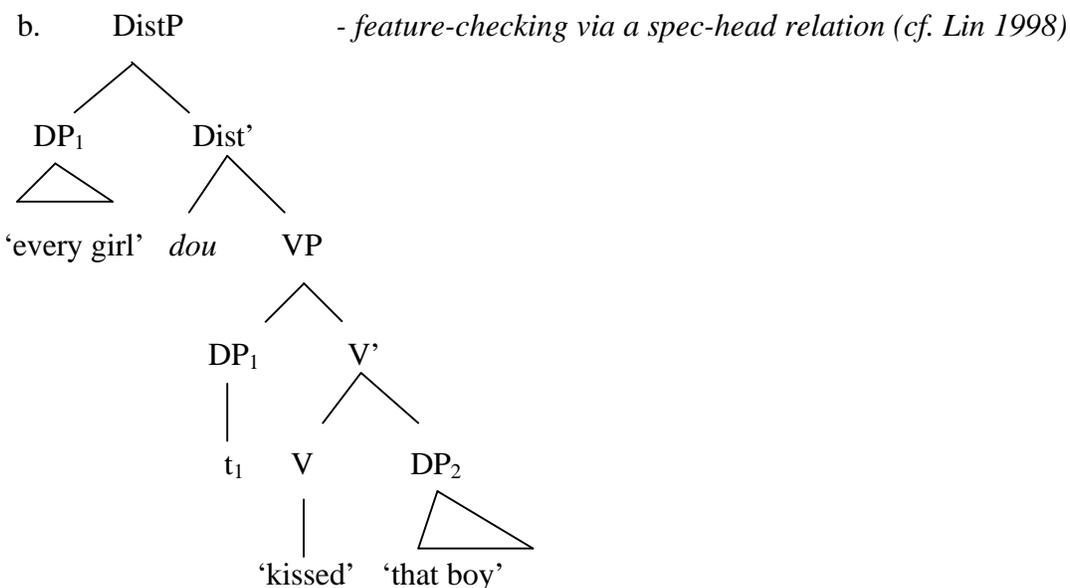
What about the D-operator at the V-level, then? We need to examine sentences involving plural objects. As shown in (25), a sentence involving a plural object is ambiguous between a collective and a distributive reading.

- (25) Zuotian ta baifang-le Yuehan he Mali. *collective/distributive*
 yesterday he visit-Asp John and Mary
 i. ‘Yesterday he visited John and Mary together.’
 ii. ‘Yesterday he visited John and Mary individually.’

Therefore, it seems that while *dou* functions as an overt D at the VP level, Chinese also has a covert D-operator operating at the V-level.

Let’s now consider the question why these D-operators are required by a quantified NP, beginning with the preverbal case, as illustrated in (26a-b).

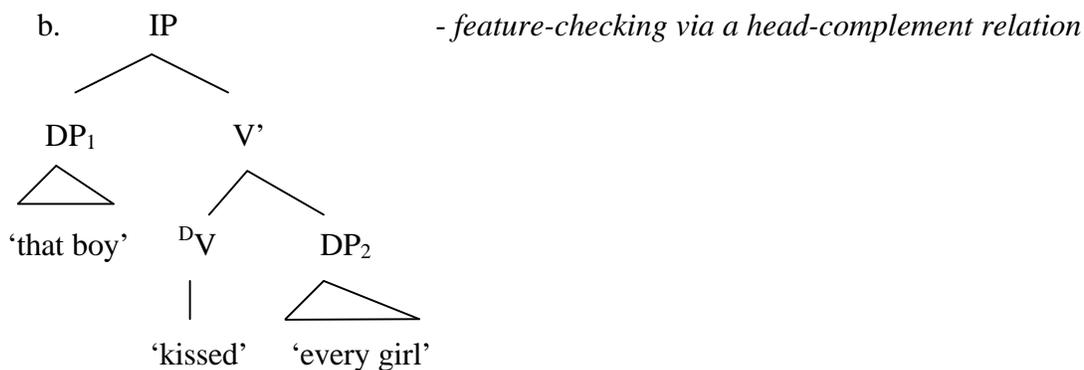
- (26) a. Mei-yi-ge nuhai dou qin-guo nei-ge nanhai. *Overt D-on-VP*
 every-1-CL girl all kiss-Asp that-CL boy
 ‘Every girl kissed that boy.’



According to Lin 1998, the quantified NP has a distributive-quantificational feature that needs to be checked. As *dou* projects a DistP (following Beghelli and Stowell's 1997 proposal), it can thus check the feature of the quantifier via a spec-head relation.

But, what about the postverbal case? As discussed earlier, Chinese quantified NPs also occur in postverbal position, and they do so without *dou*. I assume that this fact has to do with the covert D-operator on the V-level. Just as *dou* can license a preverbal quantifier via feature checking, the covert D-on-V can license a postverbal quantifier by checking its feature within a head-complement configuration, as illustrated in (27a-b).

- (27) a. *Nei-ge nanhai qin-guo mei-yi-ge nuhai.* *Covert D-on-V*
 that-CL boy kiss-Asp every-1-CL girl
 'That boy kissed every girl.'



As for the semantic interpretation, postverbally quantifiers work in exactly the same way as they do preverbally, in that they contribute varying quantificational force, with the D-operator contributing distributivity⁴⁵.

4.6.2 Evidence from scope interactions between postverbal quantifiers

Witness the following scope relations between the universal *mei*-NP and an existential NP in double object sentences:

- (28) a. Wo song-le mei-ge ren yi-ben shu. " >\$
 I give-Asp every-CL man 1-CL book
 'Every one is such that I gave him/her a book.'

⁴⁵ The suggested account also makes some predictions about Chinese sentences containing multiple plural NPs. For example, it seems that English sentences containing a plural NP at both preverbal and postverbal positions can be many-way ambiguous depending on whether or not each of the plural NPs is interpreted distributively, as shown in (i). However, similar Chinese sentences without *dou* are predicted to lack distributivity on the subject, but not on the object. This prediction seems to be borne out by (ii). I'm grateful to Uli Sauerland for a question he raised at the SALT X conference concerning this point.

- (i) The three boys bought two cars.
 (ii) Nei-san-ge nanhai mai-le liang-bu che.
 that-3-CL boy buy-Asp 2-CL car
 'The three boys together bought two cars.'
 * 'The three boys each bought two cars.'

In (29a-b), I assume a VP-shell structure for the Chinese double object construction (following Larson 1987, Aoun and Li 1989), which has a particularly interesting consequence for our case at hand. This is because in a sentence with two postverbal quantifiers, each quantifier will necessarily occur *locally* to a verb, and also to the covert D-operator on that verb, as shown in the tree structures in (29). As a result, in the postverbal context, the position of a quantifier is indistinguishable from that of a D-operator, which determines the scope. Therefore, it is predicted that the scope of a quantifier in the postverbal context should match its own position.

In sum, to express distributivity, Chinese uses an overt D-operator on the VP-level, but a covert D-operator on the V-level. This hypothesis is, of course, not the first instance of a language using zero-vs.-overt morphology to mark two opposite grammatical or semantic features. It is a cross-linguistic fact that a language may use zero morphology for some default value of a feature, and special morphology for others. Just as English uses zero-vs.-special morphology to mark the present-vs.-past tense, and to mark Agr.O-vs.-Agr.S as suggested in some syntactic framework, I am suggesting here that Chinese happens to use zero morphology for the D-on-V, and overt morphology for the D-on-VP⁴⁶.

4.6.3 The Postverbal Constraint

We have seen that positing a VP shell structure accounts for the scope relations between postverbal elements. Let us now see if this can be independently motivated.

There is a well-known “Postverbal Constraint” in Chinese, which prohibits more than one syntactic constituent from occurring after a verb, as given in (30):

⁴⁶ I thank Maria Bittner and Roger Schwarzschild for bringing this point to my attention.

(30) The “Postverbal Constraint”:

At most one constituent may follow a verb in a Chinese sentence.

The constraint has triggered a great deal of interest in the descriptive and theoretical literature on Chinese syntax (Chao 1968, Huang 1982, Travis 1984, Li 1990, Sybesma 1992, etc.). As intriguing as it may seem to be, extensive arguments have been suggested in the Chinese literature in support of the constraint. For the modest purpose of this subsection, which is to find some independent motivation for the VP-shell structure, I will review just one important argument suggested in the Chinese literature, based on the distribution of Chinese locative PPs in relation to the verb (see the cited works for more details).

To begin with, there is a well-known contrast in grammaticality that has to do with the relative position between locative PPs and the verb in Chinese sentences (Chao 1968, Travis 1984, etc.). As illustrated in (31) and (32), such contrasts seem to suggest that Chinese locative PPs are not always allowed to occur after the verb.

- (31) a. Ta [PP zai wu-li] kanshu. - *preverbal*
 he at room-inside read
 ‘He is reading in the room.’
- b.* Ta kanshu [PP zai wu-li]. - **postverbal*
 he read at room-inside
- (32) a. Ta [PP zai yi-lou] deng ni. - *preverbal*
 he at one-floor wait you
 ‘He is waiting for you on the first floor.’
- b.* Ta deng ni [PP zai yi-lou]. - **postverbal*
 he wait you at one-floor

Further examples indicate that the above generalization does not hold for all locative PPs. In fact, there are adjunct PPs that have to occur after a main verb, as illustrated in (33-34) below.

- (33) a. *Ta [PP zai shui-li] die. - **preverbal*
 he at water-inside fall
- b. Ta die [PP zai shui-li] le. - *postverbal*
 he fall at water-inside Asp
- ‘He fell in the water.’
- (34) a. *Nei-ben shu, ta [PP zai zhuo-shang] fang le. - **preverbal*
 that-CL book he at table-top put Asp
- b. Nei-ben shu, ta fang [PP zai zhuo-shang] le. - *postverbal*
 that-CL book he put at table-top Asp
- ‘As for that book, he put (it) on the table.’

In his in-depth examination of Chinese sentences with locative PPs, Sybesma 1992 suggested that whether or not a PP can occur after a verb crucially depends, not on the choice of the PP itself, but on the relation the PP entertains with the verb. The right generalization, according to Sybesma, is that prepositional phrases that serve as “predicative complements” to a verb exclusively occur *after* the verb, whereas adjunct PPs always appear *before* a verb. This, he suggested, is predicted by Travis’ 1984 generalization that Chinese adverbial expressions may only occur preverbally.

Sybesma’s conclusion receives immediate support from our earlier examples in (33-34), where each of the b-sentences involves a main verb that subcategorizes for a locative PP, leading to a resultative interpretation for the sentence. In fact, the same sentences become unacceptable as soon as the locative PPs are left out, as shown in (35a-b):

- (35) a. ?*Ta die le.
 he fall Asp
 ‘He fell.’
- b. * Nei-ben shu, ta fang le.
 that-CL book he put Asp
 * ‘*As for that book, he put (it).’

Further evidence in support of Sybesma’s conclusion can be found from examples such as (36a-b) (which are adapted from Sybesma 1992).

- (36) a. Ta [PP zai shui-li] tiao. - *preverbal*
 he at water-inside jump
 ‘He is jumping in the water.’
- b. Ta tiao [PP zai shui-li]. - *postverbal*
 he jump at water-inside
 ‘He jumped into the water.’

For one thing, the fact that (36a) is well-formed suggests that there is nothing in the choice of the PP itself (*zai shui-li* ‘in the water’) that prevents it from occurring before a verb. It is rather the relation between the PP and the verb that is responsible for their distributions.

More importantly, (36a-b) illustrate an important contrast in interpretation between Chinese sentences with preverbal PPs and those with postverbal PPs, as has long been recognized in the literature (Chao 1968, Travis 1984, etc.). In particular, while (36a) means that the jumping event is taking place in the water, (36b) means that *ta* ‘he’ ends up in the water as a result of a jumping event. As pointed out by Sybesma, the postverbal

PP entertains a closer relation with the verb than the preverbal one, in that the former is a predicative complement to the verb while the latter is only an adjunct.

Now, the relevance of Sybesma's conclusion to our discussion of the Postverbal Constraint is as follows. The distinction between preverbal and postverbal PPs in terms of their relations with the verb provides important evidence for the Postverbal Constraint in Chinese. This is because if it is indeed true that unlike English, Chinese allows only for predicative complements, not adjuncts, to occur after a verb, then the number of postverbal constituents is greatly restricted.

As shown by the sharp contrasts in grammaticality between the corresponding English and Chinese examples in (37-38), adjuncts such as temporal and manner adverbs are generally allowed to occur after a verb in English, but not in Chinese.

(37) a. He (already) jumped in the water (already).

b. Ta (yijing) tiao zai shui-li (*yijing) le.
he (already) jump at water-inside (*already) Asp

(38) a. He (quickly) jumped in the water (quickly).

b. Ta (henkuai) tiao zai shui-li (*henkuai) le.
he (quickly) jump at water-inside (*quickly) Asp

Similar examples suggestive of the same contrast can be found in sentences containing locative PPs, as shown in (39a-b):

(39) a. He is waiting for you on the first floor.

b. Ta (zai yi-lou) deng ni (*zai yi-lou).
he at one-floor wait you at one-floor

Moreover, it can be observed that Chinese has the tendency to *restructure* a sentence in order to avoid having multiple constituents in postverbal context. As shown in (40),

even in some constructions where the main verb *fang* ‘put’ actually subcategorizes for two constituents, Chinese chooses to prepose one of the constituents - the direct object NP - to a preverbal position, leading to a BA-construction⁴⁷ or a topic construction.

- (40) a. Ta ba nei-ben shu fang zai zhuo-shang le. - *BA-Construction*
 he BA that-CL book put at table-top Asp
 ‘He put the book on the table.’
- b. Nei-ben shu, ta fang zai zhuo-shang le. - *Topic construction*
 that-CL book he put at table-top Asp
 ‘He put the book on the table.’
- c.* Ta fang nei-ben shu zai zhuo-shang le.
 he put that-CL book at table-top Asp

It should be noted that in Chinese, not all sentences involving a verb subcategorizing for multiple predicative complements choose to resort to the same restructuring strategies. For example, Chinese sentences involving frequency and duration expressions, Double Object constructions, and Dative constructions are all sentences that apparently contain multiple constituents in postverbal context. They have been investigated extensively by linguistic works such as Huang 1982, Aoun and Li 1989 and Sybesma 1992. While analyses of various forms have been proposed in the literature, the descriptive generalization summarized in the Postverbal Constraint in (30) has remained essentially unchallenged.

⁴⁷ BA-constructions refer to Chinese sentences involving object preposing, in which an NP interpreted as an object of the verb appears in preverbal position (before the subject, and is immediately preceded by the morpheme *ba* (cf. Chao 1968, Li and Thompson 1981, Huang 1982, Sybesma 1992, etc)).

In conclusion, it is evident that Chinese is much more constrained than English in the number of constituents that are allowed for postverbal contexts. Regardless of what are the real syntactic (and semantic) factors behind this contrast, it is a plausible assumption, for the current purpose of discussion, that the Postverbal Constraint is a valid descriptive generalization about Chinese, and it provides motivations for analyzing Double Object and Dative constructions in terms of VP-shell structures (see Aoun and Li 1989 for detailed arguments).

4.7 Discussing the alternatives

In this section, I discuss two alternative approaches to Chinese quantified NPs that have been suggested in the literature. I will first discuss Lin 1998, focusing solely on his account of the universal *mei* ‘every’, as this is where his approach crucially differs from mine. I then examine and comment on Lee 1986, which, to my knowledge, is the first to propose a non-quantificational approach to Chinese quantified NPs.

4.7.1 Lin’s 1998 analysis of *mei*-NPs

Part of Lin’s goal his 1998 paper is to argue for an essentially non-quantificational approach to universal *mei*-NPs, while maintaining the quantifier-status for other D-quantifiers in Chinese. In particular, he proposes to analyze *mei*-NPs as *definite plurals* that need to be licensed by *dou*, as shown in (41):

$$(41) \quad \| mei \| = \text{that function } f \text{ such that for all } P \in D_{\langle e, t \rangle}, f(P) = \cup \| P \| \langle \langle e, t \rangle, e \rangle$$

(Lin 1998: 238)

According to this definition, the determiner *mei* basically denotes a function that takes a predicate, and yields an entity which is a maximal collection of the individuals denoted by that predicate. Lin’s central claim is that Chinese *mei*-NPs semantically

denote the same entity as plural definites, in that they both have no inherent quantificational force and no built-in distributivity, and that the contrast between *mei*-NPs and regular definites has to do solely with the presence of *dou* in the former case and its absence in the latter.

Lin's account, as sketched above, does offer an explanation for some key facts about *mei*-NPs, including: 1) why *mei*-NPs in preverbal position can occur with *dou*, 2) why the scope of *mei*-NPs is always fixed by the surface position of *dou*, and 3) why they differ from English *every*-NPs in taking collective predicates such as *zhang-de xiang* 'look-alike' (see Yang 2000a for a discussion on this fact). Under his semantics in (41), all these facts are explained exactly because the same things would be true of definite plurals as well⁴⁸.

4.7.2 Problems with Lin's approach

As Lin treats *mei*-NPs semantically on a par with definite plurals, except for the licensing of the former by *dou*, it is predicted that when both occur with *dou*, *mei*-NPs

⁴⁸ It should be pointed out that Lin also considers an alternative meaning for the universal quantifier, similar to the semantics I proposed earlier (parallel to the semantics of *dabufen* 'most' (in (ii)):

$$(i) \quad \parallel \textit{mei-yi-ge} \textit{ 'every-1-CL'} \parallel = \lambda P \lambda Q \exists X [P(X) \& \forall Y (P(Y) \rightarrow Y \subseteq X) \& Q(X)]$$

$$\text{Cf. (ii) } \parallel \textit{dabufen} \parallel = \lambda P \lambda Q \exists Z \exists X [P(X) \& \forall Y (P(Y) \rightarrow Y \subseteq X) \& Z \subseteq X \& Q(Z) \& |Z| > |X| - |Z|]$$

But Lin rejects this alternative for the following reason: this approach is based on the assumption that the common noun combined with *dabufen* is a pluralized predicate (cf. (ii)). The same cannot be true for *mei*, according to Lin, because *mei* always combines with a singular common noun in the *mei*-'one'-CL-N combination.

It should be noted, however, that my definition of *mei* (in (iii) below) does not have this problem, because it assumes that *mei* should combine with a singular property P that holds of every atomic part of a maximal sum X:

$$(iii) \parallel \textit{mei} \textit{ 'every'} \parallel = \lambda P \lambda Q [\exists X (\forall x (x \in X \leftrightarrow P(x)) \wedge Q(X))]$$

and definite plurals should be semantically equivalent. This is, however, not borne out. There are many respects in which *mei*-NPs show their quantifier-nature independent of the licenser *dou*, and hence must be distinguished from non-quantifiers like regular definites. We consider four such examples below.

First, in a context where a definite plural *naxie ren* ‘those people’ (plus *dou*) allows for both a collective and a distributive reading, a *mei*-NP only allows for a distributive reading, as shown by the contrast in (42a-b).

- (42) a. *Naxie ren dou kang-zhe yi-ge da xiangzi shang-le lou.* *distributive/collective*
 those man all carry-Asp 1-CL big box up-Asp stairs
 i. ‘Those people each carried a big box upstairs.’
 ii. ‘Those people together carried a big box upstairs.’
- b. *Mei-ge ren dou kang-zhe yi-ge da xiangzi shang-le lou.* *distributive only*
 every-CL man all carry-Asp 1-CL big box up-Asp stairs
 ‘Every one carried a big box upstairs.’

The fact that (42a), with the presence of *dou*, still allows for a collective reading further suggests that in (42b), it must be something in the meaning of the universal NP itself, rather than *dou* alone, that has blocked the collective reading.

In fact, this is precisely what I have suggested in my account. By allowing for the [numeral-classifier] complex, which is always ‘one’-CL, to play a crucial role in fixing the cover value for the D-operator *dou*, my account can explain the above contrast in (42a-b).

Secondly, as has been noted by Partee (1995: 581), the distribution of possible modification by *almost* in English (43a-b) illustrates that “universality is asserted in

universal NPs” such as *every man* or *all men*, but not in regular definites such as *the men*⁴⁹:

- (43) a. *almost the men
 b. almost every man / all men

We can observe similar distribution facts about Chinese *jihu* ‘almost’, as illustrated in (44a-b).

- (44) a. (*Jihu) Naxie ren (jihu) dou lai-le.
 almost those man almost all come-Asp
 ‘(*Almost) Those people (almost) all came.’
 b. (Jihu) Mei-ge ren (jihu) dou lai-le.
 almost every-CL man almost all come-Asp
 ‘(Almost) Every one (?almost) came.’

It is, therefore, evident that unlike regular definites, *mei*-NPs have an inherent universal force independent of the licenser *dou*, contrary to Lin’s prediction. However, this fact is again predicted by my proposed account, as I assume that the universal force is contributed by *mei* itself, instead of *dou*.

Thirdly, in a generic context, *mei*-NPs differ from definite NPs in allowing for a generic construal, a fact again comparable to their English counterparts, as shown in (45) and the corresponding translations.

- (45) a. Naxie gou dou you yi-tiao weiba. - generic reading impossible
 those dog all have one-CL tail
 ‘Those dogs all have a tail.’

⁴⁹ Partee notes that *almost* is also acceptable with numeric expressions, but that does not affect the point here.

b. Mei-zhi gou dou you yi-tiao weiba. - *generic reading possible*
 every-CL dog all have one-CL tail

i. ‘(In general) every dog has a tail.’

ii. ‘Each of the dogs has a tail.’

Presumably, this is due to the fact that while regular definites have contextually “anchored” interpretations for the common noun, universal quantifiers are not so restricted.

Finally, contrary to Lin’s assumption, there are contexts in which *mei*-NPs can occur in the absence of *dou*, namely, at a postverbal position. As discussed in Lee 1986, sentences involving post-verbal *mei*-NPs are grammatical, though sometimes less preferred than their object-preposed counterparts:

(46) a. Wo mai le mei-ben shu. (Lee 1986: his (270a-b))

I buy asp every-CL book

‘I bought every book.’

b. Mei-ben shu wo dou mai le.

every-CL book I all buy asp

‘Every book, I bought.’

As reported by native speakers I have consulted, there are many Chinese sentences involving post-verbal *mei*-NPs that are just as acceptable as their object-preposed counterparts, as shown in (47):

(47) a. Wo yao baifang mei-yi-wei pengyou.

I will visit every-1-CL friend

‘I will visit every friend.’

- b. Mei-yi-wei pengyou wo dou yao baifang.
 every-1-CL friend I all want visit
 ‘Every friend, I will visit.’

I now show that even when *mei*-NPs occur (without *dou*) in a postverbal context, they still behave differently from regular definites. For instance, as exemplified in (48a-b), at a postverbal position, *mei*-NPs only allow for a distributive reading while regular definites are compatible with both a distributive and a collective reading.

- (48) a. Wo songgei neixie ren yi-ben shu. - *collective/distributive*
 I give those man one-CL book
 ‘I gave those people a book.’
- b. Wo songgei mei-ge ren yi-ben shu - *distributive only*
 I give every-CL man one-CL book
 ‘I gave every one a book.’

While the universal *mei*-NP in (48b) requires that a book be given to every student individually, the definite NP in (48a) also allows for a collective construal, where there is a single book-giving event. This is unexpected by Lin’s account, as he attributes every difference between *mei*-NPs and definite plurals on the occurrence of *dou*. Under my account, however, the above contrast is predicted as it reflects a well-known distinction between quantified and referential NPs, as illustrated in the familiar examples like (49).

- (49) a. The Pope looked at (all) the members of his flock.
 b. The Pope looked at every member of his flock.

(Beghelli and Stowell 1997: 88)

As pointed out by Beghelli and Stowell 1997, while in (49a) the Pope might have looked at the assembled multitude with a single glance, in (49b) he must have looked individually at each and every member of his flock.

In a postverbal context, *mei*-NPs and regular definites also differ in their ability to support discourse anaphora. For instance, while *naxie ren* ‘those men’ in (50a) allows discourse anaphora of *na-ben shu* ‘that book’, the *mei*-NP in (50b) blocks such anaphora.

- (50) a. Yuehan songgei naxie ren yi-ben shu₁.
 John give those man one-CL book
 Na-ben shu₁ haokan-ji-le.
 that-CL book interesting-very-Asp
 ‘John gave those men a book₁. The book₁ is very interesting.’
- b. Yuehan songgei mei-ge ren yi-ben shu₁.
 John give every-CL man one-CL book
 *Na-ben shu₁ haokan-ji-le.
 that-CL book interesting-very-Asp
 ‘John gave every man a book₁. *The book₁ is very interesting.’

This contrast arises only if the *mei*-NP is a quantificational NP, and hence incapable of binding any anaphor outside its scope.

In sum, Lin’s 1998 approach to the universal *mei*-NP, while accounting for some of the difference in behavior between Chinese and English universals, overlooks a number of facts that indicate *mei*’s inherent quantificational properties. It also fails to predict the distribution of *mei*-NPs at a postverbal position, in absence of *dou*, to which I will return in Section 4.6.

4.7.3 Lee 1986: A variable-based approach

Let us now turn to a very different proposal regarding Chinese quantified NPs. It is commonly known that Wh-words in Chinese have two distinct uses: as *interrogatives* and as *indefinites*, depending on the context in which they occur (Lee 1986, Li 1992, etc.). While Wh-indefinites are polarity-sensitive items that need to be licensed by an operator like *dou*, Wh-interrogatives occur in the absence of any licensing operator, as shown by the contrast in (51):

- (51) a. Shei lai-le ? - as an interrogative
 who come-Asp
 ‘Who came?’
- b. Shei dou lai-le. - as an indefinite
 who all come-Asp
 ‘Everybody came.’

Interestingly, Chinese quantified NPs display a similar asymmetry between their preverbal and postverbal uses. As shown in (52a-b), while a universal NP at a preverbal position needs to be licensed by *dou*, the same NP at a postverbal position seems to occur without such a requirement.

- (52) a. Mei-ge ren *(dou) lai-le.
 every-CL man all come-Asp
 ‘Every man came.’
- b. Wo jiandao-le mei-ge ren.
 I see-Asp every-CL man
 ‘I saw everybody.’

By drawing on the above parallel with Wh-indefinites, Lee 1986 proposes that Chinese quantified NPs should be analyzed as *variables* that need to be bound by operators such as *dou*, on a par with Wh-indefinites. According to Lee, just like a conditional operator, *dou* functions as “a genuine natural language equivalent of an unselective quantifier in the sense of Lewis 1973” (Lee 1986: 29). As a result, they both can bind Wh-phrases, quantified NPs, plural NPs, or time/event adverbials within its quantification domain, regardless of their syntactic categories.

4.7.4 Problems with Lee’s approach

While Lee’s account provides a possible approach to the apparent non-quantificational characteristics of Chinese quantified NPs (discussed in Section 4.2), it also runs into a number of problems, particularly in its treatment of quantified NPs and Wh-indefinites as semantically on a par. First and foremost, such a non-quantificational approach overlooks the important fact that unlike *true* variables such as Wh-indefinites, which invariably get a universal construal in the context of *dou* (cf. (53a)), quantified NPs, in combination with *dou*, give rise to a variety of quantificational force (cf. (53b)).

(53) a. In the case of Wh-indefinites:

shei ‘who’ + *dou* ‘all’ => Quantificational force: \forall ‘anybody’

shenme ‘what’ + *dou* ‘all’ => Quantificational force: \forall ‘anything’

shenmeshihou ‘when’ + *dou* ‘all’ => Quantificational force: \forall ‘anytime’

b. In the case of quantified NPs:

mei ‘every’ + *dou* ‘all’ => Quantificational force: every

dabufen ‘most’ + *dou* ‘all’ => Quantificational force: most

henduo ‘many’ + *dou* ‘all’ => Quantificational force: many

suoyou ‘all’ + *dou* ‘all’ => Quantificational force: all

In order to derive the quantificational variability illustrated in (53b), a non-quantificational approach would have to posit a large-scale ambiguity on *dou*. A more plausible alternative, however, is to assume that the quantified NPs each contribute a quantificational force of their own.

Secondly, as shown in (54-55) below, Wh-indefinites can be bound by other unselective operators such as a conditional operator, a modal operator, a yes-no or Wh-question operator, while quantified NPs can only be licensed by *dou*, contrary to what is expected under an analysis of these NPs as pure variables.

- (54) a. Ruguo shei zhao wo,
 if who look.for me
 qing gaosu wo yixia.
 please tell me once
 ‘If anybody looks for me, please let me know.’
- b. Keneng shei zhao-guo ni.
 maybe who look.for-Asp you
 ‘Perhaps somebody looked for you.’
- c. Shei kanjian ni le ma?
 who see you Asp Q
 ‘Did anybody see you?’

- (55) a. Ruguo mei-ge ren *(dou) zhao wo,
 if every-CL man all look.for me
 qing gaosu wo yixia.
 please tell me once
 ‘If everybody looks for me, please let me know.’
- b. Keneng mei-ge ren *(dou) zhao-guo ni.
 maybe every-CL man all look.for-Asp you
 ‘Perhaps everybody looked for you.’
- c. Mei-ge ren *(dou) kanjian ni le ma?
 every-CL man all see you Asp Q
 ‘Did everybody see you?’

Thirdly, the variable binding relation between Wh-indefinites and an operator like *dou* is subject to a more strict set of *locality* conditions than the licensing of quantified NPs by *dou* (see Cheng 1995 for more details). As illustrated in (56-57) below, intervening NPs are allowed in the latter case, but not in the former⁵⁰.

- (56) a. You yi-ge ren shenme-shu dou kan. [‘one’ ‘what’ *dou*]
 have one-CL man what-book all read
 ‘There is a man who reads any book.’
- b. Shenme-shu you yi-ge ren dou kan. [‘what’ ‘one’ *dou*]
 what-book have one-CL man all read
 ‘What are the books that a man read them all?’
 *‘There is a man who reads any book.’

⁵⁰ The association between quantified NPs and *dou* is clause-bound (cf. (i)), as noted by Lee 1986.

(i) * Mei-ge ren shuo ta dou lai-le.
 every-CL man say he all come-Asp
 ‘Every one said that he came.’

- (57) a. You yi-ge ren mei-ben shu dou kan. [‘one’ ‘every’ *dou*]
 have one-CL man every-CL book all read
 ‘There is a man who reads every book.’
- b. Mei-ben shu you yi-ge ren dou kan. [‘every’ ‘one’ *dou*]
 every-CL book have one-CL man all read
 ‘There is a man who reads every book.’

In sum, a variable-based approach as proposed in Lee 1986 does not account for many facts about Chinese quantified NPs, including their quantificational variability, exclusive dependency on *dou* and their long-distance association with *dou*. All these argue against treating quantified NPs as pure variables, on a par with Wh-indefinites.

4.8 Summary

In this chapter, I have developed a compositional account of Chinese quantified NPs in their interaction with distributive operators. I first discussed characteristics of Chinese quantified NPs that are distinct from those of standard quantifiers, including their obligatory occurrence with the overt D-operator *dou* in preverbal positions, and their persistent scope dependency on *dou*. I then attempted to answer these questions, based on an analysis of Chinese quantified NPs as generalized quantifiers built up of plural individuals. In particular, I suggested a compositional approach, with quantifiers contributing quantificational force and distributive operators introducing distributivity, and pointed out that Chinese quantifiers differ from their English counterparts crucially in lacking built-in distributivity. The suggested analysis is argued to not only account for the observed variation in quantificational force, but also provide an explanation for why the scope of Chinese quantified NPs is persistently fixed by the D-operator *dou*.

A number of interesting consequences have been considered for the suggested analysis, concerning, for example, a contrast in distributivity between the two Chinese universal quantifiers and the semantics of definite plurals. The fact that numeral classifiers occur in some quantified NPs but not others is shown to play a crucial role in determining the behaviors of these quantifiers with respect to distributivity and domain of quantification. This has been argued to be one of the major advantages offered by the proposed account. I also addressed and attempted an explanation for the observation that Chinese quantified NPs require the presence of *dou* in preverbal position, but not in postverbal position. Finally, I reviewed two alternative approaches suggested in Chinese literature, namely Lin's 1998 non-quantificational account of universal *mei*-NPs and Lee's 1986 variable-based approach to Chinese quantified NPs in general. I presented arguments showing that these approaches fail to provide an explanation for a number of Chinese facts that are predicted by the present account.

Chapter V: Classifiers in Individual and Event Quantification

5.1 Introduction

Recent work on event semantics has shown increasing evidence for possible formal analogies between the nominal and temporal domains. Such analogies have, in turn, led to discoveries of further properties of both events and individuals. Among the best-known formal attempts utilizing the nominal-verbal analogy are Partee's 1973 analysis of tenses analogous to that of pronouns, Bach's 1986 formal account of the parallels between the nominal mass-count distinction and the distinction between processes and events in aspectual classes of verbs, and Lasersohn's 1995 attempt to unify the semantics of conjunction with the notion of 'event plurality'.

Though rarely recognized as such, classifiers provide yet another important venue through which the quantificational structure in the nominal and verbal domains may be understood, as it will be shown that the use of two different types of classifiers are closely related to quantification over *individuals* and quantification over *events*. With its rich and productive system of classifiers, Chinese provides an excellent candidate language for a study concerned with quantificational structures in the two domains.

In this chapter, I will study the interaction of classifiers with individual and event quantification, with a particular focus on quantification over events expressed by the so-called "frequentative" adverbials (Lee 1986, Sybesma 1992, etc.). To capture the parallels that these expressions display with quantified NPs involving numeral classifiers, I will refer to these expressions as "verbal classifiers", a term commonly used by traditional Chinese grammarians. Also, to better highlight the nominal-verbal dichotomy,

I will use a new term “nominal classifiers” (instead of the earlier term “numeral classifiers”) to refer to classifiers that are needed for counting purposes in Chinese nominal phrases (as discussed in Chapter 3).

This chapter is organized as follows. In Section 5.2, I present two central claims, one concerning the semantic distinction between nominal and verbal classifiers, and the other concerning the lexical semantic variation among common nouns in general. For the second claim, in particular, I introduce a three-way typology of natural language common nouns, to be distinguished in terms of their ability to lexically denote entities of the *individual* sort or *event* sort. I then present cross-linguistic evidence from two typologically distinct languages, including the use of nominal and verbal classifiers in Chinese and the selectional restrictions of a variety of predicates in English. In Section 5.3, I focus on the Chinese data, and present a compositional approach for the occurrence of the three noun classes with the two types of classifiers, based on the semantic distinctions I have suggested for the noun classes as well as a proposed meaning definition for verbal classifiers. In Section 5.4, I will give a semantic account for the English facts along the same lines as for Chinese, and present further data from English to support the account. Section 5.5 concludes the whole chapter.

5.2 A three-way typology of common nouns

5.2.1 The claim

There are two central claims I’d like to advance in this chapter, as shown in (1):

- (1) Two claims:
- a. In a classifier language like Chinese, while the nominal classifier is needed to count *individuals* (or individual instantiations of kinds), the verbal classifier is used to count *events*. The complementary functions of the two classifiers impose a semantic restriction on the *sort* of entities they each can take as arguments.
 - b. Cross-linguistically, natural language common nouns vary in the *sort* of entities they denote lexically, and hence are expected to occur with a (verbal or adverbial) predicate if and only if they can contribute the right sort of argument for the predicate, either lexically or compositionally.

For the second claim above, I further propose that natural language common nouns should be divided into the following three classes, depending on whether or not they have individual-level or event-level denotations:

- (2) A three-way typology of natural language common nouns:

N-Class-1: individual⁵¹-denoting only (e.g. *car, book, table ...*)

N-Class-2: both individual- and event-denoting (e.g. *movie, party, game ...*)

N-Class-3⁵²: event-denoting only (e.g. *event, sale, flight, rehearsal ...*)

Intuitively, the basic idea is as follows: Natural language common nouns, though syntactically on a par, need to be distinguished *semantically*, in terms of the *sort* of

⁵¹ Individuals (i.e. non-events) include both objects (i.e. ordinary individuals) and kinds (cf. Chapter 2) in the current framework (following Carlson 1977).

⁵² This third class of nouns typically includes the class of English “derived NPs” (as in (i)), but not gerundives (as in (ii)) or ING_{of}-NPs (as in (iii)) (as discussed in Zucchi 1989).

- (i) his performance of the song
- (ii) his performing of the song
- (iii) his performing the song

entities they denote lexically. As indicated in (2), while some common nouns (as in N-Class-1) unambiguously denote individuals, other nouns (as in N-Class-3) unambiguously denote events. Still other nouns (as in N-Class-2) may be ambiguous between an individual-level and an event-level denotation. As a natural consequence of the suggested meaning differences, the three classes of common nouns display distinctive behavior whenever they occur in the context of those predicates that are sensitive to the *sort* of entities they take as arguments, giving rise to sharp contrasts in syntactic distributions and semantic interpretations.

As will become clear later in this chapter, by proposing the three-way distinctions among natural language common nouns in terms of their lexical denotations, I am, in effect, identifying, for the first time, *two* independent sources for quantification over events: it can be contributed either *directly* by the lexical meaning of common nouns, or *compositionally* by the combination of noun phrases with the predicational context.

5.2.2 Diagnostic evidence from Chinese

The first piece of diagnostic evidence for the proposed three-way typology comes from the occurrences of common nouns with nominal and verbal classifiers in Chinese. If we start with Class-2 nouns like *dianying* ‘movie’, examples like (3a-b) show that they can occur with a nominal classifier at both a preverbal and a postverbal position.

- (3) a. San-bu dianying dou haokan.
 3-CL_N movie all interesting
 ‘The three (specific) movies are all interesting.’

- b. Wo kan-le san-bu dianying.
 I watch-Asp 3-CL_N movie
 ‘I watched three movies.’

The data in (4) then show that the same is true when the noun occurs with a verbal classifier⁵³, pointing to a possible parallel between the two types of classifiers.

- (4) a. San-ci dianying dou haokan.
 3-CL_V movie all interesting
 ‘The three (specific) movie showings are all interesting.’
- b. Wo kan-le san-ci dianying.
 I watch-Asp 3-CL_V movie
 ‘I watched three movie showings.’

If we consider a Class-1 noun like *shu* ‘book’ and a Class-3 noun like *jingong* ‘attack’, however, the above parallel becomes less clear. As shown in (5-6), while the Class-1 noun *shu* ‘book’ can occur with a nominal classifier at any position, it occurs with a verbal classifier only at a postverbal position.

- (5) a. San-ben shu dou haokan.
 3-CL_N book all interesting
 ‘The three (specific) books are all interesting.’

⁵³ Throughout this chapter, I will focus on the classifier *ci* ‘CL_V’ to illustrate the behavior of verbal classifiers, because like *ge* ‘CL_N’ in the nominal domain, *ci* has been assumed to be the most ‘general’ classifier in the verbal domain. To my knowledge, with the exception of kind classifiers, *ci* differs from other ‘less general’ classifiers only with respect to their “classifying”, not “quantifying”, function (cf. Section 3.3 of Chapter 3). Note that as shown in (i) below, Chinese kind classifiers can also be *verbal* in the sense that they can quantify over ‘kinds of events’ (see Footnote 17 of Chapter 3 for their *nominal* use quantifying over ‘kinds of individuals’):

- (i) Zheli san-zhong shijian jingchang fasheng.
 here three-CL^{kind} event often occur
 ‘Here, three kinds of events are very common.’

- b. Wo kan-le san-ben shu.
I read-Asp 3-CL_N book
'I read three books.'
- (6) a. *San-ci shu dou haokan.
3-CL_V book all interesting
- b. Wo kan-le san-ci shu.
I read-Asp 3-CL_V book
'I read three times.'

In the case of a Class-3 noun, the situation is just the reverse. As shown in (7-8), while the Class-3 noun *jingong* 'attack' can occur with a verbal classifier at any position, it cannot occur with a nominal classifier at all.

- (7) a. *San-ge jingong dou shibai le.
3-CL_N attack all fail Asp
- b. *Tamen faqi-le san-ge jingong.
they launch-Asp 3-CL_N attack
- (8) a. San-ci jingong dou shibai le.
3-CL_V attack all fail Asp
'The three (specific) attacks all failed.'
- b. Tamen faqi-le san-ci jingong.
they launch-Asp 3-CL_V attack
'They launched three attacks.'

The facts discussed so far about the occurrence of common nouns with classifiers can be summarized as in (9):

- (9) a. Some characteristics of Class-1 nouns: (e.g. *shu* ‘book’, *che* ‘car’)
- can occur with a nominal classifier in both preverbal and postverbal position;
 - can occur with a verbal classifier in postverbal, but *not* preverbal, position.
- b. Some characteristics of Class-2 nouns: (e.g. *dianying* ‘movie’, *wanhui* ‘party’)
- can occur with a nominal classifier in both preverbal and postverbal position;
 - can occur with a verbal classifier in both postverbal and preverbal position.
- c. Some characteristics of Class-3 nouns: (e.g. *jingong* ‘attack’, *shigu* ‘accident’)
- *cannot* occur with a nominal classifier in preverbal or postverbal position;
 - can occur with a verbal classifier in both postverbal and preverbal position.

The facts in (9) not only support the proposed three-way classification of common nouns, but more importantly, they indicate that whatever the semantic distinctions among the three noun classes may be, they must be correlated with the meaning differences between the two types of classifiers. And as will be proposed in Section 5.3, nominal and verbal classifiers in Chinese crucially differ in the *sort* of entities they can take as arguments. While nominal classifiers count individuals, verbal classifiers count events. I will also show in Section 5.3 how this lends further support to the proposed account differentiating the three classes of common nouns in terms of their lexical denotations.

5.2.3 Cross-linguistic evidence from English

As the three-way common noun typology (in (2)) is claimed to apply cross-linguistically, let’s consider some evidence from English, a typologically different language that does not employ classifiers as generally as Chinese in representing its

quantificational structure⁵⁴. In particular, I will show that in English, there are many predicates like Chinese classifiers that are highly selective of their arguments with respect to the suggested sortal distinctions. For the sake of exposition, I will first illustrate this point by presenting some sample data concerning English verbal predicates in this subsection, and later in Section 5.4, investigate and suggest an account for a wider range of empirical English data on the basis of the proposed three-way noun typology in (2).

To begin with, there are many verbal predicates in English, such as *begin*, *go on* and *take a long time*, that require as their arguments something extending over *time* and *space*. As shown in (10)-(12), such predicates generally can occur with our Class-2 and Class-3 nouns, but not Class-1 nouns.

- (10) a. The *book/*car/*table begins at 8:30.
 b. The movie/game/party begins at 8:30.
 c. The event/sale/rehearsal begins at 8:30.
- (11) a. A *book/*car/*table is going on.
 b. A movie/party/game is going on.
 c. A(n) event/sale/rehearsal is going on.
- (12) a. The *book/*car/*table took a long time.
 b. The movie/party/game took a long time.
 c. The event/sale/rehearsal took a long time.

Some predicates of this type such as *take place* and *be located* seem to occur with Class-3 nouns more easily than with Class-2 nouns.

- (13) a. A *book/*car/*table took place in New York yesterday.

⁵⁴ As is well known, English only requires classifier/measure phrases for its mass nouns, while its count nouns can combine directly with a numeral.

- b. A ?movie/?party/?game took place in New York yesterday.
- c. A(n) event/sale/rehearsal took place in New York yesterday.

Secondly, there are predicates in English that show the reverse distribution. As exemplified in (14)-(16), predicates like *touch*, *put*, and *wrap* only take Class-1 common nouns in their argument position:

- (14) a. I touched a book/car/table.
- b. I touched a *movie/*game/*party.
- c. I touched an *event/*sale/*rehearsal.
- (15) a. I put the book/table in a box.
- b. I put the *movie/*party in a box.
- c. I put the *event/*sale in a box.

Finally, there is yet another type of English predicate that does not seem to show preference for any of the three noun classes. Such examples include *see*, *like*, and *write about*, as shown in (16)-(18).

- (16) I saw a book/a movie/an event.
- (17) I like a book/a movie/an event.
- (18) I was writing about a book/a movie/an event.

As summarized in (19), in this subsection I have presented further evidence from English in support of the suggested noun typology.

- (19) a. More characteristics of Class-1 nouns:
 - cannot occur with predicates like *begin* and *take a long time*;
 - cannot occur with predicates like *take place*;
 - can occur with predicates like *touch* and *write*;

- can occur with predicates like *see* and *write about*.
- b. More characteristics of Class-2 nouns:
- can occur with predicates like *begin* and *take a long time*;
 - marginally occur with predicates like *take place*;
 - cannot occur with predicates like *touch* and *write*;
 - can occur with predicates like *see* and *write about*.
- c. Some characteristics of Class-3 nouns:
- can occur with predicates like *begin* and *take a long time*;
 - can occur with predicates like *take place*;
 - cannot occur with predicates like *touch* and *write*;
 - can occur with predicates like *see* and *write about*.

As I will argue in Section 5.4, the above English facts are not accidental, but follow from a principled reason that also accounts for the Chinese facts presented in the last subsection.

5.3 Classifiers in individual and event quantification

In this section, I examine, in greater detail, the Chinese data concerning the distribution of the three noun classes in the context of a verbal or a nominal classifier, and propose an analysis in terms of the distinctions between individual-level and event-level denotations, thus making clear the semantic function of classifiers in individual and event quantification. I will start the discussion with the case of nominal classifiers, whose semantics is more familiar to us.

5.3.1 Nominal classifiers

We have witnessed, in Subsection 5.2.2, how a nominal classifier may distinguish Class-3 nouns from the other two classes. In particular, while both Class-1 and Class-2 nouns can occur with a nominal classifier at any argument position, Class-3 nouns cannot do so at all.

It should be obvious that our semantic assumption with Krifka 1995 about nominal classifiers, coupled with the proposed three-way typology in (2), provide a natural explanation for the above contrast. As discussed in Chapter 3, a nominal classifier in Chinese introduces a measure function that counts individual instantiations of a kind (i.e. non-events), as shown in (20):

$$(20) \quad \|\text{san-bu 'three'-CL}\| = \lambda y \lambda x [\cup y(x) \wedge \text{CL}'(x)=3]$$

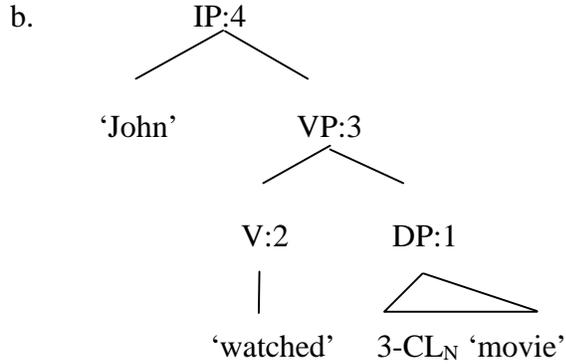
Therefore, the fact that only Class-3 common nouns cannot occur with a nominal classifier is predicted by our claim in (2) that these nouns are precisely the only common nouns that do not have individual-level denotations, and hence fail to contribute the right sort of arguments for the nominal classifier.

Formally, the occurrence between a Class-1 or Class-2 common noun and a nominal classifier can be derived as shown in (21a-b), following our semantic assumptions about Chinese NPs discussed in Chapter 2 & 3, and the neo-Davidsonian event semantics along the lines of Parsons 1990 and Landman 1994⁵⁵.

⁵⁵ In neo-Davidsonian event semantics, non-stative verbs (cf. Subsection 5.3.3) are treated as predicate of events, and they are linked to their arguments through thematic roles, as illustrated by the contrast between (ii) and (iii) below - the representations of (i) under traditional semantics and event semantics, respectively:

- (i) Brutus stabbed Caesar.
- (ii) stab'(Caesar)(Brutus)
- (ii) $\exists e[\text{stabbing}(e) \ \& \ \text{Agent}(e)=\text{Brutus} \ \& \ \text{Theme}(e)=\text{Caesar}]$

- (21) a. Yuehan kan-le san-bu dianying.
 John watch-Asp 3-CL_N movie
 ‘John watched three movies.’



- 1 $\lambda x [\cup \text{MOVIE}(x) \wedge \text{CL}'(x)=3]$
- 1' $\lambda P \exists x [\cup \text{MOVIE}(x) \wedge \text{CL}'(x)=3 \wedge P(x)]$
- 2 $\lambda x \lambda y \lambda e [\text{watch}'(e) \wedge \text{Ag}(e)=y \wedge \text{Th}(e)=x]$
- 3 $\lambda y \lambda e [\text{watch}'(e) \wedge \text{Ag}(e)=y \wedge \exists x [\cup \text{MOVIE}(x) \wedge \text{CL}'(x)=3 \wedge \text{Th}(e)=x]]$
- 4 $\lambda e [\text{watch}'(e) \wedge \text{Ag}(e)=j \wedge \exists x [\cup \text{MOVIE}(x) \wedge \text{CL}'(x)=3 \wedge \text{Th}(e)=x]]$
- 4' $\exists e [\text{watch}'(e) \wedge \text{Ag}(e)=j \wedge \exists x [\cup \text{MOVIE}(x) \wedge \text{CL}'(x)=3 \wedge \text{Th}(e)=x]]$

So, according to derivation in (21b), Sentence (21a) asserts the existence of a watching event with John as agent and a sum of three movies as theme, which matches our intuition that the [‘three’-CL_N] complex is counting the individual movies, not the movie-watching events.

Note that to arrive at Step-3 in the derivation, I assume in-situ functional application after a type-lifting operation on the verb *kan-le* ‘watched’. Here, I follow Landman 1994 in assuming the following standard rules (cf. (22)) for lifting verbs from taking individual arguments to taking generalized quantifier arguments, which have been adapted to the language of events:

(22) Let $T = \langle \langle d, t \rangle, t \rangle$, the type of noun phrases. (Landman 1994: 64)

For Intransitive verb phrases:

$$\text{LIFT: } \langle d, \text{pow}(e) \rangle \rightarrow \langle T, \text{pow}(e) \rangle \rangle^{56}$$

$$\text{LIFT } [V] = \lambda T. \{e \in E: T(\lambda x. e \in V(x))\}$$

For transitive verb phrases:

$$\text{LIFT: } \langle d, \langle d, \text{pow}(e) \rangle \rangle \rightarrow \langle T, \langle d, \text{pow}(e) \rangle \rangle$$

$$\text{LIFT } [V] = \lambda T \lambda x. \{e \in E: T(\lambda y. e \in (V(y))(x))\}$$

Moreover, for Step-4' of the above derivation, I assume a default “existential closure” at the IP-level (following Parsons 1990, etc.), which changes the predicate of events (at Step-4) into a proposition by binding the variable e over events with an existential quantifier, in the absence of other sources of event quantification.

5.3.2 Verbal classifiers

In this subsection, let's consider the distribution of Chinese common nouns in the context of verbal classifiers, which is much more complicated than their occurrence with nominal classifiers.

5.3.2.1 The background

Let us start with the basic contrast between nominal and verbal quantification as exemplified below:

- (23) a. Yuehan kan-le san-bu dianying. - *quantification over individuals*
 John watch-Asp 3-CL_N movie
 'John watched three (different) movies.'

⁵⁶ To distinguish the individual type from the event type, Landman 1994 uses the symbol d for the former and e for the latter.

- b. Yuehan kan-le san-ci dianying . - *quantification over events*
 John watch-Asp 3-CL_V movie
 ‘John watched movies three times.’
 = ‘John went to movies three times.’

So, while (23a) talks about three movies that were watched by John, (23b) talks about three individual events and during each event John watched some movie. The question arises as to how this semantic contrast should be derived compositionally. The answer does not seem to be obvious, given the apparent syntactic similarity between the two sentences.

Given our earlier conclusion from Chapter 3 that a nominal classifier combines with the following NP to form a constituent, one could easily parse the sentence involving a verbal classifier by assuming a similar structure, as shown in (24a-b):

(24) Hypothesis-1: a parallel approach to nominal and verbal classifiers

- a. Ta kan-le [_{DP} san-bu dianying].
 he watch-Asp 3-CL_N movie
- b. Ta kan-le [_{DP} san-ci dianying].
 he watch-Asp 3-CL_V movie

In fact, this parallel approach to the two types of classifiers straightforwardly observes the well-established “Post-verbal Constituent Constraint” in Chinese (see Subsection 4.7.3 for details) banning the occurrence of more than one constituent after a verb, and has indeed been suggested in the literature (cf. Sybesma 1992).

There is some evidence, from topicalization facts, that supports the parallel approach. As shown below, the post-verbal string in (25a) does seem to behave like a DP

constituent, in its ability to undergo movement in a topicalized construction in (25b) and a Chinese “BA-construction” (cf. Footnote 47 of Chapter 4) in (25c):

- (25) a. Yuehan kan-le [san-ci dianying].
 John watch-Asp 3-CL_V movie
 ‘John watched movies three times.’
- b. [San-ci dianying], Yuehan dou kan-le⁵⁷.
 3-CL_V movie John all watch-Asp
 ‘As for the three (specific) movie-showings, John watched them all.’
- c. Yuehan ba [san-ci dianying] dou kan-le.
 John BA 3-CL_V movie all watch-Asp
 ‘As for the three (specific) movie-showings, John watched them all.’

Note that there is a meaning contrast between (25a) on the one hand and (25b) or (25c) on the other. For instance, (25a) talks about three events of John going to a movie, while (25b) talks about three contextually salient movie-showing events, each of which was watched by John.

This contrast in specificity is not surprising, as the same contrast can be found between sentences involving postverbal nominal classifiers and their topicalized counterparts. It is a well-known fact about Chinese (and many other languages as well) that the specificity of a noun phrase is often correlated with the position of the NP relative to the main verb. For example, an indefinite NP (containing a nominal classifier) becomes specific as a result of topicalization, as illustrated in (26a-b):

⁵⁷ As illustrated in this example, the Chinese adverb *dou* ‘all’ quantifies over events, as well as individuals.

- (26) a. Yuehan kan-le san-bu dianying.
 John watch-Asp 3-CL_N movie
 ‘John watched three movies.’
- b. San-bu dianying, Yuehan dou kan-le.
 3-CL_N movie John all watch-Asp
 ‘As for the three (specific) movies, John watched them all.’

So (26a) and (26b) differ crucially in the fact that the existence of three movies is presupposed in the former, but not in the latter. Although this seems to contradict my claims about moved topics in Subsection 2.4.5 of Chapter 2, I will show later in this chapter that the contradiction is more apparent than real.

What seems evident so far is that at least for a Class-2 noun like *dianying* ‘movie’, it can form a DP constituent with the verbal classifier in postverbal position, just as it can do so with a nominal Classifier. So (24b) is a possible structure for such a sentence involving a Class-2 noun in postverbal position.

5.3.2.2 The problem

A further investigation of the Chinese data, however, suggests that the parallel approach to nominal and verbal classifiers as illustrated in (24a-b) cannot hold for all common nouns. As shown by the topicalization facts in (27)-(28) below, there are common nouns that clearly do not form NP constituents with a verbal classifier, even though they do so with a nominal classifier in the same context.

- (27) a. Yuehan xiu-le san-bu che.
 John fix-Asp 3-CL_N car
 ‘John fixed three cars.’

- b. San-bu che, Yuehan dou xiu le.
3-CL_N car John all fix Asp

‘As for the three specific cars, John fixed them all.’

- (28) a. Yuehan xiu-le san-ci che.
John fix-Asp 3-CL_V car

‘John fixed cars three times.’

- b.* San-ci che, Yuehan dou xiu le.
3-CL_V car John all fix Asp

In fact, examples of common nouns that behave exactly like *che* ‘car’ and *shu* ‘book’ in (27-28) above are numerous, and they all fall into the first class in our noun typology.

Moreover, when these common nouns occur with a verbal classifier in postverbal position, the configuration does not have to be strictly local. As shown in (29), a nominal classifier can be inserted between the verbal classifier and the common noun in the postverbal context.

- (29) Ta xiu-le san-ci [nei-bu che]
he fix-Asp 3-CL_V that-CL_N car

‘He fixed that car three times.’

By contrast, the same nouns, in combination with a nominal classifier, do not allow for such an insertion, as shown in (30).

- (30) *Ta xiu-le san-bu [nei-bu che]
he fix-Asp 3-CL_N that-CL_N car

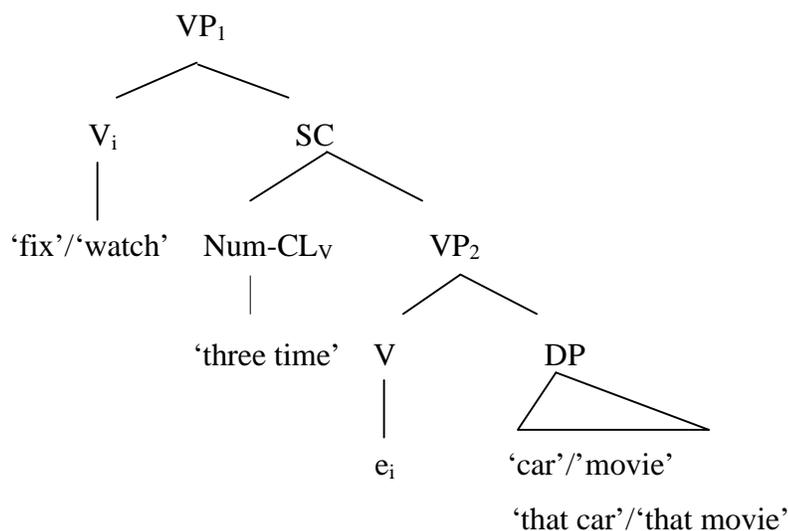
(30) is ungrammatical, presumably because a single DP structure has only one position for a classifier to occur and hence does not allow for multiple occurrence of classifiers, as was discussed in Chapter 3. And the fact that (29) is OK further suggests

that the postverbal string in that sentence must involve a structure more complicated than a single NP, since the verbal classifier can itself be followed by a full-fledged NP.

5.3.2.3 The analysis

In view of the above facts, I'd like to propose an alternative account to derive the occurrence of verbal classifiers with Chinese Class-1 common nouns in postverbal position, one that does not assume a single DP constituent for the postverbal string, but still complies with the “Postverbal Constituent Constraint” in Chinese.

(31) The proposed structure for (28a) and (29), as well as (23b):



As shown in (31), the proposed analysis crucially makes use of a VP-shell structure (in the sense of Larson 1987), with the verbal classifier occurring outside the lower VP-shell containing the NP. Furthermore, as summarized in (32), I suggest that while the proposed VP-shell structure is the only possible structure for such a sentence involving Class-1 nouns, it is one of the two structures available for Class-2 nouns, with the other being the simpler DP-structure shown in the table below.

(32) The syntax of Class-1 and Class-2 nouns occurring with a verbal classifier

	Preverbally	Postverbally
Class-1 nouns	*	... [VP V Num-CL _V [VP e [DP N]]]
Class-2 nouns	[IP [DP Num-CL _V N] [IP ...V...]]	i. ...[VP V Num-CL _V [VP e [DP N]]] ii. ... [VP V [DP Num-CL _V N]]

Before presenting arguments in favor of the proposed VP-shell structure, I first explain why a Class-1 noun like *che* ‘car’ differs from a Class-2 noun like *dianying* ‘movie’ in lacking the simpler DP structure. This, I suggest, has to do with the semantics of the verbal classifier as proposed in (33):

(33) a. The semantics of a [Num-CL_V] complex⁵⁸:

$$\| \text{san-ci '3'-CL}_V \| = \lambda E \lambda e [*E(e) \wedge 3(e)] \quad e^e t < e^e t >^{59}$$

$$\text{cf. b. } \| \text{san-bu '3'-CL}_N \| = \lambda y \lambda x [\cup y(x) \wedge \text{CL}'(x) = 3] \quad e < et >$$

So, the combination of *san* ‘three’ with a verbal classifier denotes a function that maps a set of events onto a set of plural events with three atomic parts, while a [‘three’-CL_N] complex denotes a function that maps a kind individual onto a set of plural individuals that contains three instantiations of the kind.

⁵⁸ It is obvious that the semantics of the verbal classifier as defined in (33a) is not exactly parallel to that of the nominal classifier in (33b), in that the latter requires a *kind* argument whereas the former requires a *property* argument. I will maintain this difference for now, for lack of strong evidence for the existence of an *event-kind*, as well as what is to be discussed in Footnote 67 of this chapter.

⁵⁹ Here, the symbols e^e and e correspond to e and d in Landman 1994, marking the types of individuals and events, respectively.

The above semantics is defined on the basis of the following fundamental distinction: in a classifier language, while nominal classifiers are used to count individuals (or individual instantiations of a kind), verbal classifiers are used to count events. The complementary functions of the two classifiers, I claim, impose a semantic restriction on what entities they can take as arguments. This is captured in (33) crucially via a *sortal* distinction. While the nominal classifier takes individual-denoting arguments only, the verbal classifier takes event-denoting arguments.

On the other hand, natural language common nouns also differ in the sort of entities they can contribute. As suggested in our three-way common noun typology in (2), while Class-2 nouns like *dianying* ‘movie’ are lexically ambiguous between individual-level and event-level denotations, Class-1 nouns like *che* ‘car’ only have denotations of a kind individual. It is therefore predicted that unlike a Class-2 noun, a Class-1 noun fails to contribute the right sort of arguments and hence cannot combine with a verbal classifier to form a DP constituent.

As a result, to account for the occurrence of such nouns with the verbal classifier in postverbal position, I suggest that such an occurrence *compositionally* contributes an event argument for the classifier, via a VP-shell structure, based on a number of arguments as follows.

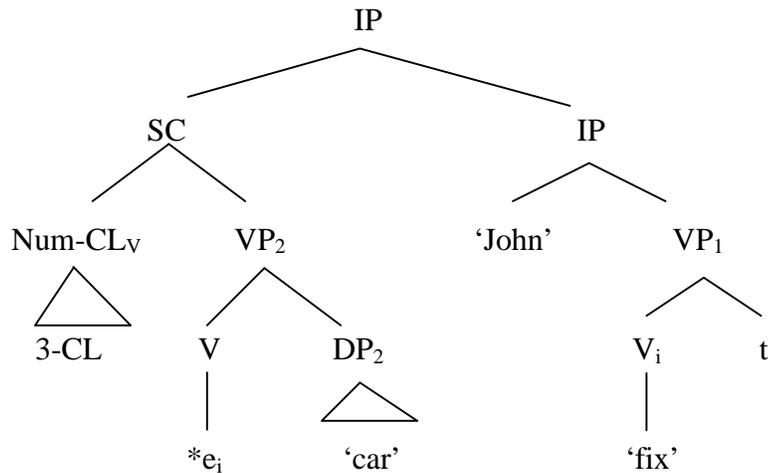
First, although the postverbal verbal classifier no longer forms a single constituent with the following noun in (31), the VP-shell structure satisfies the “Postverbal Constituent Constraint” by forcing one constituent only to occur after each verb (see Subsection 4.7.3 for a discussion on the Chinese-particular constraint).

Secondly, the proposed structure allows for the occurrence of a full-fledged DP in the DP position, hence accounting for the insertion facts observed in (29).

Thirdly, it provides an account for the topicalization fact in (28b) (repeated as (34a) below). As shown in (34b) below, the topicalized sentence is syntactically ill-formed, because the gap e_i within the topicalized complex is too high to be licensed by its antecedent *xiu* 'fix' located at a VP-internal position. This is in clear contrast to the gap e_i in (31) above, which is located in the c-commanding domain of its antecedent at the V_I position.

(34) a.* San-ci che, Yuehan dou xiu le.
 3-CL_V car John all fix Asp

b. The ill-formed structure for (34a):



Further support for this account comes from English sentences with a similar VP-shell structure, which display parallel characteristics with respect to topicalization. In a Double Object construction, for instance, a contrast can be found between the in-situ

form in (35a) and the topicalized form in (35b), presumably for the same reason as the one behind the contrast between our earlier examples in (28a) and (28b)⁶⁰.

- (35) a. John gave Mary a book.
 b.* Mary a book, John gave.

Finally, I present some evidence for why the proposed VP-shell structure in (31) also has to be available for sentences involving Class-2 nouns and a verbal classifier, independently of the simpler DP structure. As shown in (36), a Class-2 noun such as *dianying* ‘movie’ is just like a Class-1 noun in allowing for an intervening classifier to occur between the verbal classifier and the noun itself.

- (36) Ta kan-le san-ci nei-bu dianying
 he watch-Asp 3-CL_V that-CL_N movie
 ‘He watched that movie three times.’

⁶⁰ Jim Huang (personal communication) points out a similar contrast in (i):

- (i) a. Mary put the book on the table.
 b. *The book on the table, Mary put.

But he also points out that there are other examples of unbound traces that must be allowed. Such examples include (ii), where *John* is first raised out of the lower IP into the higher IP, forming an intermediate structure: *John is [how likely [t to win]]*, before *how likely [t to win]* is *wh*-moved as in (ii), with the NP trace unbound at s-structure.

- (ii) How likely [t to win] is John?

As suggested by Jim, there could be two solutions to this problem. One strategy is to permit only NP-traces to be unbound (to be saved by reconstruction, for example). An alternative is to attribute the bad cases (in (34a), (35b) and (ib)) to the principle that movement can affect only maximal (or minimal) projections (i.e. only XP or X⁰, but not intermediate phrases). In the bad cases, the main verb has moved from the lower shell into the higher VP shell, before the sequence 3-CL_V-*t*-‘car’, *Mary-t-a-book* or *the-book-t-on-the-table* is topicalized, to the exclusion of the main verb. These moved phrases, then, consist of only the lower VP shell (plus an adjunct Num-CL phrase in the first case). These are not maximal projections, for in VP-shell structures, only the higher VP counts as a maximal projection. Pending for further investigation, I will, for now, adopt this alternative explanation, which is compatible with my account.

- (37) a. Ta [VP kan-le [san-ci [VP e_i [DP nei-bu dianying]]]]
 he watch-Asp 3-CL_V that-CL_N movie
- b. *Ta [VP kan-le [DP san-ci [NP nei-bu dianying]]]]
 he watch-Asp 3-CL_V that-CL_N movie

This suggests that the position after the verbal classifier in (36) should also allow for a full-fledged DP to occur, hence forcing a VP-shell structure in (37a) and ruling out the DP-structure option in (37b).

An immediate prediction of this analysis is that the postverbal string in (36) should not be able to undergo topicalization, for failure of licensing the empty category e_i. The prediction is obviously borne out by the following example:

- (38) *[san-ci [VP e_i [DP nei-bu dianying]]], ta dou kan_i-le.
 3-CL_V that-CL_N movie he all watch-Asp

As shown in (39-40), the fact that the insertion of a classifier is not allowed between a nominal classifier and any common noun is also predicted. Neither the DP-structure option in (40b) nor the VP-shell structure in (40a) is possible in this case, because, as I will show by a derivation in the next section, the lower VP in the VP-shell structure can only contribute event-denoting entities, which cannot combine with a nominal classifier taking only individual arguments.

- (39) *Ta kan-le san-bu nei-bu dianying
 he watch-Asp 3-CL_N that-CL_N movie
- (40) a. *Ta [VP kan-le [san-bu [VP e_i [DP nei-bu dianying]]]]
 he watch-Asp 3-CL_N that-CL_N movie
- b. *Ta [VP kan-le [DP san-ci [NP nei-bu dianying]]]]
 he watch-Asp 3-CL_V that-CL_N movie

To summarize the basic idea of the analysis so far, I have shown that in the context of a verbal classifier, Class-1 and Class-2 nouns behave very differently. This is because a verbal classifier takes only event-level arguments, something that can be contributed directly by the lexical meanings of Class-2 nouns, but not Class-1 nouns. I have also shown that in the postverbal context, some Num+CL+(Dem)+N sequences (involving Class-1 nouns in particular) must involve V-raising into a Larsonian VP-shell. In the case of Class-2 nouns, though, a simpler structure in terms of a DP constituent is also a potential possibility when they occur with a verbal classifier in postverbal position. Moreover, in preverbal position, we have observed that only Class-2 nouns can occur with a verbal classifier, because unlike the DP structure, the VP-shell structure is barred for syntactic licensing reasons⁶¹.

⁶¹ In his examination of a class of very interesting syntax-semantics mismatches in Chinese sentences, Huang 1994 discusses some observations that appear to be in direct conflict with my account. As illustrated in (i-ii) below, there are grammatical sentences in Chinese that involve Class-1 individual-denoting nouns (*shu* ‘book’ and *che* ‘car’) occurring with verbal classifiers in preverbal position, with the sequences 3-CL_V(time)-movie and 3-CL_V(time)-car each being a constituent.

- (i) Ta san-ci shu dou kan-de hen lei.
 he 3-CL_V book all watch-DE very tired
 ‘On all three instances of book reading, he got tired.’
- (ii) San-ci che, ta dou kai-de hen chengong.
 3-CL_V car he all drive-DE very successful
 ‘On all three instances of car driving, he drove successfully.’

But, despite the apparent conflict, these facts may not necessarily present counterexamples to my analysis, as suggested by Jim Huang (personal communication). Here, too, the sentences involve true event quantification, where the frequency expressions (3-CL_V) actually measure the event compositionally expressed by the MAIN verb and its object NP. For instance, the 3-time-book sequence in (i) means three events of book-reading, and 3-time-car in (ii) means three events of car-driving. Therefore, according to Huang 1994, it is crucial for the grammaticality of (i)-(ii) that the main verb be eventive verbs (which are then measurable by the verbal classifier), and thus in sentences like (i)-(ii) there is a strict dependency between the Num-CL_V complex and the main verb.

To account for the above observation, Huang 1994 argues for analyzing the sentences as involving what he calls “gerundive nominalization”, where the main verb has raised from a lower

As for the third class of common nouns in our typology, they behave exactly like Class-2 nouns when occurring with a verbal classifier, as we have witnessed in (9b-c). This parallel is expected, because crucially according to our semantics in (2), both noun classes have event-level denotation lexically.

The tables in (41), then, sum up our conclusions so far about the Chinese classifiers and their occurrence with the three classes of common nouns. Notice that in (41b), Class-3 nouns behave exactly like Class-2 nouns, because they too can contribute event arguments lexically.

(41) a. In the context of a nominal classifier:

	Preverbally	Postverbally
Class-1 nouns	[_{IP} [_{DP} Num-CL _N N] [_{IP} ...V...]]	... [_{VP} V [_{DP} Num-CL _N N]]
Class-2 nouns	[_{IP} [_{DP} Num-CL _N N] [_{IP} ...V...]]	... [_{VP} V [_{DP} Num-CL _N N]]
Class-3 nouns	*	*

VP under gerundive DP, into a higher light verb meaning DO. Under such an analysis, the sentence in (ii) actually has an underlying structure meaning ‘all 3-times of DRIVING cars were successfully DONE’, with DRIVE moved into the abstract DONE position (see Huang 1994 for details).

As all the Chinese sentences like (i)-(ii) seem to involve a special dependency between the Num-CL-N sequence and the main verb, I will, for now, adopt Huang’s analysis based on “gerundive nominalization” for handling this subset of sentences, and maintain the suggested analysis for sentences that do not involve such a dependency.

b. In the context of a verbal classifier:

	Preverbally	Postverbally
Class-1 nouns	*	... [VP V Num-CL _V [VP e [DP N]]]
Class-2 nouns	[IP [DP Num-CL _V N] [IP ...V...]]	i. ...[VP V Num-CL _V [VP e [DP N]]] ii. ... [VP V [DP Num-CL _V N]]
Class-3 nouns	[IP [DP Num-CL _V N] [IP ...V...]]	i. ... [VP V Num-CL _V [VP e [DP N]]] ii. ... [VP V [DP Num-CL _V N]]

In the remainder of this section, I will use the Class-2 noun *dianying* ‘movie’ as a main example to illustrate how the various occurrences of Chinese common nouns with verbal (and nominal) classifiers can be formally derived.

Let’s start with the preverbal case, as illustrated in (42).

- (42) San-ci dianying, Yuehan dou kan-le.
3-CL_V movie John all watch-Asp

‘As for the three (specific) movie-showings, John watched them all.’

In order to fully understand the interpretation of this sentence, it is helpful to compare (42) with (43) – two sentences minimally different in the choice of the classifier, by considering situations in which each sentence can be uttered felicitously.

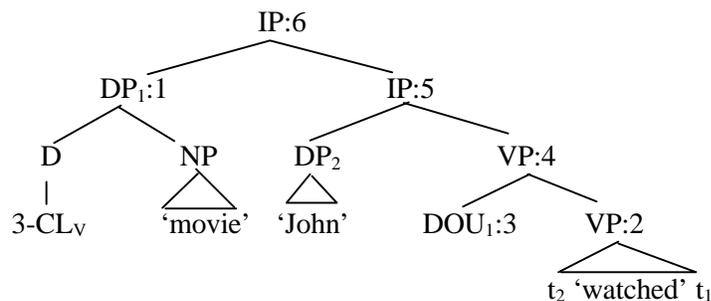
- (43) San-bu dianying, Yuehan dou kan-le.
3-CL_N movie John all watch-Asp

‘As for the three (specific) movies, John watched them all.’

Take a situation with three movies – “Crouching Tiger and Hidden Dragon” (m_1), “Traffic” (m_2) and “Gladiator” (m_3), with each one being played at a local Sony Loews theatre at three different show-times, say, 6pm (s_1), 8pm (s_2) and 10pm (s_3). The total number of showings is, of course, nine. For (43) to be uttered felicitously in this situation, John has to have watched all three movies, while (42) can be reported as long as he has watched a movie at all three times. (42) is, therefore, compatible with the same movie being watched by John, a huge movie fan, for three times. Intuitively, the verbal classifier in (42) measures the number of movie-showings, while the nominal classifier in (43) measures the number of movies (or movie shows). Just as an NP like 3-CL_N-‘movie’ denotes a plural individual consisting of three movies, we can think of an NP like 3-CL_V-‘movie showing’ as denoting an *abstract* plural individual made up of three movie-showing events. As we will see in the following derivations, the subtle distinction in meaning between (42) and (43) is captured by the proposed account.

Let’s first consider how the sentence (in (42)) involving a verbal classifier can be formally derived under the current approach:

(44)



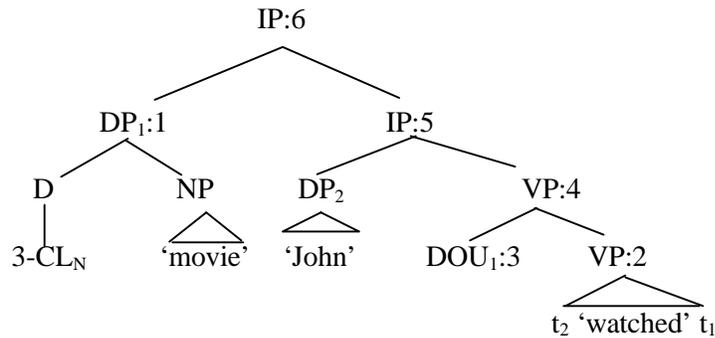
- 1 $\lambda e [3(e) \wedge *movie'(e)]$
- 2 $\lambda e [watch'(e) \wedge Ag(e)=x_2 \wedge Th(e)=u_1]$
- 3 $\lambda P \lambda e \forall v [[v \subseteq V_1 \wedge v \in ||Cov||] \rightarrow \exists e' [P(e')(v) \wedge e' \subseteq e]]$
- 2' $\lambda u_1 \lambda e [watch'(e) \wedge Ag(e)= x_2 \wedge Th(e)=u_1]$

- 4 $\lambda e \forall v [[v \subseteq V_1 \wedge v \in \|\text{Cov}\|] \rightarrow \exists e' [\text{watch}'(e') \wedge \text{Ag}(e')=x_2 \wedge \text{Th}(e')=v \wedge e' \subseteq e]]$
 5 $\lambda e \forall v [[v \subseteq V_1 \wedge v \in \|\text{Cov}\|] \rightarrow \exists e' [\text{watch}'(e') \wedge \text{Ag}(e')=j \wedge \text{Th}(e')=v \wedge e' \subseteq e]]$
 5' $\exists e \forall v [[v \subseteq V_1 \wedge v \in \|\text{Cov}\|] \rightarrow \exists e' [\text{watch}'(e') \wedge \text{Ag}(e')=j \wedge \text{Th}(e')=v \wedge e' \subseteq e]]$
 5'' $\lambda V_1 \exists e \forall v [[v \subseteq V_1 \wedge v \in \|\text{Cov}\|] \rightarrow \exists e' [\text{watch}'(e') \wedge \text{Ag}(e')=j \wedge \text{Th}(e')=v \wedge e' \subseteq e]]$
 1' $\text{te} [3(e) \wedge * \text{movie}'(e)]$
 6 $\exists e \forall v [[v \subseteq \text{te}'' [3(e'') \wedge * \text{movie}'(e'')] \wedge v \in \|\text{Cov}\|] \rightarrow \exists e' [\text{watch}'(e') \wedge \text{Ag}(e')=j \wedge \text{Th}(e')=v \wedge e' \subseteq e]]$

So, the sentence in (42) is predicted to mean that “for each one of the three specific movie-showings, there is a corresponding watching event with John as agent and that show as theme”. Crucially, our intuition about the movie-showing interpretation is captured, by positing the event-taking semantics for a verbal classifier and allowing the Class-2 common noun *dianying* ‘movie’ to contribute a ‘movie-showing’ event argument lexically.

Consider, now, the derivation of the sentence (in 43) with a nominal classifier:

(45)



- 1 $\lambda x [{}^{\cup} \text{MOVIE}(x) \wedge \text{CL}'(x)=3]$
 2 $\lambda e [\text{watch}'(e) \wedge \text{Ag}(e)=x_2 \wedge \text{Th}(e)=y_1]$
 3 $\lambda P \lambda e \forall y [[y \subseteq X_1 \wedge y \in \|\text{Cov}\|] \rightarrow \exists e' [P(e')(v) \wedge e' \subseteq e]]$
 2' $\lambda y_1 \lambda e [\text{watch}'(e) \wedge \text{Ag}(e)=x_2 \wedge \text{Th}(e)=y_1]$
 4 $\lambda e \forall y [[y \subseteq X_1 \wedge y \in \|\text{Cov}\|] \rightarrow \exists e' [\text{watch}'(e') \wedge \text{Ag}(e')=x_2 \wedge \text{Th}(e')=y \wedge e' \subseteq e]]$
 5 $\lambda e \forall y [[y \subseteq X_1 \wedge y \in \|\text{Cov}\|] \rightarrow \exists e' [\text{watch}'(e') \wedge \text{Ag}(e')=j \wedge \text{Th}(e')=y \wedge e' \subseteq e]]$

- 5' $\exists e \forall y [[y \subseteq X_1 \wedge y \in \|\text{Cov}\|] \rightarrow \exists e' [\text{watch}'(e') \wedge \text{Ag}(e')=j \wedge \text{Th}(e')=y \wedge e' \subseteq e]]$
- 5'' $\lambda X_1 \exists e \forall y [[y \subseteq X_1 \wedge y \in \|\text{Cov}\|] \rightarrow \exists e' [\text{watch}'(e') \wedge \text{Ag}(e')=j \wedge \text{Th}(e')=y \wedge e' \subseteq e]]$
- 1' $\iota x [\cup \text{MOVIE}(x) \wedge \text{CL}'(x)=3]$
- 6 $\exists e \forall y [[y \subseteq \iota x. [\cup \text{MOVIE}(x) \wedge \text{CL}'(x)=3] \wedge y \in \|\text{Cov}\|] \rightarrow \exists e' [\text{watch}'(e') \wedge \text{Ag}(e')=j \wedge \text{Th}(e')=y \wedge e' \subseteq e]]$

According to this derivation, the sentence with a nominal classifier in (43) asserts that “for each one of the three specific movies, there is a corresponding watching event with John as agent and that movie as theme.” It is, therefore, evident that the current approach offers a plausible way to capture the subtle semantic distinction between (42) and (43), despite their striking syntactic similarity.

Before we proceed to consider the postverbal case, a few more things need to be noted about the above two derivations. First, as shown by the formula at Step-3 in each derivation, the meaning I assume for *dou* ‘all’ in the above derivation is a generalized D-operator meaning adapted to event semantics (following Brisson 1998: 127)⁶².

Secondly, as discussed earlier, the topicalized NP in both sentences gets a specific interpretation. This, I assume, is crucially due to its co-occurrence with *dou* ‘all’⁶³. Just as what we saw happened with Chinese quantified NPs in Chapter 4, the D-operator *dou* here again requires a plural individual (“V₁” at Step-3 and Step-5’’) to distribute over. As

⁶² The D-operator in event semantics was originally defined in Brisson 1998 as shown in (i) below. And in the derivation in (44), I have left the variable V₁ (or x in (i)) free for future binding (for details see a discussion on this point in Section 4.3 of Chapter 4).

(i) $\lambda P \lambda x \lambda e \forall y \exists e' [y \subseteq x \wedge y \in \|\text{Cov}_i\| \rightarrow P(e')(y) \wedge e' \subseteq e]$

⁶³ I thank Veneeta Dayal for pointing this out.

a result, the topicalized NP has to shift from their predicative terms (of type $\langle e, t \rangle$) to individual-denoting terms (of type e), via an ι -operator⁶⁴ (cf. Step-1’).

Thirdly, in the current notational system, I use the symbols u , v , and e to represent event variables as opposed to x , y , and z for individual variables. It is important to allow for two alternative meanings for the verb *kan* ‘watch’, as given in (46):

- (46) a. $\lambda z \lambda v_1 \lambda e$ [watch’(e) \wedge Ag(e)= z \wedge Th(e)= v_1]] cf. Step-2 in (44)
 b. $\lambda z \lambda y_1 \lambda e$ [watch’(e) \wedge Ag(e)= z \wedge Th(e)= y_1]] cf. Step-2 in (45)

So, in (46) while the verb *kan* ‘watch’ is assumed to look for an event-denoting theme in the first case, it looks for an individual-denoting theme in the second. This ambiguity, I suggest, comes from the fact that verbs like *kan* ‘watch’ and *xihuan* ‘like’ are the kind of predicates that are capable of taking both individual-level and event-level arguments, as we have already witnessed in our earlier discussion about the English facts in (16-18) (repeated below).

(16) I saw a book/a movie/an event.

(17) I like a book/a movie/an event.

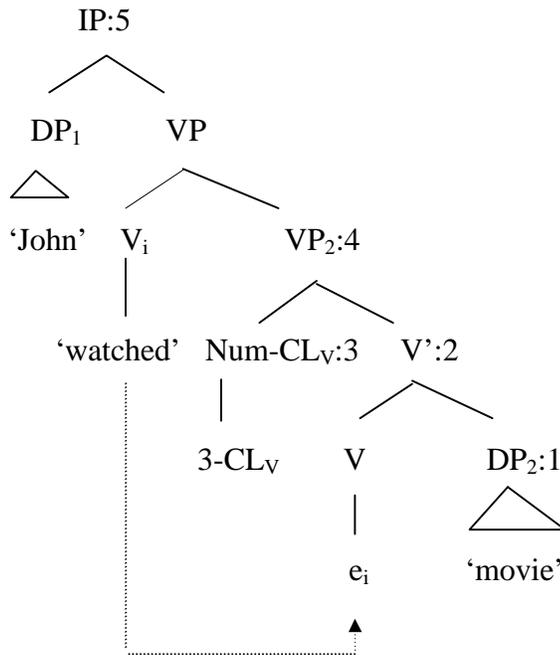
(18) I was writing about a book/a movie/an event.

Now, let’s see how the interpretation of a sentence like (47) can be formally derived, under the two alternative structures that are both argued to be available, as shown in (48a-b).

- (47) Yuehan kan-le san-ci dianying .
 John watch-Asp 3-CL_V movie
 ‘John watched movies three times.’

⁶⁴ As another generally available type-shifting operator, \exists does not help resolve the mismatch.

(48) a. Under the VP-shell structure: (assuming reconstruction)

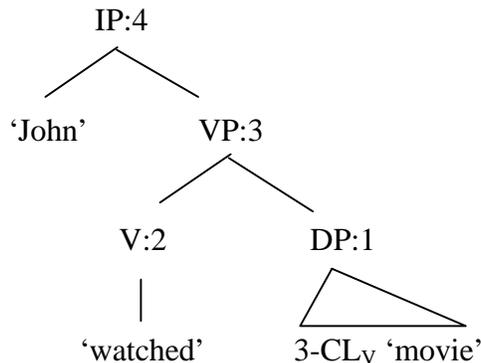


1. movie
- 1'. $\lambda x [\cup \text{MOVIE}(x)]^{65}$
- 1'' $\lambda P \exists x [\cup \text{MOVIE}(x) \wedge P(x)]$
2. $\lambda e [\text{watch}'(e) \wedge \text{Ag}(e)=y \wedge \exists x [\cup \text{MOVIE}(x) \wedge \text{Th}(e)=x]]$
3. $\lambda E \lambda e [3(e) \wedge *E(e)]$
4. $\lambda e [3(e) \wedge *[\text{watch}'(e) \wedge \text{Ag}(e)=y \wedge \exists x [\cup \text{MOVIE}(x) \wedge \text{Th}(e)=x]]]$
5. $\exists e [3(e) \wedge *[\text{watch}'(e) \wedge \text{Ag}(e)=j \wedge \exists x [\cup \text{MOVIE}(x) \wedge \text{Th}(e)=x]]]$

⁶⁵ Following Krifka 1995, I derive this meaning (at Step-1') from the kind-denoting meaning (at Step-1) by an operator which takes a kind and yields a predicate applying to instantiations of that kind (i.e. $\lambda x[\mathbf{R}(x, \mathbf{k})]$) (which is then adapted to our notational convention using the \cup -operator.) As pointed out by Krifka, such a device is needed in order to derive the widely observed indefinite (or predicative) use of a Chinese bare NP (as in (i)) from its definite kind-referring use (see Section 2.2 of Chapter 2 for how to derive the indefinite reading in a Neocarlsonian approach suggested by Chierchia 1998).

- (i) Wo kanjian xiong le.
 I see bear Asp
 'I saw (some) bears.'

b. Under the DP structure:



- 1 $\lambda e [3(e) \wedge *movie'(e)]$
- 1' $\lambda E \exists e [3(e) \wedge *movie'(e) \wedge E(e)]$
- 2 $\lambda v \lambda y \lambda e [watch'(e) \wedge Ag(e)=y \wedge Th(e)=v]$
- 3 $\lambda y \lambda e [watch'(e) \wedge Ag(e)=y \wedge \exists e' [3(e') \wedge *movie'(e') \wedge Th(e)=e']]$ ⁶⁶
- 4 $\exists e [watch'(e) \wedge Ag(e)=j \wedge \exists e' [3(e') \wedge *movie'(e') \wedge Th(e)=e']]$

Therefore, under the VP-shell structure in (48a), the sentence is predicted to talk about “a plural event with three sub-events, each of which is a watching event with John as agent and a movie as theme”. And under the DP structure in (48b), the sentence is expected to be about “a watching event with John as agent and a sum of three different movie-showings as theme”.

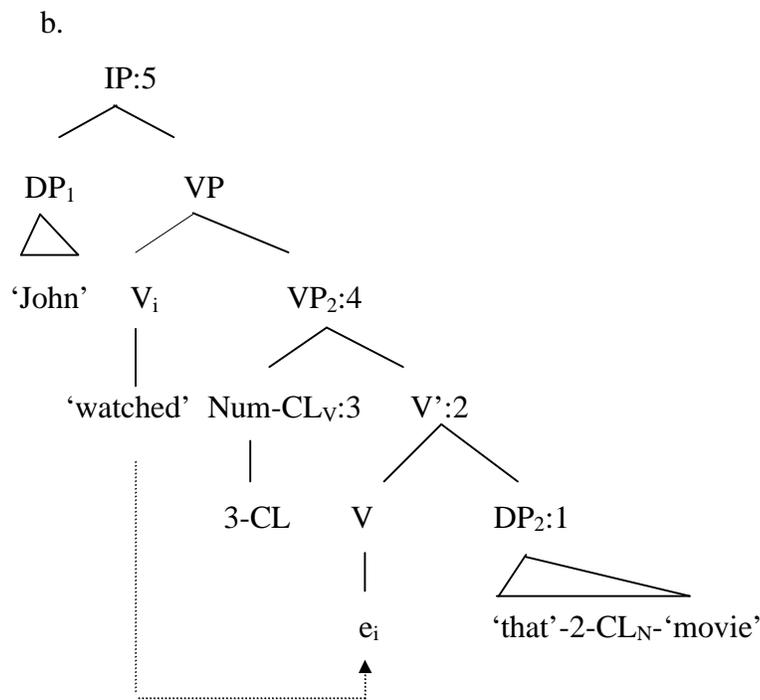
As summarized in the conclusions given in (41a-b), both of the above readings are presumably available for a Chinese sentence like (47), which involves the occurrence of a verbal classifier and bare common noun at the postverbal position. A question remains, though, as to why such a sentence is often reported to have only one interpretation, which corresponds to the reading derived under the VP-shell structure. Pending for further

⁶⁶ See (22) in Subsection 5.3.1 for details about the event-based rules for lifting verbs from taking individual arguments to taking generalized quantifier arguments (following Landman 1994).

investigation, my tentative suggestion is that this may have to do with the fact that the above two readings (derived in (48a-b)) are very close, and hard to tease apart. After all, one cannot watch a movie without it being shown, and neither reading actually requires a different movie to have been watched by John each time.

Finally, let's derive the meaning for sentences involving the occurrence of a verbal classifier with a full-fledged DP in the postverbal context, for which the only possible structure is the proposed VP-shell structure (as discussed earlier).

- (49) a. Yuehan kan-le san-ci [nei-liang-bu dianying]⁶⁷.
 John watch-Asp 3-CL_V that-2-CL_N movie
 'John watched the two movies three times.'



1. $\iota x [\cup \text{MOVIE}(x) \wedge \text{CL}'(x)=2]$

⁶⁷ Since the event of “watching the two movies” in (49a) is most naturally understood to refer to a property, rather than a kind, it seems obvious that the verbal classifier should, at least, be allowed to take properties as its argument, as is assumed in the proposed semantics for the verbal classifier in (33a).

2. $\lambda e [\text{watch}'(e) \wedge \text{Ag}(e)=y \wedge \text{Th}(e)=ix [\cup \text{MOVIE}(x) \wedge \text{CL}'(x)=2]]$
3. $\lambda E \lambda e [3(e) \wedge *E(e)]$
4. $\lambda e [3(e) \wedge *[\text{watch}'(e) \wedge \text{Ag}(e)=y \wedge \text{Th}(e)=ix [\cup \text{MOVIE}(x) \wedge \text{CL}'(x)=2]]]$
5. $\exists e [3(e) \wedge *[\text{watch}'(e) \wedge \text{Ag}(e)=j \wedge \text{Th}(e)=ix [\cup \text{MOVIE}(x) \wedge \text{CL}'(x)=2]]]$

As derived in (49b), the sentence talks about “a plural event with three sub-events, each of which is a watching event with John as agent and the (same) two contextually salient movies as theme”, matching the translation given in (49a).

5.3.3 Stative and eventive predicates

In this subsection, I discuss an interesting consequence of the proposed analysis, concerning the distribution of stative and eventive verbal predicates in Chinese.

As has been well recognized in the literature (Vendler 1967, Verkuyl 1972, Dowty 1979, etc), English verbal predicates can be distinguished, in terms of their aspectual properties, into four basic classes: activities, accomplishments, achievements and states (cf. (50)). Examples of such aspectual properties include restrictions on time adverbials, tenses, and logical entailments.

(50)	<u>Activities</u>	<u>Accomplishments</u>	<u>Achievements</u>	<u>States</u>
	paint	paint a picture	recognize	like
	write	write a letter	find	know
	look for	kill	die	have

As shown in (51-52) below, the four verb classes generally⁶⁸ differ in whether they allow continuous tense and what kind of duration adverbials they can combine with (*in*-adverbials or *for*-adverbials). The unique ability of accomplishment verbs to take both

⁶⁸ The generalizations hold true for most English verbs, with a few exceptions (cf. Parsons 1990, etc).

types of adverbials, for instance, has been attributed to the fact that these verbs include both an action/process aspect and a result aspect, unlike any of the other verb classes.

- (51) a. He wrote for/*in an hour. - *activity*
 b. He wrote a letter for/in an hour. - *accomplishment*
 c. He found the key *for/in an hour. - *achievement*
 d. He has liked the professor for/*in a year. - *state*
- (52) a. He is writing. - *activity*
 b. He is writing a letter. - *accomplishment*
 c. *He is finding the key. - **achievement*
 d. *He is liking the professor. - **state*

Turning now to the Chinese case, a similar four-way classification of verbal predicates has been suggested in Yang 1998b (partly incorporating approaches suggested in Tai 1984 and Smith 1990), as shown in (53):

- (53) Activities: *hua (hua)* ‘paint pictures’, *zhao* ‘look for’, *sha* ‘try to kill’ ...
Accomplishments: *hua (yi-zhang hua)* ‘paint a picture’,
Achievements: *hua-wan* ‘finish painting’, *sha-si* ‘kill’, *zhao-dao* ‘find’ ...
States: *xihuan* ‘like’, *renshi* ‘know’, *yongyou* ‘have’ ...

On the basis of this classification, we can observe aspectual distinctions among Chinese verbal predicates that are parallel to the distinctions among English verbs observed in (51-52), as illustrated in (54-56):

- (54) a. *Ta yi-xiaoshi-nei xie-le xing. - **activity*
 he one-hour-within write-Asp letter
 Lit: ‘*He wrote letters in an hour.’

- b. Ta yi-xiaoshi-nei xie-le yi-feng xing. - *accomplishment*
 he one-hour-within write-Asp one-CL letter
 ‘He wrote a letter in an hour.’
- c. Ta yi-xiaoshi-nei xie-wan-le yi-feng xing. - *achievement*
 he one-hour-within write-finish-Asp one-CL letter
 ‘He finished writing a letter in an hour.’
- d.?*Ta yi-xiaoshi-nei xihuan-le jiaoshou. - **state*
 he one-hour-within like-Asp professor
 Lit: ‘*He liked the professor in an hour.’
- (55) a. Ta xie-le yi-xiaoshi de xing. - *activity*
 he write-Asp one-hour DE letter
 ‘He has written letters for an hour.’
- b. Ta xie-le yi-xiaoshi de yi-feng xing. - *accomplishment*
 he write-Asp one-hour DE one-CL letter
 ‘He has written a letter for an hour.’
- c. *Ta xie-wan-le yi-xiaoshi de xing. - **achievement*
 he write-finish-Asp one-hour DE letter
 Lit: ‘He finished writing letters for an hour.’
- d. Ta renshi jiaoshou yi-nian le. - *state*
 he know professor one-year Asp
 ‘He has known the professor for an hour.’
- (56) a. Ta zai-hua hua. - *activity*
 he Asp-paint picture
 ‘He is painting pictures.’

As shown in (57), in postverbal context, while stative verbs such as *xihuan* ‘like’ are blocked from occurring with frequency expressions containing verbal classifiers, the other three classes of verbs in general can occur with verbal classifiers.

Moreover, it can be observed that even in the grammatical cases, the sentences could become unacceptable once their aspectual features are changed. As shown in (58a-c), Chinese verbal classifiers cannot occur postverbally with an activity or accomplishment verb if the latter has a progressive (instead of perfective) aspect.

(58) a. *Yuehan zai hua san-ci hua. - *activity*

John Asp paint three-CL_V picture

Lit: ‘John is painting pictures three times.’

b. *Yuehan zai hua san-ci nei-zhang hua. - *accomplishment*

John Asp paint three-CL_V that-CL picture

Lit: ‘John is painting the picture three times.’

As we have witnessed in (56a) earlier, the above two sentences were perfectly acceptable without the verbal classifier phrase. Therefore, it has to be something in the semantics (or syntax) of the verbal classifier phrase that is responsible for the change in grammaticality.

I now show that there is a natural and uniform explanation for both facts observed above, under the proposed account summarized as follows. Recall that as defined in (33a) (repeated below), verbal classifiers can only be predicated of event-denoting arguments, unlike nominal classifiers that only take individual-denoting arguments:

(33) a. The semantics of a [Num-CL_V] complex:

$\| \text{san-ci '3'-CL}_V \| = \lambda E \lambda e [3(e) \wedge *E(e)]$ $e^t \langle e^t \rangle$

cf. b. $\| \text{san-bu '3'-CL}_N \| = \lambda y \lambda x [\cup y(x) \wedge \text{CL}'(x) = 3]$ $e \langle et \rangle$

Therefore, in a Chinese sentence combining a verbal classifier and a common noun in the postverbal context, there are two alternative ways to satisfy this event-taking requirement imposed by the semantics of the verbal classifier, as the event argument can be derived either directly from the lexical meaning of the postverbal common noun (cf. (48b)), or compositionally from the combination of the common noun with the verb via reconstruction within a VP-shell structure (cf. (48a)).

In (57a-d), as the postverbal common noun *hua* ‘picture’ belongs to our N-Class-1 and unambiguously denotes a non-event individual, the first option is, of course, unavailable. The only option remaining is to derive an event argument from the combination of the verb with the common noun. As stative predicates are the only ones among the four verb classes that never have event-level interpretations (cf. Parsons 1990), it is then expected that stative predicates are also the only predicates that cannot occur with verbal classifiers in postverbal position (see Huang 1997 for a slightly different account).

Likewise, the observed fact that no verbal predicate in its progressive aspect can occur with verbal classifiers is also expected, because any predicate in its progressive aspect is a stative predicate and cannot contribute an event argument, including activity and accomplishment verbs.

5.4 Individual-taking and event-taking predicates in English

In Subsection 5.2.3, I have presented some cross-linguistic evidence from three types of English verbal predicates supporting the proposed three-way common noun typology. As illustrated below, while there are predicates such as *see* in (59) that can combine with any class of common nouns, there are also predicates that impose restrictions on their

arguments. For example, some predicates like *touch* only take Class-1 nouns as their arguments (as in (60)), whereas others (like *begin*) only occur with Class-2 and Class-3 nouns (as in (61)).

(59) I saw a book/a movie/a sale.

(60) I touched a book/*a movie/*a sale.

(61) a. *The book begins at 8:30.

b. The movie begins at 8:30.

c. The sale begins at 8:30.

The idea I would like to suggest is that the above English facts are not *accidental*, but follow from the same principles that account for the classifier facts in Chinese. That is, just as common nouns differ in the sort of entities they can denote lexically, verbal predicates also differ in the sort of entities they take as their arguments.

Take the verb predicate *begin* for example. As indicated in the formulas in (62), *begin* looks for something that has *time* coordinates to serve as its argument, and hence can only combine with an event-denoting entity.

(62) a. $*\exists e [\text{book}'(e) \wedge \text{begin}(e)=8:30]$ - *Class-1 nouns*

b. $\exists e [\text{movie}'(e) \wedge \text{begin}(e)=8:30]$ - *Class-2 nouns*

c. $\exists e [\text{sale}'(e) \wedge \text{begin}(e)=8:30]$ - *Class-3 nouns*

As I have suggested in the proposed typology, Class-1 common nouns such as *book* are the only ones in a language that do not have event-level denotations lexically, and therefore, are predicted to be the only class that cannot occur with an event-seeking predicate like *begin*.

On the other hand, predicates such as *mail* and *touch* requires for their arguments something that has concrete physical presence. As a result, Class-1 common nouns that are the most individual-denoting can combine with such predicates most easily.

Finally, the fact that predicates like *see* and *like* can occur with all the three noun classes is explained by their flexibility in taking either an individual-denoting or event-denoting argument, as illustrated by the formulas in (63a-c).

- (63) a. $\exists e [\text{see}'(e) \wedge \text{Ag}(e)=i \wedge \exists x [\text{book}'(x) \wedge \text{Th}(e)=x]]$ - *Class-1 nouns*
 b. i. $\exists e [\text{see}'(e) \wedge \text{Ag}(e)=i \wedge \exists x [\text{movie}'(x) \wedge \text{Th}(e)=x]]$ - *Class-2 nouns*
 ii. $\exists e [\text{see}'(e) \wedge \text{Ag}(e)=i \wedge \exists e' [\text{movie}'(e') \wedge \text{Th}(e)=e']]$ - *Class-2 nouns*
 c. $\exists e [\text{see}'(e) \wedge \text{Ag}(e)=i \wedge \exists e' [\text{sale}'(e') \wedge \text{Th}(e)=e']]$ - *Class-3 nouns*

Now, I want to show that the current account, as sketched above, makes interesting predictions about other English predicates. As the relevant distinction among the above three types of verbal predicates is of a *semantic*, not *syntactic*, nature, the distinction should not be limited to predicates of one syntactic category. Indeed, as shown in (64-71), in the context of the three noun classes, the same contrast in distribution can be observed with predicates of various syntactic categories, ranging from adjectival phrases, prepositional phrases to verbal predicates.

- (64) It was a *slow* event/movie/*book.
 (65) It was a *one-hour* event/movie/*book.
 (66) I saw her *at* the event/the movie/*the book.
 (67) He was shot right *after* the event/the movie/*the book
 (68) I went to a *crowded* event/*movie/*book.
 (69) I *wrote* an *event/a movie/a book about the incident.

(70) It was an *expensive* event/movie/book.

(71) He *criticized* the event/movie/book a number of times.

5.5 Concluding remarks

In this chapter, I have discussed three types of natural language common nouns, and proposed that they should be distinguished semantically in terms of the sort of entities they denote lexically (individuals or events). Corresponding to the semantic distinctions in common nouns, I suggested that predicates also differ in the sort of entities they require as arguments. As a result, common nouns are expected (and observed) to occur with a predicate if and only if they contribute the right sort of arguments for the predicate, either lexically or compositionally.

As one major piece of cross-linguistic evidence, I have examined the semantics of Chinese nominal and verbal classifiers, paying particular attention to their interactions with individual and event quantification in Chinese, and have shown that their syntactic and semantic characteristics follow naturally from their central characteristics as described above. In particular, I observed that nominal and verbal classifiers display rather different distribution patterns when they combine with the suggested three classes of common nouns. I claimed that in a classifier language like Chinese, while the nominal classifier is needed to count *individuals*, the verbal classifier is used to count *events*, and that the complementary functions of the two classifiers impose a semantic restriction on the *sort* of entities they each can take as arguments. This is shown to be the key to explaining the observed distributions of nominal and verbal classifiers.

Evidence from English was also presented to support the proposed hypothesis, where I showed that a variety of verbal predicates in English impose certain selectional restrictions on their nominal arguments, and that such selectional restrictions are best analyzed in terms of a sortal distinction between individual-denoting entities and event-denoting entities as I proposed for natural language common nouns and predicates.

To conclude, then, in this dissertation work I have examined the syntax and semantics of common nouns, classifiers and quantificational determiners, as a formal inquiry into the nature of quantification in Chinese. While many questions remain open, I hope to have brought to light the respective contributions of the individual components to the interpretation and quantificational structure of Chinese noun phrases as a whole.

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