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The Interfaces of Chinese Syntax with Semantics and Pragmatics

Yicheng Wu

ROUTLEDGE

The Interfaces of Chinese Syntax with Semantics and Pragmatics

The Interfaces of Chinese Syntax with Semantics and Pragmatics provides an in-depth exploration of a variety of interface phenomena in Chinese, a non-inflectional language, where to a large extent word order constrains its interpretation and defines its grammatical functions.

Under the Dynamic Syntax approach, which takes the incremental left-to-right processing of linguistic forms to be a fundamental part of characterizing the relation between syntactic structure and semantic interpretation, a straightforward explanation is provided. The study features detailed analysis of a range of key grammatical constructions such as topic, passive, copular and cleft, where previous analyses were sought in pure syntactic, semantic or pragmatic terms.

Clear and straightforward throughout, *The Interfaces of Chinese Syntax with Semantics and Pragmatics* will be of interest to graduate students and scholars of Chinese, linguistics and cognitive science.

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The Interfaces of Chinese Syntax with Semantics and Pragmatics

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Introduction

The notion of 'interface' plays an increasingly central role in the development of grammatical theory. Linguists of all theoretical persuasions generally agree that a proper understanding of language-specific phenomena and the architecture of the human mind all require reference to the interfaces between components of the grammatical system of natural language, syntax, semantics, pragmatics, phonetics, phonology, etc. Thus there is a need to shift the perspective of linguistic study from static (i.e., a characterization of a string of words and its fixed structure) to dynamic (i.e., a characterization of the incremental process of building up structures) so that the interfaces of syntax with semantics and pragmatics (or other areas) can be studied in a unified way.

This book provides an in-depth exploration of a variety of interface phenomena in Chinese, a non-inflectional language where to a large extent word order constrains its interpretation and defines its grammatical functions. Under the Dynamic Syntax approach, which takes the incremental left-to-right processing of linguistic forms to be a fundamental part of characterizing the relation between syntactic structure and semantic interpretation, and also makes pragmatic inference a part of linguistic formalism, a parsimonious, straightforward explanation is provided through detailed analysis for a range of key grammatical constructions such as topic, passive, copular and cleft. Previous analyses of these constructions are sought in pure syntactic, semantic or pragmatic terms.

In chapter 1, I present a general picture of Chinese syntax and a sketch of how syntax interacts with semantics and pragmatics in the production and interpretation of the Chinese language. Chapter 2 introduces the technical tools used in the Dynamic Syntax model. In the following chapters, I provide an in-depth exploration of prominent grammatical phenomena in Chinese, some of its major grammatical constructions in particular, within the theoretical framework of Dynamic Syntax. As a parsing-based model of grammar, Dynamic Syntax takes the incremental left-to-right processing of linguistic forms to be a fundamental part of characterizing the relation between syntactic structure and semantic interpretation and makes pragmatic inference a central part of linguistic formalism.

I devote chapter 3 to addressing a prominent grammatical phenomenon – i.e., verbal underspecification in Chinese, which is manifested in the way verbs

are lexically underspecified as to the number and the type of complements (i.e., arguments and argument-like adjuncts) they can take. I show that (i) the representation of predicate-argument structure can be established dynamically at the level of propositional form, which is constructed incrementally, and (ii) just like semantically selected expressions, semantically unselected yet syntactically expressed expressions contribute to the enriched semantic composition that no abstract syntactic mechanisms need to be invoked for.

In chapters 4 and 5, I investigate topic and passive constructions, respectively, which are two major grammatical constructions, in the hope that their structural properties will be characterized from a dynamic perspective. Chapter 4 presents a comprehensive account of topic constructions, both English style and Chinese style, employing two strategies, linked structures and unfixed node. Chapter 5 provides a principled account of various patterns of the passives formed by the morpheme *bei*, and argues that the morpheme is a grammaticalized particle whose fundamental function is to signal that the pre-*bei* argument functions as an affected argument of the event expressed by the following clause, giving rise to a pragmatic type of passive interpretation.

Chapters 6, 7 and 8 explore cases of semantic underspecification. Chapter 6 proposes an analysis of copular constructions, with a particular focus on the copular morpheme *shi*, which is shown to share the characteristics of anaphoric expressions and is thus treated uniformly as a semantic placeholder – precisely, a predicate pro-form, which takes its value from context, either from the copular clause itself or from the discourse context. Chapter 7 looks at cleft construction formed by *shi*, which still treats the morpheme as a pro-predicate, which is semantically underspecified and pragmatically enriched from the local context. The dynamic analysis shows that the realization of focus in the construction is entirely through syntactic means – namely, by dislocating one of the arguments to the postcopular position. Therefore, the construction in question is a purely syntactic-focusing construction. Chapter 8 demonstrates how a unitary account of anaphora as a pragmatic process can be given. It provides both structural and functional characterizations of the different uses of *ta*, assuming that there is only a single representation of the same pronominal form, while sustaining a unitary account of anaphora as a pragmatic process.

Finally, I summarize the major findings of this study in chapter 9, where the theoretical implications of these findings for linguistic research are also discussed.

Although I develop a parsing-based dynamic account of a variety of interface phenomena in Chinese, implicit in it are some findings about the general properties of this language. Looked at from a descriptive viewpoint, the major findings of the present study are as follows: (i) the extent to which syntax, semantics and pragmatics interact in the interpretation of grammatical structures in Chinese is considerable; (ii) verbal underspecification, which is manifested in the way verbs are lexically underspecified as to the number and the type of complements, is a salient characteristic of the Chinese language; and

(iii) a full account of linguistic structures in Chinese cannot be sought in only syntactic, semantic or pragmatic terms, but should be grounded in a dynamic perspective that combines all three.

The present study demonstrates that with the dynamics of natural language encoded in linguistic formalisms, the grammatical machinery required to account for linguistic phenomena is massively simplified. The parsimonious, straightforward nature of the proposed analyses is reflected in the economical use of technical entities throughout the present study. The dynamic approach developed in the book does not involve a multiplicity of abstract, static notions but only two dynamic notions: underspecification (both syntactic and semantic) and pragmatic enrichment.

The study not only provides a novel analysis of a particular language from an interpretive viewpoint but also justifies the stance of Dynamic Syntax about linguistic knowledge. With special reference to a fascinating language such as Chinese, the book re-examines the relationship between linguistic competence and linguistic performance. Specifically, it demonstrates that a full understanding of the nature of language and the knowledge of language cannot be achieved without a better understanding of the use of that language. The subtle interaction between various kinds of linguistic knowledge in the parsing process of some major grammatical constructions is a perfect reflection of what natural languages enable human beings to do.

The book is a reworked version of my doctoral dissertation, which I completed in the Department of Linguistics at the University of Edinburgh. I am extremely grateful to my supervisor, Professor Ronnie Cann, for the linguistics he has taught me and for the high standard he has demanded of all my work throughout my doctoral study and beyond. I am also extremely grateful to my mentor, Professor Ruth Kempson, for her unfailing support, encouragement and guidance over the past years. The work in this book has also benefited enormously from exchanges with colleagues, friends and students. I would like to thank Lutz Marten, Caroline Heycock, Bob Ladd, Jim Hurford, Dora Alexopoulou, Daniel Wedgewood, Ruth Hanson, Virve Vihman, Stavros Assimakopoulos, Miriam Bouzouita and Eleni Gregoromichelaki. Special thanks also go to Adams Bodomo, Steven Matthews, Tao Gong, Lan Shuai, Olivia Lam, Yuxiu Hu and Yanhong Pan, with whom I have had fruitful discussions and collaborations during my stay in the Department of Linguistics at the University of Hong Kong.

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1 Chinese syntax
A general description

1 Introduction

The Chinese language, genetically classified as an independent branch of the Sino-Tibetan language family, displays some typological properties compared with other languages in the world. One of the salient characteristics of this language is the striking simplicity in its word formation. The simplicity of the words of Chinese can be evidenced by the fact that such a language does not manifest the morphological complexity found in inflectional languages. Specifically, Chinese has no prefixes nor suffixes nor number markers nor case markers nor agreement markers nor tense markers,[1] which is why it has been referred to as an isolating language, where each word consists of just one morpheme and cannot be further analyzed in component parts (Li and Thompson 1981).

The lack of inflectional morphology renders Chinese largely, if not entirely, dependent on word order to constrain interpretation and define its grammatical system. Unlike inflectional languages, where inflectional morphemes clearly signal certain grammatical functions of nouns such as subject, object and so on, Chinese expresses such grammatical relations by means of the ordering of nouns relative to the verb. In general, the noun preceding the verb is taken as the subject of a sentence, while the one following the verb is taken as the object of the sentence (Chao 1968), which appears to follow the subject-before-object word order universal in natural languages (Greenberg 1966). Given this primary characteristic, Chinese can be roughly described as an SVO language. However, this is not the absolute truth, of course. In actual speech, Chinese does not observe a rigid SVO word order, but instead displays a considerable degree of flexibility.

2 Word-order flexibility

Due to the lack of inflectional morphology in Chinese, there lies a possibility that such a language tends to take advantage of this central property and enjoy a considerable freedom in its grammatical system. Indeed, it has been observed that Chinese manifests a high degree of flexibility in its surface word order. Consider the examples in Figures 1.1, 1.2, 1.3 and 1.4.

women *mai* *le* *fangzi.*
1PL sell PFV house
'We sold the house'.

Figure 1.1

women *fangzi* *mai* *le.*
1PL house sell PFV
'We sold the house'.

Figure 1.2

women *ba* *fangzi* *mai* *le.*
1PL BA house sell PFV
'We sold the house'.

Figure 1.3

fangzi *women* *mai* *le.*[2]
house 1PL sell PFV
'We sold the house'.

Figure 1.4

If we take Figure 1.1 as a canonical sentence – namely, one with an SVO order, then Figure 1.2 obviously has an SOV order. The same is true of Figure 1.3, if we follow the common practice of treating the particle *ba* as the object marker. As regards Figure 1.4, it is undoubtedly an OSV order, though the fronted object NP has certain topical properties from a discoursal perspective. All the sentences are perfectly grammatical and frequently used in everyday conversation, though one pattern may be more preferable than another to a particular speaker, or more applicable than another to a particular context.

The word order variation has engendered a lot of controversy over the issue involving the basic structure of Chinese. It certainly begs at least one question: What is the basic order of such a language? Two theses concerning word order have emerged as a result of debate among researchers. Some linguists such as Li and Thompson (1976, 1981) assert that Chinese is undergoing a change from SVO towards SOV and is becoming a topic-prominent language, whereas others such as Sun and Givón (1985) claim that Chinese is a typical and rigid SVO language such as English and the OV construction is only an emphatic or a contrastive discourse device.

It seems problematic to provide a definite answer to the question concerning the basic structure in Chinese given the hard fact that both SVO and SOV constructions co-exist in such a fascinating language. Just as we have no complete proof that SOV is in the process of becoming a preferable pattern,

we equally have no complete proof, as Sun and Givón (1985) themselves admit, that SOV order is in every detail an emphatic or a contrastive discourse device. Of the earlier four examples, the construction in Figure 1.4 is structurally akin to the left-dislocation structure in English and functionally can be employed as a contrastive device. Compare Figure 1.5, a Chinese example adapted from Figure 1.4, and Figure 1.6, an English example with the leftmost element being emphasized and contrasted with the initial NP in the subsequent utterance.

But for the sentences in Figure 1.1 to Figure 1.3, they are all perfectly natural if employed as an answer to a question such as the one in Figure 1.7, which implies that an SOV structure as in Figure 1.2 to Figure 1.3 does not invariably function as a contrastive discourse device.

Although it is true that sometimes word order variation is likely to be motivated by semantic or pragmatic considerations, what is significant is the fact that the constructions demonstrated in the earlier out-of-context examples are all grammatical devices employed in the Chinese language. If we have to make a generalization about its structural properties, we may tentatively draw a conclusion that Chinese does not have a rigid SVO word order as English does, but it does have a rigid SV construction at its very heart, with the remaining elements freely ordered with respect to this according to communicative contexts.

fangzi	*women*	*mai*	*le;*	*qiche*	*(women)*	*mei*	*mai.*
house	1PL	sell	PFV	car	1PL	not	sell

'The house we sold, the car we didn't'.

Figure 1.5

Potatoes we like, tomatoes we don't.

Figure 1.6

A:	*nimen*	*zenme*	*yixiazi*	*you*	*zheme*	*duo*	*qian?*
	2PL	how	suddenly	have	so	much	money
	'How could you suddenly have so much money?'						
B1:	*women*	*mai*	*le*	*fangzi.*			
	1PL	sell	PFV	house			
	'We sold the house'.						
B2:	*women*	*fangzi*	*mai*	*le.*			
	1PL	house	sell	PFV			
	'We sold the house'.						
B3:	*women*	*ba*	*fangzi*	*mai*	*le.*		
	1PL	BA	house	sell	PFV		
	'We sold the house'.						

Figure 1.7

3 Semantics in syntax

The fact that in Chinese grammatical relations among constituents are coded by means of surface word order to a large extent opens up the possibility that there could be more interaction between syntax and semantics in this language than inflectional languages where grammatical functions of syntactic units are in general indicated by means of inflectional morphology. It has been observed by a number of linguists (e.g., Mullie 1932; Chao 1968; Li and Thompson 1976) that word order in Chinese often carries a lot of semantic functions, which shows a high correlation between syntax and semantics.

One piece of evidence is that the interpretation of a noun phrase has a different result in reference to its syntactic position. Specifically, preverbal and postverbal positions often signal a semantic distinction for nominal expressions. Chao (1968, p.76), who treats a preverbal NP as a subject and a postverbal one as an object, has provided an explanation of the semantic contrast in terms of information:

> The subject is likely to represent the known while the predicate introduces something unknown . . . Thus there is a very strong tendency for the subject to have a definite reference and the object to have an indefinite reference.

Consider the following examples (Figures 1.8–1.11) where bare NPs appear in both subject and object positions.[3]

laoshi *chuban* *guo* *shu.*
teacher publish EXP book
'The teacher has published a book'.

Figure 1.8

laoban *zai* *xie* *baogao.*
Boss DUR write report
'The boss is writing a report'.

Figure 1.9

Shu *chuban* *le.*
Book Publish PFV
'The book has been published'.

Figure 1.10

baogao *xiewan* *le.*
Report finish PFV
'The report is finished'.

Figure 1.11

As shown in the English translations of Figure 1.8 to Figure 1.9, native speakers tend to assign a definite reading to the preverbal NPs *laoshi* 'teacher' and *laoban* 'boss', and an indefinite reading to the postverbal NPs *shu* 'book' and *baogao* 'report'. However, when the same bare NPs appear before the main verb as exhibited in Figure 1.10 to Figure 1.11, they receive a definite interpretation as indicated by the translations. One may argue that linguistic behaviour of this sort is not particular to one language since it is a widespread tendency among languages to place old information, hence definite NPs, before new information, hence indefinite NPs. However, the significance of the linguistic phenomenon in Chinese lies in the systematic aspect of the correlation between syntax and semantics.

Another piece of evidence for the effect of semantics on syntax in the Chinese grammatical system is the interpretation of adverbial expressions with regard to the verb. Just like nominal expressions, semantic differences often arise between preverbal and postverbal positions for adverbial expressions such as temporal expressions and locative expressions (Li and Thompson 1981). Take temporal expressions as an example. A general tendency in terms of semantics is that punctual time phrases are prone to appear preverbally, whereas durative time phrases are prone to occur postverbally. The following examples (Figures 1.12–1.13) are illustrative of such a semantic tendency.

Given the systematic interaction between semantics and syntax in Chinese, native speakers would have to resort to semantics to resolve syntactic problems in some cases. Since Chinese displays a considerable degree of word-order flexibility, as discussed earlier, sometimes more than one noun phrase can precede the verb, which naturally raises a question as to how to determine their grammatical functions. Consider the following sentence (Figure 1.14) where there is usually a short pause after the initial noun phrase.

a.	*wo*	*shi*	*dianzhong*	*qichuang*	
	1SG	ten	o'clock	get up	
	'I get up at ten o'clock'.				
b.	**wo*	*qichuang*	shi	dianzhong	
	1SG	get up	ten	o'clock	

Figure 1.12

a.	*wo*	*shui*	*le*	*shi-ge*	*zhongtou*	
	1SG	sleep	PFV	ten-CL	hour	
	'I slept for ten hours'.					
b.	**wo*	*shi-ge*	*zhongtou*	*shui*	*le.*	
	1SG	ten-CL	hour	sleep	PVF	

Figure 1.13

Zhangsan	*Zhongwen*	*wo*	*jiao*	*guo*	*(ta).*
Zhangsan	Chinese	1SG	teach	EXP	3SG
'As for Zhangsan, Chinese I taught (him)'.					

Figure 1.14

Since subject is not a structurally well-defined notion in Chinese (see Chao 1968; Li and Thompson 1981), one has to examine the semantic relationship of noun phrases with the verb. With the help of the phonological cue, one is able to identify the leftmost NP *Zhangsan* as the topic of the sentence; namely, it is what the rest of the sentence is about. With the help of semantics, one should then be able to identify *wo* 'I' as the subject of the sentence and *Zhongwen* 'Chinese' as the (fronted) object of the sentence,[4] because the former as the agent performs the teaching action, while the latter as the theme receives the teaching action. Clearly, the notion of subject employed here is based on the semantic ground, viz. the subject of a sentence in Chinese, as defined by Li and Thompson (1981), is the noun phrase that has a 'doing' or 'being' relationship with the verb in that sentence.

4 Pragmatics in syntax

It is advisable to assume that pragmatics may play an important role in the flexibility of word order and the interplay between semantics and syntax. The definiteness versus indefiniteness interpretation of bare noun phrases in preverbal and postverbal positions, for instance, is also a manifestation of pragmatic factors in constituent ordering since it is a general tendency in language use to place known information at the beginning of a sentence and new information at the end of a sentence. As a matter of fact, pragmatic considerations have a strong effect on linguistic performance in Chinese as well as its surface word order.

As is well known, Chinese has the freedom of omitting any argument when it is clear that it can be recovered from the context. Apart from the pro-drop property, Chinese could go as far as to omit any constituent if the message to be conveyed, however parsimonious, is comprehensible to the hearer. There is a joke that could best show how Chinese speakers observe Zipf's economy, Grice's maxim of quantity or Sperber and Wilson's principle of relevance by using language as a pragmatic tool. It goes like this: two strangers see each other in the dark and they then start a conversation as follows (Figure 1.15):[5]

A: *shui*? ('who')
B: *wo*. ('me')
A: *zhua*? ('what', a northern dialect)
B: *niao*. ('pee')

Figure 1.15

The joke is simply a case showing that Chinese attempts to speak as little as possible, for which we have a set of good pragmatic theories. In some cases, Chinese tend to speak a bit more, for which we seem to lack a good theory though it is in essence a matter of pragmatics. Consider the following sentences (Figures 1.16–1.18):

Lisi pao le (Beijing) ***ji-tang***.
Lisi run PFV Beijing several-times
'Lisi made several trips (to Beijing)'.

Figure 1.16

Wangwu deng le (ni) ***ban-tian***.
Wangwu wait PFV 2SG half-day
'Wangwu waited (for you) for a long time'.

Figure 1.17

Zhangsan chi le ***yi-bu***.
Zhangsan late PFV one-step
'Zhangsan was late by one step'.

Figure 1.18

laoshi kanjian le Lisi.
teacher see PFV Lisi
'The teacher saw Lisi'.

Figure 1.19

Lisi bei laoshi kanjian le.
Lisi Bei teacher see PFV
'Lisi was seen by the teacher'.

Figure 1.20

Expressions like the boldfaced ones in Figure 1.16 through Figure 1.18 are adjuncts in the eyes of modern linguists, precisely frequency phrases as in Figure 1.16, duration phrases as in Figure 1.17 and extent phrases as in Figure 1.18. They may not necessarily mean what they literally mean. However, for native speakers, these adjunct expressions seem sort of obligatory because otherwise hearers would feel that the relevant utterances are a bit infelicitous. These expressions, which both transitive and intransitive verbs are allowed to take, naturally blur the distinction between arguments that are taken to be obligatory and adjuncts that are thought to be optional.

The relative effect of pragmatics is not only confined to linguistic performance in general but also in certain grammatical constructions. Take the *bei* construction, the typical passive construction, as an example. Unlike English, passives which are of derived voice nature, Chinese passives generally, if not exclusively, display a pragmatic nature. To illustrate this point, consider the following active-passive pair and their English translations (Figures 1.19–1.20).

The active sentence in Figure 1.19 simply describes a seeing event in which the semantics of 'see', a verb of perception, is neutral, and the Chinese sentence is corresponding in every way to its English counterpart. However, the passive sentence in Figure 1.20 is in no way equivalent to its English counterpart, because for native speakers, the *bei* construction often carries an unfortunate or pejorative message. In the case of Figure 1.20, it implies the adverse situation *Lisi* would face subsequent to the seeing event – i.e., he might be severely scolded for his mischief or even punished consequently. Clearly, the adverse implication of *bei* construction is reached via a relevance-based interpretation, given that teachers are usually considered stern in the Chinese cultural context. This example illustrates that translation of voice in Chinese from active to passive is pragmatically grounded to a large extent, given that *bei* construction generally shows some salient pragmatic commitments.

The prominent role played by pragmatics in Chinese syntax has prompted some researchers to label Chinese as a 'pragmatic' language as opposed to English-type 'syntactic' languages (e.g., J. Huang 1984; Y. Huang 1994; Liu 1995; Lu 2013). Since pragmatics does a lot of work in the production and interpretation of the Chinese language, many of its grammatical constructions display another salient property – namely, hidden complexity, which may involve pragmatic inferences in the course of interpretation (see Bisang 2009, 2014, 2015 for a detailed discussion).[6]

5 Overview of the book

In the foregoing introductory discussion, I have presented a general picture of Chinese syntax and a sketch of how syntax interacts with semantics and pragmatics in the production and interpretation of the Chinese language. In the following chapters, I shall provide an in-depth exploration of prominent grammatical phenomena in Chinese, some of its major grammatical constructions in particular, within the theoretical framework of Dynamic Syntax (Kempson et al. 2001; Cann et al. 2005). As a parsing-based model of grammar, Dynamic Syntax (henceforth DS) takes the incremental left-to-right processing of linguistic forms to be a fundamental part of characterizing the relation between syntactic structure and semantic interpretation, and makes pragmatic inference a central part of linguistic formalism.

The next chapter, which is entitled "The Dynamics of Language Processing", provides an introduction to the technical tools used in the DS model. I then devote chapter 3 to addressing a prominent grammatical phenomenon – i.e., verbal underspecification in Chinese – which is manifested in the way verbs are lexically underspecified as to the number and the type of complements (i.e., arguments and argument-like adjuncts) they can take. I show that (i) the representation of predicate-argument structure can be established dynamically at the level of propositional form which is constructed incrementally and (ii) just like semantically selected expressions, semantically unselected yet syntactically

expressed expressions contribute to the enriched semantic composition that no abstract syntactic mechanisms need to be invoked for.

In chapters 4 and 5, I investigate topic and passive constructions, respectively, which are two major grammatical constructions, in the hope that their structural properties will be characterized from a dynamic perspective. Chapter 4 presents a comprehensive account of topic constructions, both English style and Chinese style, employing two strategies, linked structures and unfixed node. Chapter 5 provides a principled account of various patterns of the passives formed by the morpheme *bei*, arguing that the morpheme is a grammaticalized particle whose fundamental function is to signal that the pre-*bei* argument functions as an affected argument of the event expressed by the following clause, giving rise to a pragmatic passive interpretation.

Chapters 6, 7 and 8 explore cases of semantic underspecification. Chapter 6 proposes an analysis of copular constructions, with a particular focus on the copular morpheme *shi*, which is shown to share the characteristics of anaphoric expressions and is thus treated uniformly as a semantic placeholder, precisely a predicate pro-form which takes its value from context, either from the copular clause itself or from the discourse context. Chapter 7 looks at cleft construction formed by *shi*, which still treats the morpheme as a pro-predicate, which is semantically underspecified and pragmatically enriched from the local context. The dynamic analysis shows that the realization of focus in the construction is entirely through syntactic means – namely, by dislocating one of the arguments to the postcopular position. Therefore, the construction in question is a purely syntactic focusing construction. Chapter 8 demonstrates how a unitary account of anaphora as a pragmatic process can be given. It provides both structural and functional characterizations of the different uses of *ta*, assuming that there is only a single representation of the same pronominal form, whereas sustaining a unitary account of anaphora as a pragmatic process.

Finally, the major findings of this study are summarized in chapter 9, where the theoretical implications of these findings for linguistic research are also discussed.

Notes

1 There is one exception in terms of number markers. In Chinese, pronouns or nouns referring to people can be marked with – *men*, which corresponds to plural in English – e.g., *wo* 'I/me'→ *women* 'we/us', *ni* 'you' → *nimen* 'you', *ta* 'he/she/it' → *tamen* 'they/them'.

2 In sentences such as the one in Figure 1.4, there is not necessarily an intonational break between the two preverbal noun phrases *fangzi* 'house' and *women* 'we'. Optionally, the initial noun phrase could take a pause particle *a*, *ma*, *ya*, etc., but this would result in a topic construction which, as will be discussed in chapter 4, is essentially different from the construction in Figure 1.4.

3 Of course, native speakers are allowed to make the preverbal bare NPs morphologically definite by marking them with demonstratives such as *zhe-wei laoshi* 'this teacher' and *na-ge laoban* 'that boss', and the postverbal bare NPs morphologically

indefinite by marking them with numerals such as *yi-ben shu* 'a book' and *yi-fen baogao* 'a report'.

4 As will be discussed later in chapter 4, constituents such as *Zhongwen* 'Chinese' are the focus of the sentence – precisely, a topicalized focus in contrast to the topic of the sentence which is either morphologically or phonologically marked.

5 In English, the conversation would usually carry on as follows:

A: Who is over there?
B: It's me.
A: What are you doing?
B: I'm having a pee.

6 This can best be illustrated by *chi* 'eat', one of the most commonly used verbs in Chinese. It can be followed by a variety of semantic types of NP, such as *shitang* 'dining hall', *fumu* 'parents', *shouyi* 'craftsmanship', *huanjing* 'environment' and *jiankang* 'health'. The interpretation of (at least some of) these [chi + Non-patient NP] expressions may involve pragmatic reasoning, though they are simple in terms of form.

2 The dynamics of language processing

1 A preliminary introduction

Before demonstrating the DS architecture (Kempson et al. 2001; Cann et al. 2005), I shall first introduce its stance about a theory of linguistic knowledge. From a common-sense view, it should be a simple matter to provide an answer to a question as to what it means to know a language such as Chinese and English. At the very least, knowing a language means having the capacity to communicate in that language, such as being able to interpret what is being said and being able to say meaningful utterances. Such a common-sense view, which shows a close correspondence between language capacity and language use, naturally allows linguists to adopt a linguistic methodology of taking the latter as a point of departure from which the former can be explained – a departure different from the standard practice that has dug a gulf between linguistic competence and language use.

DS as a reflex of the common-sense view of language takes the stance that linguistic knowledge involves the capacity to process natural language input. Based on such a preliminary assumption, DS attempts to provide a formal account of natural language by characterizing its parsing process in which various kinds of linguistic knowledge, such as syntactic, semantic and pragmatic properties, contribute to the ultimate goal of interpretation. As a formal model of natural language understanding, it defines the parsing process as a progressive building up of representations of content. The novelty of such a model lies in the fact that it takes the formal articulation of the parsing process as a basis for syntactic explanations of natural languages. Hence this paradigm can be considered a parsing-directed grammar formalism. Before demonstrating how syntactic explanations become possible through the dynamics of semantic interpretations, we set out two challenges that all grammar formalisms face for the purpose of providing some preliminary justification for the DS methodology.

1.1 Compositionality and context-dependency

All human languages display two central properties, which constitute two major problems challenging all linguistic theories. One is compositionality in

the sense that individual words can be combined into sentences at arbitrary depths of complexity. The other is context-dependency in the sense that almost every linguistic expression can be taken to express different interpretations in different contexts. For theoretical linguists, the problem of characterizing the compositional property of language, then, is to articulate the interaction between the ordering of words and their interpretation within a sentence, whereas the problem of characterizing the context-dependent property of language is to explain the association between interpretation of words and those neighbouring them.

The common practice in addressing the two problems is that the first one is usually considered a syntactic one, and hence syntacticians take up the challenge, while the second problem is uniformly considered a semantic one, and semanticists or pragmaticists take up the challenge. Yet, as will be discussed in this section, both the problem of compositionality and the problem of context-dependency truthfully reflect the intrinsic properties of language, viz. the way language is used in context. In addition, there is systematic interaction between the two sorts of phenomena, with linguistic expressions whose semantic interpretation is determined in context feeding into structural processes in different ways (cf. Cann et al. 2005).

The compositional property of language reflects the capacity of human beings to systematically construct structurally complex sentences and assign some semantically interpretable content to each of them. Accordingly, linguistic knowledge does not mean merely having the capacity to string individual words together to establish an arbitrary structure. Instead, it means having the capacity to string them together in such a way that they can be taken to have an interpretation that has itself been assigned in a systematic fashion. Seen from this perspective, there is a systematic correspondence between syntax and semantics – the underlying significance of which does not seem to have been sufficiently recognized since the problem of syntax-semantics dependence has been generally given an exclusively syntactic explanation, and the problem of context dependence purely semantic explanation.

The sharp separation between syntactic and semantic explanations of properties of language often results in a tension between the characterization of how words are grouped together to form strings (syntax), which often involves static representations of syntactic structure, and characterization of how such strings are assigned an interpretation (semantics), which is assumed to depend on how information is established in context. One of the consequences of such a sharp separation is that when it comes to the mapping from syntactic structure to semantic structure, linguists would come up against a lot of empirical evidence resisting the formal stance. Attempts to resolve the problems often result in postulating multiple levels of highly abstract structures, as in mainstream theories of language, which inevitably makes complicated the grammatical machinery required to account for linguistic phenomena.

To resolve the theoretical problem, therefore, we would have to consider a methodology able to address the problems of syntax-semantics dependence

and context dependence, and a framework able to characterize both the compositional and context-sensitive properties of natural language. Based on the assumption that intrinsic properties defining language is a direct reflection of the way it is used in context, DS takes the stance that both syntactic and semantic explanations can be articulated in terms of the dynamics of language. Accordingly, it takes parsing as the basic task of defining a dynamic system and places time linearity and context dependency at the heart of such a system on the ground that they determine the progressive building of information during the parsing process. With a definition of parsing as a goal-directed updating process, the syntactic properties of language can become explicable in terms of the development of structure relative to context against which choices can be made. The concept of context is, therefore, not only sentence by sentence but also word by word.

1.2 Interpretation and representation

To devise a parsing-directed framework that attempts to characterize both the syntactic and semantic properties of language from a dynamic perspective, we are naturally concerned with three principal questions: What interpretation for a natural language string is constructed relative to a particular context? How do components contribute to the overall interpretation? How can the characterization of the parsing process constitute the basis for explaining the structural properties of language? With the appropriate answers to these questions, we may get a feel for the general spirit of DS, as well as its formal basis, for the purpose of better understanding its technical apparatus, which will be presented in the next section.

DS provides a formal model of natural language interpretation on the assumption that the parsing process is a process of constructing representations. Its theoretical framework is set within the representationalist methodology of Fodor (1981, 1983), who proposes that all cognitive processing involves the construction of mind-internal representations, and humans process incoming information from external stimuli and assign interpretation to a signal by means of this internal representational system. Following the spirit of Fodor, DS defines interpretation for a natural language string as a process of establishing some logical formula as representation of content attributed to that string relative to context. Furthermore, DS shares with the relevance-theoretic assumption (Sperber and Wilson 1995) that human reasoning is goal-directed to the maximally efficient processing of maximally relevant information,[1] and hence further defines natural language processing as a goal-driven process. The overall goal is to construct some full representation as interpretation.

To reflect the compositional properties of language– namely, individual words can combine into larger constituents – DS models language processing as a task of the incremental building of structured representations of the interpretation assigned to a string uttered in context. In other words, the goal of constructing an eventual representation may start from a very partial structure

representing an incomplete interpretation, which is increasingly enriched through the processing of more lexical items. This directly reflects the way human beings process information: they can manipulate partial information and systematically map it into another using each piece of information provided as context for processing subsequent information.

As will be shown in section 2.3, the update process of building up representations is based on a left-to-right, word-by-word basis, reflecting not only the time linearity of information building in natural language processing but also the step-by-step parsing procedure towards the goal of establishing an eventual representation. The process of parsing a sentence, for instance, is a process of progressively establishing semantically transparent structures, bit by bit, through the parse of each word – initially starting with very incomplete structures and ultimately deriving a complete propositional structure representing the interpretation assigned to that sentence. Given that lexical items provide the input to the representations of content, DS, in line with other frameworks such as HPSG and LFG, assigns a central role to the lexicon. Within DS, lexical information is employed to build more articulated representation by adding information and providing instructions. To reflect the context-dependent property of language, the parsing process in DS also involves taking information independently established in context, as in the processing of anaphora, which generally requires pragmatic operations.[2]

Finally, a very brief word about the ultimate question, as a more detailed discussion will be provided in section 2.3. Although the overall construction process ends up with some full representation, it involves a set of transitions from very partial representations to more complete ones, as more information from lexicon comes in. What distinguishes DS from other frameworks is that the structural properties of language are not characterized in some static configuration, but through the dynamics of transitions from one structure to another. It is in this sense that syntax has been made dynamic. Therefore, syntactic explanations, which are encapsulated in the dynamic transitions, have to make reference to the process of building up representations.

1.3 Underspecification and resolution

As discussed in the preceding subsection, natural language interpretation in DS is an incremental process of constructing structured representations. The whole process of construction, which is geared towards some complete representation of content, characteristically involves successive updating of representations as parsing proceeds. This is because at different stages of the parsing process, there may exist various aspects of incomplete interpretation. More information, either from lexicon or from context, makes possible the transition from a partial structure to a richer structure, viz. the update from an incomplete specification of interpretation to a full specification of interpretation. The

incompleteness of interpretation occurring at every intermediate step of the interpretive process justifiably licenses DS to incorporate the concept of underspecification into its framework.

Underspecification is manifested in a number of different ways, and its resolution could best reflect the dynamics of natural language interpretation. One typical form of underspecification is the so-called long-distance dependency that is generally taken to constitute a central challenge for any syntactic explanation. Consider how to interpret the following Chinese sentence (Figure 2.1):

Lisi,	*wo*	*jide*	*ni*	*shuo*	*guo*	*ai*	*he*	*jiu.*
Lisi	1SG	remember	2SG	say	EXP	love	drink	wine

'Lisi, I remember you once said he likes drinking'.

Figure 2.1

The noun phrase *Lisi* at the left periphery of the sentence is a long distance from the position where it is supposed to be interpreted. In other words, it appears to be in the wrong position, or displaced from an appropriate position, because there is no way to reflect the semantic compositionality. Put simply, this left-peripheral word cannot combine with its neighbouring word *wo* 'I' to build up a straightforward semantic interpretation.

Now consider what is involved in the parse of the left-dislocated expression. From a parsing perspective, sentences with a left-dislocation structure such as Figure 2.1 present a particular form of structural underspecification. At the point of processing the leftmost expression, one cannot decide what precise contribution it makes to the interpretation of the whole sentence. To construe it as the subject of the verb phrase *ai he jiu* 'love drinking', one has to relate the initial position with some position in the string – its interpretation site. Reflecting this observation, DS defines the initial expression as projecting an unfixed node, a fixed position of which is determined later within the structured representation as more lexical items are processed. The resolution of the initial underspecification is apparently part of the dynamics of the parsing process. This example gives a sketch of how the characterization of the interpretive process makes available the characterization of structural properties of natural language.

Apart from the underspecification of position, natural language expressions may display the underspecification of content, as in the case of anaphoric expressions. The interpretation of anaphoric expressions presumably involves the resolution of semantic underspecification, which actually involves updating from an incomplete representation to an articulated representation. The update process, as will be discussed in section 3.4, is a process of pragmatic substitution. Consider how to interpret the pronouns in the following sentence (Figure 2.2):[3]

jinguan	*Mei*	*Xiaojie*	*taoyan*	*Mao*	*Xiansheng*,	*ta*	*haishi*	*jiagei*
although	Mei	Miss	dislike	Mao	Mr.	3SG	still	marry
le	*ta.*							
PFV	3SG							

Figure 2.2

Without recourse to the first clause, we only know from the second clause that some female individual married some male individual, given that in Chinese the subject of the verb *jia* 'marry' can only be some female person. In this sense, the denotational content of the two pronouns is underspecified, since their contentful values depend on the antecedents they have in context. To resolve the semantic underspecification of the anaphoric expressions, we would have to refer to the contextual information to yield a specific interpretation. Reflecting the context-dependent properties of natural language, pronominal expressions in DS are treated as placeholders whose values would be enriched by the information established in context. Specifically, the initial incomplete specifications of interpretation should be replaced by context-particular representations of content. The replacement is implemented through general pragmatic operations, which applies as part of the parsing process.

The characterization of underspecification and its resolution, as will be shown in the next section through DS's formal tools, is the central task of this particular model of natural language interpretation. It demonstrates how humans employ various kinds of information, such as syntactic, semantic and pragmatic, during the interpretive process, and simultaneously justifies the DS stance about linguistic knowledge – namely, knowing a language means knowing how to process it.

2 The tools of dynamic syntax

This section introduces the technical concepts and the formal tools of DS, setting out the architecture for describing the process of constructing representations of content relative to context against which choices can be made as the parsing process proceeds.

2.1 Tree-logic and treenode decorations

To model the process of building structured representations of interpretation on a left-to-right sequence of words, DS employs the concept of a tree structure to represent the semantic structure of interpretations assigned to words uttered in context, rather than the syntactic structures defined over words in a string. The interpretive process in DS is thus a process of tree growth, initially beginning with some very partial structure and then increasingly enriching that structure and ultimately ending with some completed structure.

The formal backbone of the dynamic process of tree growth is the logic of finite trees (LOFT) (Blackburn and Meyer-Viol 1994; also see Kempson et al. 2001) – a modal logic that describes binary tree structures, reflecting the

mode of semantic combination in functional application. Nodes in a tree may be identified by their assigned addresses consisting of a numerical index ranging over 0 and 1. Following the conventional pattern, the argument daughter of a node is assigned the index *n*0 and placed on the left side, and the functor daughter, the index *n*1, is placed on the right side. This locational information may be expressed by the predicate *Tn* (treenode), which takes some index as value, as illustrated in Figure 2.3.

The language of description used in the DS framework includes not only the vocabulary that describes individual nodes but also modal operators that describe the relation between treenodes. There are two basic modalities with one corresponding to the daughter relation, ⟨↓⟩ 'down', and the other corresponding to the mother relation, ⟨↑⟩ 'up', which can be used with or without the numerical subscript. In addition, modality operators can be iterated – e.g., ⟨↓⟩⟨↓⟩, ⟨↑⟩⟨↑⟩, ⟨↓⟩⟨↑⟩, ⟨↑⟩⟨↓⟩ – thus providing a means of identifying from one node in a tree that certain property holds for some other node a means to express additional requirements that need to be satisfied at some other node other than the current node. Hence the statements in Figure 2.4 are all true of a tree from the node *n* (cf. Cann et al. 2005).

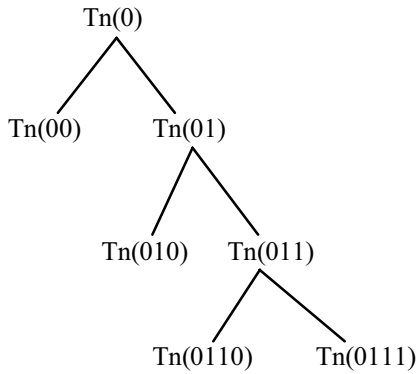

Figure 2.3 Tree locations

$\langle\downarrow_0\rangle$X	X holds at the argument daughter of *n*
$\langle\downarrow_1\rangle$X	X holds at the functor daughter of *n*
⟨↓⟩X	X holds at the daughter of *n*
⟨↑⟩X	X holds at the mother of *n*
$\langle\downarrow_*\rangle$X	X holds at a node dominated by *n*
$\langle\uparrow_*\rangle$X	X holds at a node that dominates *n*
⟨↓⟩⟨↓⟩X	X holds at *n*'s daughter's daughter
⟨↑⟩⟨↑⟩X	X holds at *n*'s mother's mother
⟨*L*⟩X	X holds at a node that is linked to *n*
$\langle L^{-1}\rangle$X	X holds at a node that *n* is linked to

Figure 2.4 From node *n*

Ty(e)	Individual term
Ty(t)	Proposition
Ty(e → t)	(one-place) Predicate
Ty(e → (e → t))	(two-place) Predicate
Ty(e → (e → (e → t)))	(three-place) Predicate
Ty(t → (e → t))	(Proposition-taking) Predicate
Ty(t → t)	Sentential modifier
Ty((e → t) → (e → t))	Adverbial modifier
Ty(cn)	Nominal
Ty(cn → e)	Determiner

Figure 2.5 Common types

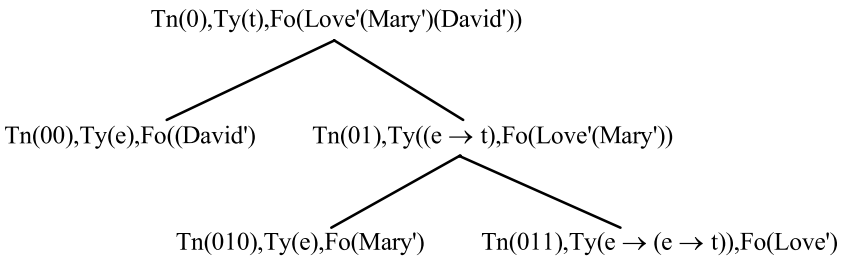

Figure 2.6 Representation of interpreting *David loves Mary*

In addition to the description representing the locational information, declarative units (DU) decorate nodes in a tree, mainly representing the semantic information holding at a given node. The DUs consist of a set of labels expressing a range of different sorts of information, among which two are most commonly used. One label is *Fo*, the formula value representing the concepts expressed by words uttered in context. *Fo(Elizabeth')*, for instance, is the representation of the concept we construct from the English word *Elizabeth*. Depending on context, it may refer to the current queen in the UK or a particular individual bearing the name 'Elizabeth'.

The other label is *Ty*, the type value that not only provides the information about the semantic type of an expression but also associates the expression with a particular sort of denotation. Thus type *t* is a propositional type denoting a truth value, and type *e* is a term denoting some entity. Complex types, including functor ones, provide information about the number and types of arguments with which a particular expression can combine. DS only employs a small set of basic types *e*, *t*, *cn*,[4] on which the complex types are represented as conditional statements. The most common types used in the DS system are listed in Figure 2.5 (cf. Kempson et al. 2001).

With the treenode descriptions, we can now provide a sketch of how the interpretation of a sentence such as *David loves Mary* is established through the construction of structured representations. The tree in Figure 2.6, where

nodes are decorated with semantic information as well as locational information, shows how the tree growth results in a propositional formula as the eventual representation by means of combining information from the functor nodes with information from the argument nodes.

2.2 Requirements and tree growth

As introduced in the previous subsection, the parsing process in DS is defined as a process of tree growth. Intrinsic to this parsing process, as discussed in section 1, are concepts of underspecification which are manifested in a variety of ways. The driving force of tree growth is thus the need to specify underspecified information. From this perspective, the development of tree is also a process of satisfying a set of requirements for resolving various forms of underspecification.

A requirement is used to specify a goal to be undertaken and is indicated by a question mark in front of the label to be instantiated. The use of requirements accompanies the development of a tree: at a particular stage of the parsing process, nodes in a partial tree are always decorated with outstanding requirements as well as declarative units. The starting point of tree growth, for instance, is to build a tree the root node of which is formally introduced as *?Ty(t)* by the rule called Axiom, a universal requirement to build a representation of a propositional content as interpretation. Such a requirement provides the minimal initial tree with only a root node underspecified of content but with a specified goal of constructing a formula of type *t*, reflecting the DS stance that natural language processing is goal-directed.

Requirements can only be satisfied through the achievement of the specified goal, usually by establishing formulae of particular types with information from the lexicon. The overall goal *?Ty(t)*, for instance, is then achieved when the processing of the information provided by a string of words results in a complete propositional formula. The label *Ty(t)* is only allowed to be annotated on the root node of a tree until after the universal requirement is fulfilled. Given the incremental nature of the parsing process, the overall goal often leads to subgoals allowing more and more coming information to be processed. Therefore, in the DS model, nodes in partial trees are usually introduced with some declarative units and a set of requirements specifying the smaller goals to be achieved, as illustrated in Figure 2.7.

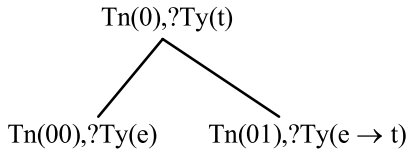

Figure 2.7 Initial expansion of the tree

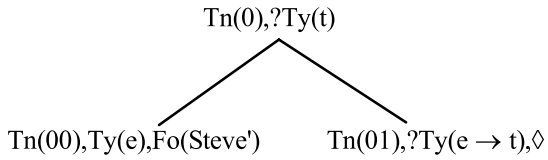

Figure 2.8 Parsing *Steve*

The tree in Figure 2.7 shows that the achievement of the overall goal relies on the satisfaction of at least two subgoals — namely, the requirements to develop the root node into two daughter nodes, which in turn relies on incorporation of the lexical information into the tree. To indicate a node is under construction, DS makes use of a pointer symbol ◊, which is a part of language for the description of tree growth. The pointer shows the current task state under development during the parsing process.

In general, the requirement holding at a specific node must be fulfilled if it is highlighted by the presence of the pointer. Supposing that the processing of a string such as *Steve smokes* reaches a stage as shown in Figure 2.8.

The pointer in the partial tree indicates that subsequent to the successful parse of the subject NP *Steve*, the node under construction is the functor node and the current task state is then *?Ty(e → t)*, which is a requirement to build a one-place predicate. This allows the verb *smoke* to be processed and to induce a sequence of lexical actions since as input it can meet the current requirement. Since the pointer provides important information about tree growth, its movement plays a significant role in the analyses to be presented in the subsequent chapters.

3 The dynamics of the parsing process

This section introduces how DS makes use of the formal tools presented earlier to characterize the dynamics of the parsing process and hence fleshes out the mechanism governing the DS system. As already pointed out, the development of tree is a step-by-step procedure, constantly involving transition from one parse state to another. The transitions, as will be shown next, are implemented through three types of action: computational, lexical and pragmatic, which constitute the major components of the DS architecture as a linguistic formalism.

3.1 Computational rules

Transitions from parse state to parse state are licensed either by a number of computational rules or by lexical instructions. The computational rules are general transition rules which constrain the way trees are developed and are formally stated in terms of tree descriptions, with an input description and an output description, as shown in Figure 2.9.

$$\frac{\text{Input Tree Description}}{\text{Output Tree Description}} \qquad \frac{\{\ldots\phi\ldots\Diamond\}}{\{\ldots\psi\ldots\Diamond\}}$$

Figure 2.9 Transition rules

$$\frac{\{\ldots ?Ty(Y)\ldots\Diamond\}}{\{\ldots ?Ty(Y),\ ?\langle\downarrow_0\rangle Ty(X),\ ?\langle\downarrow_1\rangle Ty(X\ \rightarrow\ Y),\ldots\Diamond\}}$$

Figure 2.10 Introduction

$$?Ty(Y),\Diamond \Rightarrow ?Ty(Y),?\langle\downarrow_0\rangle Ty(X),?\langle\downarrow_1\rangle Ty(X\rightarrow Y),\Diamond$$

Figure 2.11 Tree growth

In what follows, I shall only introduce those transition rules which are of direct relevance to the present study, but shall not discuss them in detail nor present a lot of examples, since applications of these rules will be demonstrated in a step-by-step way in the analyses throughout the subsequent chapters. Rules concerning the construction of trees will be introduced before those concerning the completion of trees.

3.1.1 Introduction and prediction

A rule called Introduction licenses additional requirements to some node to the effect that one initial goal can be divided into two subgoals to require the tree to grow, viz. we can use the rule to add further requirements for two daughter nodes of certain types to a node that already has a type requirement. The formal definition is given in Figure 2.10 in terms of tree descriptions and shown in Figure 2.11 in terms of tree growth.[5]

Note that the rule of Introduction merely adds to a node with a requirement to find an expression of type Y requirements to have two daughter nodes – one decorated with an expression of type X and the other an expression of type $X \rightarrow Y$. So the tree in Figure 2.11 has not grown into a tree with three nodes, but it is still a tree with only one node. It is a second rule of Prediction that licenses the construction of the two required nodes decorated with requirements to be annotated with expressions of required types. The formal definition is stated in Figure 2.12 in terms of tree descriptions and shown in Figure 2.13 in terms of tree growth.

The correlation between the two computational rules is clear: Introduction licenses the introduction of modal requirements, while Prediction translates them into non-modal requirements by building the appropriate nodes with required types. The effect of these two transition rules can be illustrated by

$$\frac{\{Tn(n),\ \ldots,\ ?\langle\downarrow_0\rangle\phi,\ ?\langle\downarrow_1\rangle\psi,\Diamond\}}{\{\{Tn(n),\ \ldots,\ ?\langle\downarrow_0\rangle\phi,\ ?\langle\downarrow_1\rangle\psi\},\{\langle\uparrow_0\rangle Tn(n),\ ?\phi,\Diamond\},\{\langle\uparrow_1\rangle Tn(n),\ ?\psi\}\}}$$

Figure 2.12 Prediction

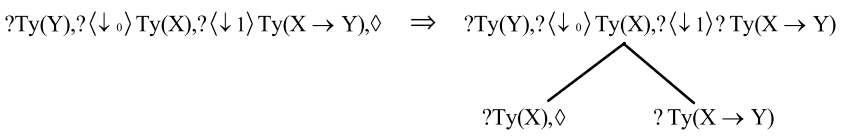

Figure 2.13 Tree growth

$$\frac{\{Tn(0),?Ty(t)\Diamond\}}{\{Tn(0),?Ty(t),?\langle\downarrow_0\rangle Ty(e),?\langle\downarrow_1\rangle Ty(e\rightarrow t)\Diamond\}}$$

Figure 2.14a Introduction – subject and predicate

$$\frac{\{Tn(0),\ ?\langle\downarrow_0\rangle Ty(e),?\langle\downarrow_1\rangle Ty(e\rightarrow t)\Diamond\}}{\begin{array}{l}\{\{Tn(0),?Ty(t),?\langle\downarrow_0\rangle Ty(e),?\langle\downarrow_1\rangle Ty(e\rightarrow t)\Diamond\},\{\langle\uparrow_0\rangle Tn(0),?Ty(e)\Diamond\},\\ \{\langle\uparrow_1\rangle Tn(0),?Ty(e\rightarrow t)\Diamond\}\}\end{array}}$$

Figure 2.14b Prediction – subject and predicate

instantiating the type variables as *t* for *Y* and *e* for *X*, which is actually the introduction and prediction of subject and predicate as shown in Figure 2.14a and Figure 2.14b, respectively.

Alternatively, the introduction and prediction of subject and predicate through the application of the transition rules can be illustrated by a step-by-step procedure of tree growth, as in Figure 2.15, where the transition from a single-node tree with a propositional requirement to a new single-node tree with two daughter requirements, and finally to a newer tree with two new nodes annotated with requirements of type *e* and type $e \rightarrow t$, is effected first by application of the rule of Introduction and then by application of the rule of Prediction.

*3.1.2 *Adjunction and LINK adjunction*

The transition rules introduced so far are concerned with the introduction of nodes into the tree and assignment of a fixed treenode position to them, such as subject node and predicate node. This subsection discusses transition rules concerning the introduction of unfixed nodes into a partial tree. A rule called

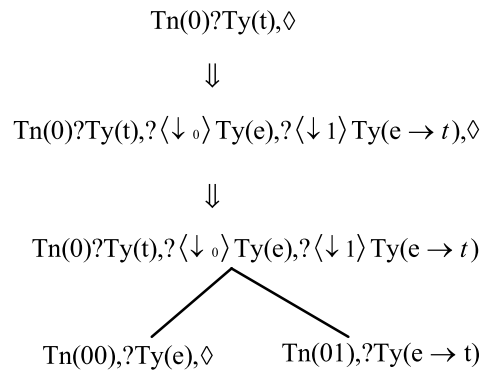

Figure 2.15 Introduction and Prediction of subject and predicate

$$\frac{\{Tn(a),\ \ldots\ ?Ty(t)\Diamond\}}{\{\{Tn(a),\ \ldots\ ?Ty(t)\},\ \{\langle\uparrow_*\rangle Tn(a),\ ?Ty(e),\ ?\exists x.Tn(x),\Diamond\}\}}$$

Figure 2.16 *ADJUNCTION

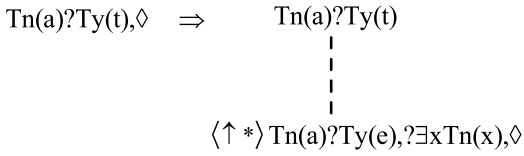

Figure 2.17 Tree growth

*Adjunction defines a transition from a partial tree containing only one node with a propositional requirement of *Ty(t)* to another partial tree that has an additional node with a requirement of *Ty(e)* expression dominated by the input node and a requirement to find a fixed position within the unfolding tree, which is defined in Figure 2.16 in terms of tree descriptions and shown in Figure 2.17 in terms of tree growth.

As will be seen in the next three chapters, *Adjunction finds its best application in left-dislocation structures, since it captures the intuition that the left-peripheral expression, as discussed in section 1.3, requires a fixed position for the overall structure to be interpreted. With the rule of *Adjunction, the parse of *Mary* in a string *Mary, David loves* can be shown in Figure 2.18.

Notice how this computational rule reflects our intuition about structural underspecification: (i) the dislocated expression in a string may be parsed, which is why the pointer is situated at the new node lower than the top node, requiring it to be developed next; (ii) the dislocated expression is part of the string, which is why the new node has a modal requirement $\langle\uparrow_*\rangle$Tn(a),

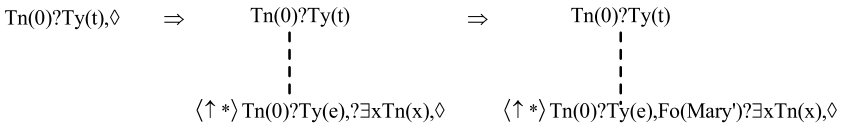

Figure 2.18 Parsing *Mary* with *Adjunction

$$\frac{\{\ldots ND,\ ND'\ldots\}}{\{\ldots ND \cup ND'\ldots\}}$$

$$\Diamond \in ND$$

Figure 2.19 Merge

indicating that it is dominated by the top node Tn(a); and (iii) the dislocated expression awaits to be slotted somewhere in the string, which is why the pointed new node has a positional requirement ?∃x.Tn(x). In DS derivations, structural underspecification of this sort is always indicated by the dashed line in the tree.

The output tree in Figure 2.17 provides an environment in which the dislocated expression can be parsed, and so an unfixed node can be constructed. As the parse of the rest of the string proceeds, the partial tree then grows to have subject and predicate daughter nodes through the application of Introduction and Prediction rules. The search for a fixed position for the unfixed node will continue until it reaches a point where the information on the unfixed node is compatible with that on a fixed position. A rule of Merge licenses the unification of all information on two nodes, and hence the resolution of structural underspecification, as defined in Figure 2.19, where two node descriptions, referred to as ND and ND', are combined into one.

Merge normally takes place at a stage when the outstanding requirement on the unfixed node to find a treenode address and the outstanding requirement on a fixed node to find a formula of a certain type are both satisfied. Assume that the parse of the string *Mary, David loves* reaches a state where there is no coming information when the task of processing the verb is finished. At the point where the pointer sits at the internal argument node projected by the transitive verb *love*, the unfixed node projected by the left-dislocated expression *Mary* can merge with this open Ty(e) node as shown in Figure 2.20, since the two discrete nodes have a complementary relation: The former provides the formula value for the latter, whereas the latter provides the treenode address for the former.

With the notion of unfixed node and the strategy of adjunction, the DS system can characterize not only the relation between two discrete nodes in one single tree but also the relation between two discrete trees. A rule called LINK Adjunction defines a transition from an initial tree with its root node annotated

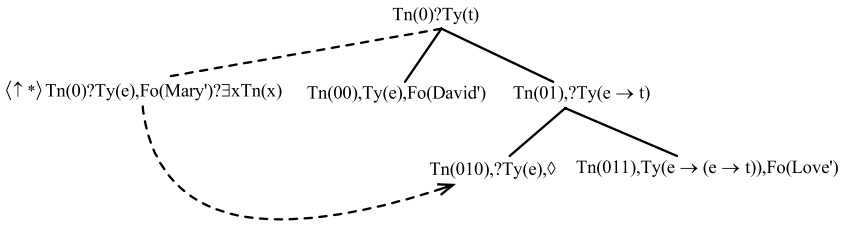

Figure 2.20 Parsing *Mary, David loves* with Merge

$$\frac{\{\ldots Tn(a), Ty(e), Fo(\alpha)\Diamond\}}{\{\{\ldots Tn(a), Ty(e), Fo(\alpha)\}, \{\langle L^{-1}\rangle Tn(a), ?Ty(t), ?\langle\downarrow_*\rangle (Ty(e) \wedge Fo(\alpha))\Diamond\}\}}$$

Figure 2.21 LINK Adjunction

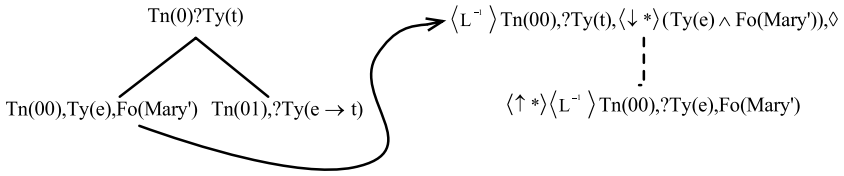

Figure 2.22 Building a LINK transition from parsing *Mary, Whom*

by some formula α of type *e* to some subsequent tree with its root node annotated by type *t*, by imposing a requirement on the second tree that the development of this new tree structure contain some node annotated by the formula α. As indicated in the formal definition (Figure 2.21), the output tree description contains a new root node with ?Ty(t), and below the new root node there should be some unfixed node whose type and formula is identical to the node in the input tree description.

Note that the relation between the node in the initial tree and the root node in the second tree is some LINK relation, which is ensured by the imposition of a formula requirement on the LINKed tree development. Cross-linguistically, the LINK relation is one of the salient characteristics of a number of grammatical structures.[6] A LINKed analysis, for instance, can be straightforwardly developed for the construal of relative clause structure in English such as *Mary, whom David loves, is going to marry George*. The application of LINK Adjunction is shown in Figure 2.22, which illustrates a parse state subsequent to the processing of *Mary*, *whom*.

The construction process proceeds in a standard fashion from the aforementioned tree, towards the building of a relative structure where the unfixed node

will be eventually fixed in the gap position. The LINK transition rule, as will be discussed in chapter 4, can apply to some Chinese grammatical constructions as well – in particular the topic construction.[7]

3.1.3 Thinning, completion and elimination

While the preceding subsections introduced the construction rules concerning unfolding of the tree, this subsection presents the rules dealing with completion of the tree. As is already known, the parsing process is a process of tree growth driven by requirements to specify underspecified information. To complete the tree, DS needs (i) a means of removing requirements when they are satisfied, (ii) a means of moving the pointer away from nodes when they are completed, and (iii) a means of accumulating information established at daughter nodes to satisfy requirements on mother nodes.

To remove requirements once fulfilled, DS has a transition rule called Thinning, which provides a means for stating that requirements have been satisfied, as formally defined in Figure 2.23 in terms of tree descriptions and shown in Figure 2.24 in terms of tree growth.

This rule provides a means of simplification of treenode decorations: if at a current node a DU holds that includes both a fact and the requirement to fulfil the fact, the requirement is deleted and the pointer remains at the current node. With the rule of Thinning, the parse of *Steve* in the string *Steve smokes*, for instance, results in the transition shown in Figure 2.25.

In general, the transition licensed by Thinning will not be displayed, assuming that it is applied whenever a task is finished.

$$\frac{\{\ldots\phi\ldots ?\phi\ldots\Diamond\}}{\{\ldots\phi\ldots\Diamond\}}$$

Figure 2.23 Thinning

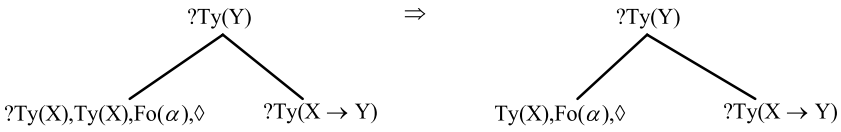

Figure 2.24 Tree growth

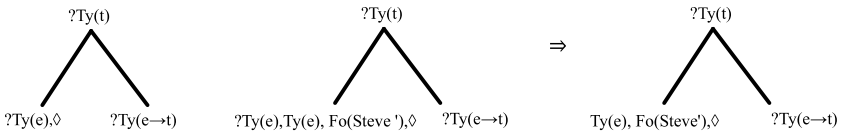

Figure 2.25 Parsing *Steve* with Thinning

To move the pointer away from nodes completed, DS has a rule called Completion, which states that if a daughter node holds information, including an established type, the mother node may then become the current node, as formally defined in Figure 2.26 in terms of tree descriptions and shown in Figure 2.27 in terms of tree growth.

This rule licenses the movement of the pointer from a daughter to a mother and annotation of the mother node with the information that it indeed has a daughter with certain properties. It has the effect of satisfying the modal requirement imposed by the rule of Introduction, and so it can be regarded as the inverse of the rule of Prediction.

Finally, to accumulate information established at the daughter nodes for satisfying the requirements holding at the intermediate nodes, DS has a rule called Elimination, which states that if a mother node has two daughter nodes both annotated with a formula and a type value, the formulae on the two daughter nodes can combine by modus ponens and then the resulting formula and type can annotate the mother node, as defined first in Figure 2.28 and illustrated in Figure 2.29.

This transition rule licenses the movement of the pointer to non-terminal mother nodes and performs functional application leading to the fulfilment of the outstanding requirements on these intermediate nodes. Supposing that the processing of the string *Steve smokes* reaches a state where both the subject and the verb have been successfully parsed. Applying the rule of Elimination

$$\frac{\{Tn(n)\ldots,\},\ \{\langle\uparrow_i\rangle Tn(n),\ldots,Ty(X),\ldots\Diamond\}}{\{Tn(n),\ldots,\langle\downarrow_i\rangle Ty(X),\ldots\Diamond\},\ \{\langle\uparrow_i\rangle Tn(n),Ty(X),\ldots\}}$$
$$i\in\{0,\ 1\}$$

Figure 2.26 Completion

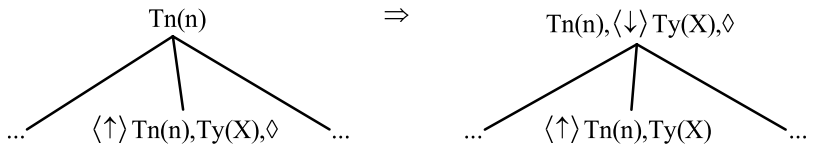

Figure 2.27 Tree growth

$$\frac{\{\ldots\langle\downarrow_0\rangle(Ty(X),\ Fo(\alpha)),\langle\downarrow_1\rangle(Ty(X\ \rightarrow\ Y),\ Fo(\beta))\Diamond\}}{\{\ldots\{Ty(Y),\ Fo(b(\alpha)),\langle\downarrow_0\rangle(Ty(X),\ Fo(\alpha)),\langle\downarrow_1\rangle(Ty(X\ \rightarrow\ Y),\ Fo(\beta))\ldots,\Diamond\}\}}$$

Figure 2.28 Elimination

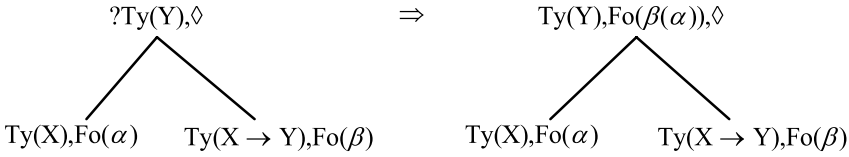

Figure 2.29 Tree growth

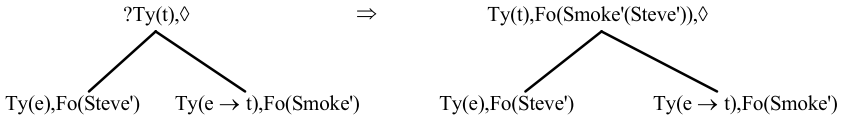

Figure 2.30 Parsing *Steve smokes* with Elimination

will result in the transition as shown in Figure 2.30, where the root node of the right tree is decorated with the combination of its two daughters' information.

As can be seen, the construction of a tree is a top-down process, while the completion of a tree is a bottom-up process. The rule of Introduction introduces modal requirements on the top node, which are satisfied through the rule of Prediction by building corresponding daughter nodes with type requirements, which are removed through the rule of Thinning, which indicates fulfilment of requirements, which leads through the rule of Completion to the introduction of modal statements at the mother nodes; the goal of building a representation as interpretation is achieved through the rule of Elimination. The computational rules introduced so far, however, must be combined with lexical information in the construction of a propositional formula. The next section will introduce the role of lexicon in the parsing process.

3.2 Lexical actions

Computational rules introduced in the preceding section provide the general format of tree descriptions whose informational content is largely provided by actions encoded in lexical entries which are accessed as words are processed. Lexical information, as pointed out in section 1, is therefore assigned an important role within the framework of DS. Since the goal of natural language processing is building representations of content, its achievement naturally relies on the contribution of lexicon, which provides specific instructions on how to construct an interpretation.

The structure of lexical entries interacts with the general format of tree descriptions. Actions encoded in lexical entries often result in decoration of nodes, creation of new nodes and movement of the pointer. Within the machinery of DS, lexical actions include a few instructions such as (i) **make** (. . .), which creates a new node; (ii) **go** (. . .), which moves the pointer to the node

IF	Trigger
THEN . . .	Actions
ELSE . . .	Elsewhere Statement

Figure 2.31 Format of Lexical Entries

	IF	?Ty(e → t)
smoke	THEN	put(Ty(e → t), Fo(Smoke'), [↓]⊥)
	ELSE	ABORT

Figure 2.32

specified in the value; and (iii) **put** (. . .), which decorates a node with certain information. A general format of lexical entries encoding a series of actions is given in Figure 2.31.

A lexical entry is presented as a conditional statement. The initial condition, providing the context under which subsequent development takes place, is a trigger that induces the parse of the word. This usually takes the form of a type requirement, as shown in Figure 2.31. However, as will be shown later in the analyses, other information may also make suitable triggers. The IF conditional statement being met, the THEN statement specifies the set of actions involving the instructions mentioned earlier. The ELSE statement induces other actions if the IF condition is not met, which is in general an instruction to abort the current parse. The lexical entry for the intransitive verb *smoke*, for example, can be stated as shown in Figure 2.32.[8]

The condition for introducing the lexical information from *smoke* is that the parsing of this verb is triggered by a context in which there is a predicate requirement ?*Ty(e → t)*. If this condition is met, the current node is then annotated with the type and formula information specified. The parse of transitive verbs (also with tense information) will be demonstrated in the next section.

3.3 A basic example

Let us take the parse of a simple sentence *David loves Mary* and see how the step-by-step process of tree growth is expressed in the DS system. The parse starts from introducing the root node of a tree by Axiom, which is annotated with a propositional requirement; then the rule of Introduction can apply, and it introduces two modal requirements on the root node. With the rule of Prediction, the two daughter nodes can be built. These three steps are shown in Figure 2.33, where the pointer moves down to the open argument node, requiring it to be developed next.

At this stage, it is the lexical items' turn to contribute information to tree building. The subject NP *David* is, first of all, parsed, and its lexical entry is specified in Figure 2.34.

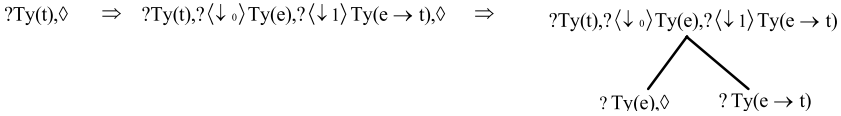

Figure 2.33 Expanding the tree

IF	?Ty(e)	Trigger
THEN	put(Ty(e), Fo(David'), [↓]⊥)	Annotation
ELSE	ABORT	Failure

Figure 2.34 Lexical entry for *David*

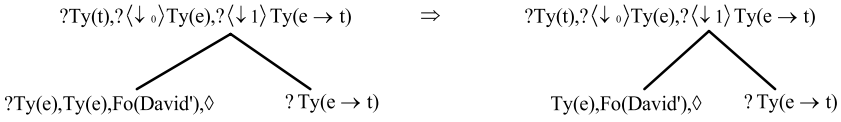

Figure 2.35 Parsing *David* with Thinning

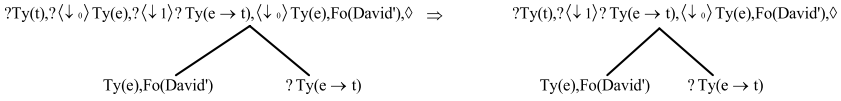

Figure 2.36 Completion and Thinning at the top node

The lexical information from *David* meets the requirement on the open argument node for a type *e* expression – namely, the condition in the IF clause. So the pointed argument node can be annotated with the type value *Ty(e)* and the formula value *Fo(David')*, as shown in the left tree in Figure 2.35. At this stage, the rule of Thinning can apply to remove the requirement, as shown in the right tree of Figure 2.35.

Since the argument daughter is now a type-complete node, the rule of Completion can apply, and the pointer can move up to the root node, which is the mother node. The information established at the argument node can then be added to the mother node, as shown in the left tree in Figure 2.36. The rule of Thinning can apply again to remove the requirement $?\langle\downarrow_0\rangle Ty(e)$, as shown in the right tree of Figure 2.36.

At this point, the pointer moves to the functor node, requiring it to be developed, as shown in Figure 2.37.

The next step is to parse the verb, which induces again a sequence of actions as shown in the lexical entry for *loves* in Figure 2.38.

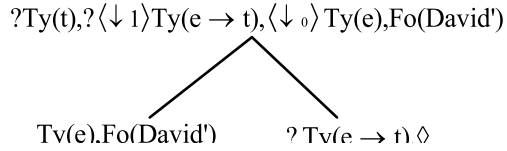

Figure 2.37 Construction of the predicate node

IF	?Ty(e → t)	Predicate trigger
THEN	go(⟨↑$_1$⟩Ty(t)),	Go (up) to propositional node
	put(Tns(PRES)),	Tense information
	go(⟨↓$_1$⟩Ty(e → t)),	Go (back) to predicate node
	make(⟨↓$_1$⟩),	Make a functor node
	go(⟨↓$_1$⟩),	Go (down) to the functor node
	put(Ty(e → (e → t)), Fo(Love'), [↓]⊥)	Annotation
	go(⟨↑$_1$⟩)	Go (back) to predicate node
	make(⟨↓$_0$⟩),	Make an argument node
	go(⟨↓$_0$⟩)	Go (down) to the argument node
	put(?Ty(e))	Annotation
ELSE	ABORT	

Figure 2.38 Lexical entry for *loves*

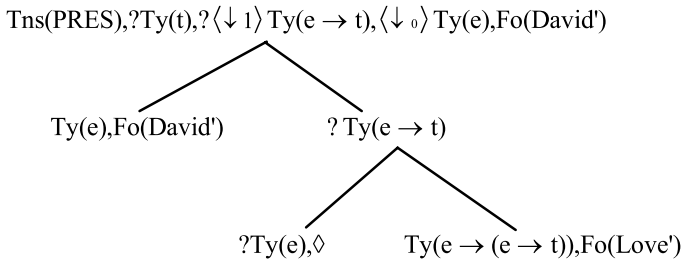

Figure 2.39 Parsing *David loves*

The predicate requirement on the pointed node triggers the parsing of the verb, so the current task state is ?*Ty(e → t)*. Then the pointer moves from the predicate node to the dominating propositional node, given by the instruction *go*⟨↑$_1$⟩?Ty(t), and annotates it with the tense information *Tns(PRES)*. After that, the pointer returns to the open predicate node, given by the instruction *go*⟨↓$_1$⟩?Ty(e → t). What follows are the actions induced by the lexical semantics of *love*: As a transitive verb, it creates its own node – a two-place predicate decorated with the type and formula information. In addition, it also creates an internal argument node (through the rule of Prediction). The effect of these actions is shown in Figure 2.39, where the pointer moves to the internal argument node subsequent to the construction of the new functor node.

With the pointer at the open argument node, the parsing of *Mary* as lexical input is triggered (Figure 2.40).

Same as the subject NP, the lexical information from this object NP, which satisfies the requirement ?*Ty(e)* on the node to be developed, can be introduced into the tree. Through the rule of Thinning, the pointed node is decorated with the type and formula information as shown in Figure 2.41.

At this stage, all lexical information has been processed, but there are still outstanding requirements on the intermediate nodes, as can be seen in Figure 2.41. The parsing process can be finished through the rule of Elimination, which performs functional application of functors over arguments, yielding expressions satisfying requirements associated with intermediate nodes. The first step is to move the pointer up to the one-place predicate node where Elimination can apply: the values of its two daughter nodes, the internal argument node and the two-place predicate node, can be combined. The compilation of the information gathered at the two daughter nodes fulfills the requirement ?*Ty(e → t)* at their mother node, which is removed as shown in Figure 2.42.

IF	?Ty(e)	Trigger
THEN	put(Ty(e), Fo(Mary'), [↓]⊥)	Annotation
ELSE	ABORT	Failure

Figure 2.40 Lexical entry for *Mary*

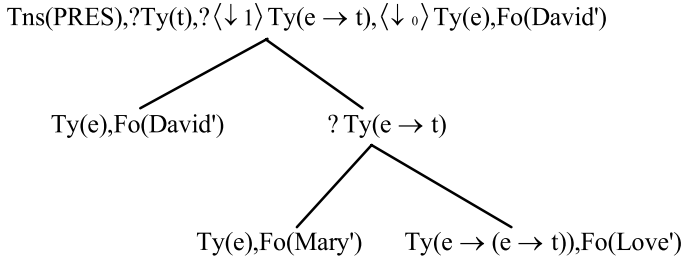

Figure 2.41 Parsing *Mary* with Thinning

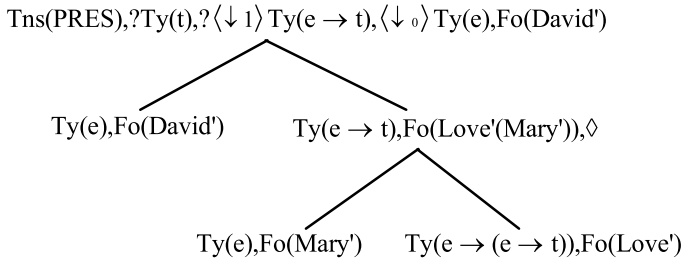

Figure 2.42 Elimination at the predicate node

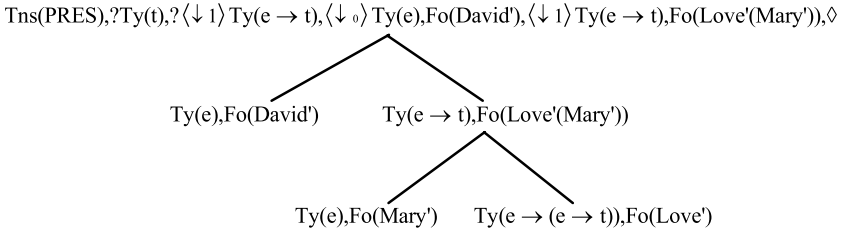

Figure 2.43 Completion at the root node

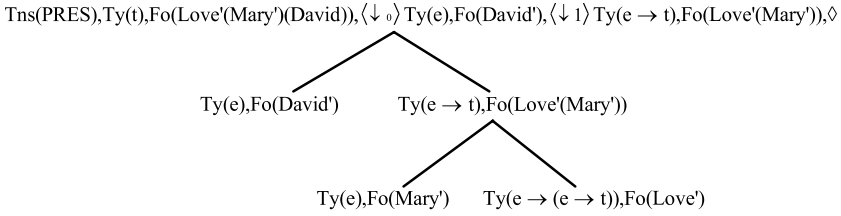

Figure 2.44 The final result of parsing *David loves Mary*

Finally, the rule of Completion applies to the root node. The pointer is licensed to move from the functor node to the top node, which can then be annotated with its predicate daughter's information, as shown in Figure 2.43.

Through the rule of Thinning, the modal requirement $?\langle\downarrow_1\rangle Ty(e\rightarrow t)$ at the root node is then removed. Through the rule of Elimination, the parsing of *David loves Mary* ends with the final tree in Figure 2.44 – the root node of which is decorated with a propositional formula representing the interpretation of the whole sentence.

The last outstanding requirement ?*Ty(t)* at the root node of the final tree is eliminated, since it has been fulfilled by the fact that the parse of the sentence yields a complete propositional formula *(Love'(Mary')(David'))*. The parsing process shows that the building of a structure representing semantic interpretation is goal-directed through a left-to-right dynamics, involving transitions between the input and output structures, which is achieved by computational rules in conjunction with lexical information.[9] This is not the whole story, though. In the next section, I shall introduce the role of pragmatics in the parsing process.

3.4 Pragmatic actions

As mentioned at the beginning of this section, DS also allows pragmatic actions a role in the parsing process, which can be illustrated by the processing of anaphoric expressions, the assignment of interpretation to a pronoun. Given

the general stance that words project lexical actions in constructing representations of content as established in context, DS treats pronouns as placeholders for logical expressions which have been constructed within the context, reflecting the fact that pronouns contribute in a different way to interpretation depending on their antecedents.

With the notion that pronouns pick out some logical terms from context, DS extends the vocabulary of its formula values to allow placeholders for values. Hence pronouns are construed as projecting metavariables represented as boldface capitals **U**, **V**, . . ., which are just formula labels waiting to be replaced by some contentful values. Since a metavariable is just a placeholder for some contentful value, it is always associated with a requirement to find such a value, ?∃x.Fo(x), which ensures that the metavariable will be substituted by some proper representation as part of the construction process. The substitution process is pragmatic in the sense that it is strictly context-dependent.

Consider the parse of the conjunct clause in the utterance *David loves Mary*, *but she hates him*. In processing the first pronoun, the subject node of the clause, we derive the information that 'she' requires to be identified with a referent that can be attributed with female properties. This constraint, which has certain presuppositional effects, can be shown as a subscript on the metavariable, U_{Female}. In addition, we also derive the information that 'she' as a nominative pronoun only occurs in the subject position. This further constraint can be shown as a requirement to be immediately dominated by a propositional node, apart from the requirement to find a contentful value for the metavariable (cf. Cann et al. 2005). The lexical specification of *she* can therefore be given as follows in Figure 2.45.

Construed in the context provided by the aforementioned utterance, substitution will determine that the metavariable U_{Female} can only pick out the logical term *Fo(Mary')* established in the first clause. The pragmatic process of substitution can be illustrated by Figure 2.46, which shows a transition from parsing the pronoun *she* to instantiating the metavariable.

The underspecified formula of the subject node being resolved, the pointer moves to the predicate node through Completion, allowing the parse of the verb *hates*, as shown by the right tree in Figure 2.46. The lexical actions given by this transitive verb, like those projected by *love* in the preceding subsection, result in creating an internal argument node as well as a two-place predicate

IF	?Ty(e)	Argument trigger
THEN	put(Ty(e),	Type statement
	Fo(U_{Female}),	Metavariable and presupposition
	?∃xFo(x),	Formula requirement
	?⟨↑$_0$⟩Ty(t),	Case condition
	[↓]⊥)	Bottom restriction
ELSE	ABORT	

Figure 2.45 She

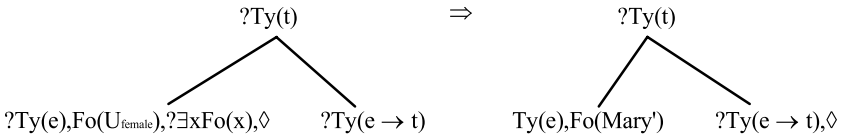

Figure 2.46 Parsing *she* and substituting *Fo(Mary')*

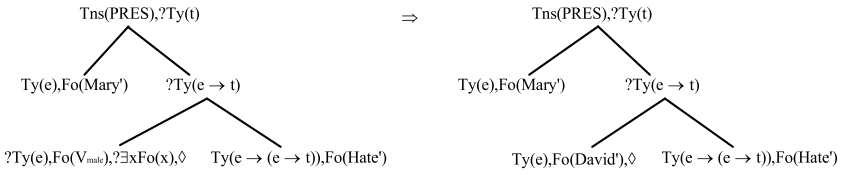

Figure 2.47 Parsing *him* and substituting *Fo(David')*

node with both type and formula values. Finally, the pointer moves to the open argument node, requiring it to be developed next. The parse of the second pronoun *him* just satisfies the type requirement on the pointed node, but leaves a formula requirement, as shown in the left tree in Figure 2.47. Again, given the context in which the utterance is uttered, the metavariable U_{Male} projected by *him* can only be replaced by the logical term *Fo(David')* constructed in the first clause, as shown by the right tree in Figure 2.47.

One bonus of the discussion of formula underspecification here is that the concepts introduced may constitute the basis for the characterization of pro-drop in Chinese. As mentioned in chapter 1, Chinese freely omits arguments when they can be clearly recovered from the context. All the following strings, for example, are grammatical in appropriate circumstances (Figure 2.48):

a. *Zhangsan da le Lisi.*
   Zhangsan beat PFV Lisi
   'Zhangsan beat Lisi'.
b. (Who did Zhangsan beat?)
   da le Lisi.
c. (Who beat Lisi?)
   Zhangsan da le.
d. (Did Zhangsan beat Lisi?)
   da le.

Figure 2.48

This freedom of omitting arguments can be accounted for by allowing a 'free-ride' set of lexical actions that allow for any type *e* argument to be

```
IF      (?Ty(e) ∧ ⟨↑⟩T)
THEN    IF      ⟨↓⟩T
        THEN    ABORT
        ELSE    put (Ty(e), Fo(U), ?∃x.Fo(x), [↓]⊥)
```

Figure 2.49 Pro-drop in Chinese

satisfied by the postulation of a metavariable just in case the relevant node is a terminal one.

Such an analysis freely allows the pro-drop examples presented earlier by ensuring that the open argument nodes are decorated by a metavariable whose value is instantiated through pragmatic substitution depending on context. Note that the analysis of Chinese pro-drop is different from that of Spanish and Greek pro-drops adopted in Cann et al. (2005), in which verbs project a propositional template where argument nodes are decorated with metavariables. Spanish and Greek are subject pro-drop languages where verbs are strongly inflected for subject-verb agreement; one can reconstruct the pronoun from the form of the verb, and it is therefore reasonable to have the verb project the propositional template. In Chinese, there is no agreement of verbs at all and so both subject and object pronouns can be dropped. As shown in Figure 2.49, pro-drops in Chinese are really like pronouns and therefore must be analyzed as having a bottom restriction.

4 Simple-clause structure in Chinese

The preceding section introduced the DS framework based on the discussion of the dynamics of language with special reference to English. This section will present a general analysis of the simple sentence in Chinese by means of the rules and concepts introduced earlier. Although it displays a considerable freedom in terms of word order, as discussed in chapter 1, Chinese could be crudely characterized as an SVO language, where the verb usually follows the subject and precedes the object. This seems to be quite reasonable with respect to simple sentence structure.

We would, however, have some trouble specifying the type of verbs in Chinese if we adopt exactly the same approach to the parsing of verbs sketched earlier in English. Recall that in Chinese there exist some adjunct NPs which appear to be syntactically on a par with nominal expressions and semantically sort of obligatory and which both transitive and intransitive verbs can take. These adjunct NPs, as exemplified by Figure 2.16 to Figure 2.18 in chapter 1, repeated here as Figure 2.50 to Figure 2.52, tend to blur the distinction between arguments and adjuncts.

This sort of phenomenon is not particular to Chinese. As has been noticed and argued by a number of authors (e.g., McConnell-Ginet 1982; Chierchia 1989; Grimshaw 1990; Jackendoff 1990; Hukari and Levine 1995), the

Lisi pao le (Beijing) ji-tang.
Lisi run PFV Beijing several-times
'Lisi made several trips (to Beijing)'.

Figure 2.50

Wangwu deng le (ni) ban-tian.
Wangwu wait PFV 2SG half-day
'Wangwu waited (for you) for a long time'.

Figure 2.51

Zhangsan chi le yi-bu.
Zhangsan late PFV one-step
'Zhangsan was a bit late'.

Figure 2.52

argument-adjunct distinction is not clear-cut, because some adjuncts behave like arguments while some arguments behave like adjuncts. Following recent work in HPSG, Marten (2002) takes a dynamic approach to verbal underspecification by treating adjunct expressions as optional arguments. He proposes that from a dynamic perspective, all verbs are underspecified with regard to the number of 'internal' arguments and 'optional' arguments (i.e., arguments and adjuncts in the traditional sense). Hence he postulates that all verbs are introduced with an underspecified type which can be represented as follows (Figure 2.53):

$(e^* \rightarrow t)$

Figure 2.53

The verbal underspecification is thus formalized through the Kleene star operation in which e* is defined over types already employed. So verbs may be instantiated as having variable types, including Ty(t), Ty(e → t), Ty(e → (e → t)), Ty(e → (e → (e → t))) and so on.[10] To solve the problem of the verbal type underspecification in Chinese, we can adopt Marten's dynamic approach, with the slight difference that the number of a verb's 'internal' arguments is specified: intransitive verbs are thus Ty(e* → (e → t)) and transitive verbs Ty(e* → (e → (e → t))). In parsing a sentence, therefore, it is only when the whole postverbal material has been parsed that a verb's type can be resolved (see Marten 2002 for details).[11]

One of the consequences of this move is that verbs must be parsed as decorating an initially unfixed node within the tree which is fixed once the number

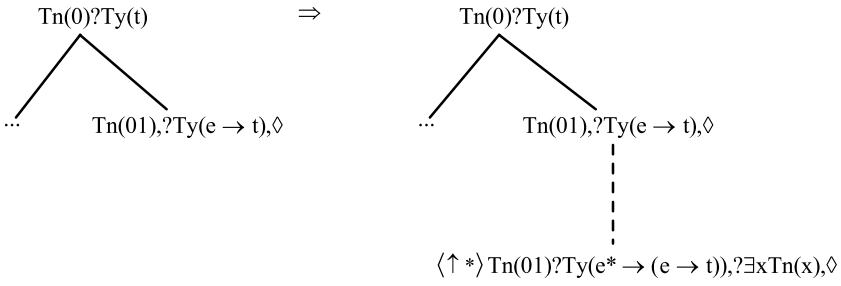

Figure 2.54 Unfixed predicates

of arguments is determined. The effect of adopting such a rule in the parse of verbs can be illustrated in Figure 2.54, which shows derivation from a tree with an open predicate requirement with no daughters to another tree that has an unfixed note dominated by the open predicate node that carries a requirement for a predicate of underspecified arity.

As an illustration, we can take the parse of Figure 2.50 as an example. Through the general construction rules Introduction and Prediction, the partial tree with only a root node expands to have subject and predicate nodes, allowing the parse of *Lisi*. After the subject node is developed, the pointer moves to the open predicate node, allowing the parse of the verb *pao-le* whose lexical entry can be stated as follows (Figure 2.55):[12]

	IF	?Ty(e → t)
pao-le	THEN	go(⟨↑$_1$⟩), put(ASP(PFV)), go(⟨↓$_1$⟩);
		make(⟨↓$_{1*}$⟩), go(⟨↓$_{1*}$⟩), put(Ty(e* → (e → t)), Fo(Pao'), [↓]⊥);
	ELSE	ABORT

Figure 2.55

Subsequent to the parse of the verb, the pointer returns to the open main predicate node. At this point, if there is no further information as in the intransitive construction *Lisi pao le*, the unfixed node would combine with the predicate node through Merge to yield a tree whose completion would give rise to a propositional formula *Pao'(Lisi')*. However, the incoming information requires the parse to carry on. The general rules Introduction and Prediction apply again to create two daughter nodes. Following convention, the pointer moves down to the argument daughter, allowing the parse of *Beijing*. Figure 2.56 shows the parse state where the pointer is at the two-place predicate node.

At this point, if the string is complete, as in *Lisi pao le Beijing*, the unfixed node would merge with the pointer node, and the tree would yield a propositional formula *Pao'(Beijing')(Lisi')*. This is not the case, though. The lexical input *ji-tang* 'several times' drives the parse along, and the two-place predicate

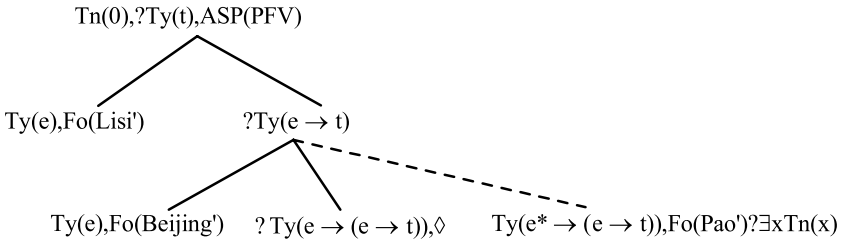

Figure 2.56 Parsing *Lisi pao le Beijing*

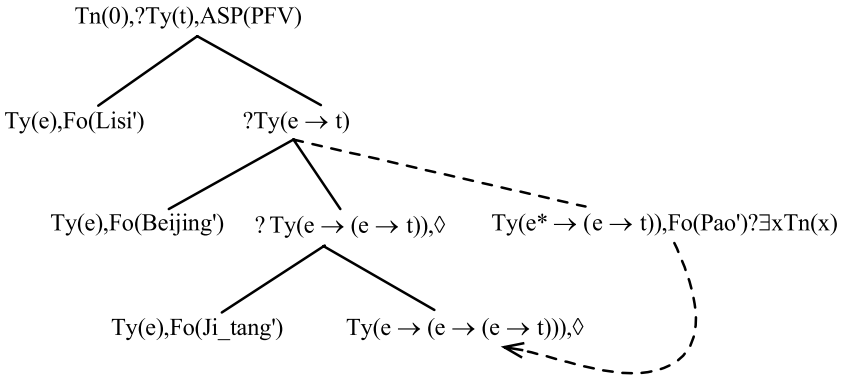

Figure 2.57 Parsing *Lisi pao le Beijing ji-tang*

node extends through the two general construction rules once again to have its own daughter nodes. This permits the parse of the last word and the pointer then moves to the three-place predicate node at which point the unfixed node merges, yielding a tree as in Figure 2.57, whose compilation will give a propositional formula *Pao'(Ji-tang')(Beijing')(Lisi')*.

Before closing this section, I shall say a brief word about noun phrase interpretation in Chinese. As noted earlier, all noun phrases in DS are construed as projecting content of type *e*. Given that bare noun phrases in Chinese may appear in any argument position as full noun phrases, as discussed in chapter 1, a decision needs to be taken with respect to the representation of the content of such expressions, which can be interpreted as definite, indefinite or generic with respect to context, as illustrated in Figure 2.58.

We can take up the proposal of Chierchia (1998) that bare nouns in Chinese should be analyzed as projecting expressions of type *e* and that they should be interpreted as kinds rather than properties. Here I shall not go into detailed interpretation in different contexts and with regard to the interaction with

Lisi *jian* *le* *toufa.*
Lisi cut PFV hair
'Lisi cut some hair'.
'Lisi cut the hair'.
'Lisi cut hair'.

Figure 2.58

classifiers. However, certain elements in conjunction with a classifier, such as demonstratives, have an individuating function – denoting functions from kinds to individual entities. Other factors also tend towards an individuating interpretation. So subjects would tend to pick out individuals rather than kinds as would the objects of certain verbs. Nevertheless, such interpretations are context-dependent, and we shall see in the subsequent chapters how local context can affect the way a bare noun is interpreted.

5 Summary

In this chapter, I have presented a general introduction to the DS framework and have demonstrated how this linguistic formalism allows the interaction between three types of action, computational, lexical and pragmatic, during the dynamic process of natural language interpretation, and how the characterization of the parsing process constitutes a basis for explanations of structural properties. Furthermore, I have extended the analysis from English data to Chinese data and provided a preliminary analysis of simple-clause structure in Chinese. With the DS machinery introduced in this chapter, I shall in the chapters that follow investigate complex grammatical constructions in Chinese and demonstrate that the structural properties of Chinese can be characterized through the dynamics of language processing.

Notes

1 See Marten (2002) for a detailed discussion of the link between relevance theory and the DS theory.
2 Section 3.4 will show how the representations of anaphora are constructed through pragmatic operations.
3 In speech, Chinese third-person pronouns do not make a distinction between masculine and feminine.
4 In DS, the type *cn* is normally assigned to common nouns. Nevertheless, common nouns in Chinese, as will be discussed later, can sometimes be assigned a type *e*, given that bare nouns can appear as arguments, as shown in chapter 1.
5 DS takes 'syntax' as just the subset of actions unfolding trees via the concepts of structural underspecification and update. As is introduced in Cann (2011), Cann et al. (2005) and developed in Kempson and Kiaer (2010), this is implemented by the computational action (Local *Adjunction) inducing initially underspecified structural relations (unfixed nodes). This indicates that the annotated node must be

fixed eventually, as a fixed argument node in tree growth (see also Kempson et al. 2016).

6 See Kempson et al. 2001 for a detailed discussion of the LINKed structures.

7 As will be seen in chapter 4, the LINK transition rule will be entirely applied to English-style topic constructions in Chinese, and it will be slightly modified to accommodate Chinese-style topic constructions.

8 The annotation [↓]⊥ is the bottom restriction, which takes the form "at all nodes below, the falsum holds". It simply means that the node constructed cannot be further developed.

9 In the remainder of this book, sometimes I shall not display the parsing process in detail, but instead focus on the building of tree structure.

10 One of the consequences of Marten's analysis of verbal underspecification is that arguments and adjuncts will not be type distinguished, but variation in order will be reflected in order of function application so that the resulting output may not be identical, as will be shown in this and the subsequent chapters.

11 It should be pointed out that Marten (2002) does not provide an analysis of proper adverbs. With regard to the Chinese clause, while Marten's proposal can apply very well to the postverbal domain, it would have some problems extending to the preverbal domain. Consider the following examples where the adverb and the PP occur in their canonical position: the preverbal position.

(i) *Wangwu jintian zai jiuba da le Lisi yi-dun.*
Wangwu today in pub beat PFV Lisi one-time
'Wangwu beat Lisi once in the pub today'.

(ii) *Lisi keneng zai huayuan jiao guo liang-ci hua.*
Lisi possibly in garden waterEXP two-time flower
'Lisi possibly watered the flowers twice in the garden'.

These preverbal adjuncts might be feasibly analyzed as predicate functors projecting a node of $Ty((e \rightarrow t) \rightarrow (e \rightarrow t))$, since the parse of the verb is taken throughout the book to be invariably triggered by $?Ty(e \rightarrow t)$. I shall leave a detailed exploration of this issue for future research.

12 There is a technical problem with having the verb project an unfixed node: DS only allows one really unfixed node at a time. However, we may get around this by imposing a different sort of modality $\langle\downarrow_1{*}\rangle$ on unfixed predicate nodes, which are in any case only very locally unfixed. This restricts the unfixed node to decorating the main functor in the local domain.

3 The dynamics of verbal underspecification in Chinese

1 Introduction

One of the salient characteristics of the Chinese language is that verbs are used quite flexibly in daily communication, in the sense that they are lexically underspecified as to the number and the type of complements (i.e., arguments and argument-like adjuncts) they can take. The examples in Figures 3.1 and 3.2,[1] which contain two common verbs, are illustrative, where *le* is a perfective aspect marker and *guo* an experiential aspect marker.

Out-of-context, high-frequency verbs such as *shui* 'sleep' and *chi* 'eat' are usually classified as one-place predicates and two-place predicates, respectively. Subcategorization frames of this sort, which entails a distinction between arguments (i.e., elements identified by the lexical semantics of the verb) and adjuncts (i.e., elements unidentified by the lexical information of the verb), apparently cannot capture the syntactic behaviour shown in Figure 3.1 and Figure 3.2.

Let us consider Figure 3.1b first. Sentences such as the one in Figure 3.1b are actually a particular type of construction, which is used to emphasize one's manner of sleeping and is highly productive in Chinese, as the verb can basically be followed by any locative NP, such as *bangongshi* 'office', *da chuang* 'big bed', *xiao chuang* 'small bed', *diban* 'floor', *keting* 'living room', *wuding* 'rooftop' and *dongxue* 'cave'. In the Chinese linguistic literature, sentences such as the one in Figure 3.1b are characterized, often in contradictory terms, either as "[Vi + non-patient argument]" or as "intransitive verb taking an object" (see Guo 1999; Wang 2001; Chen and Hu 2003; Wang 2007; Yang 2007, 2009). The reason why the postverbal NP *safa* 'sofa' in Figure 3.1b is analyzed as an object argument is that the Chinese verb *shui*'s behaviour in this case is analogous to the English verb 'reside' in 'Liz resides in Kalamazoo', which obligatorily takes a prepositional phrase as its complement (cf. McConnell-Ginet 1982).

As for Figure 3.1c and Figure 3.1d, the two sentences also represent two different types of constructions. Sentences such as the one in Figure 3.1c are often called expletive-*ta* construction in which the verb (transitive or intransitive in traditional terminology) obligatorily takes an indefinite NP as its complement

a. *women* *shui* *le*.
1PL sleep PERF
'We went to bed'.
b. *women* *shui* *shafa*.
1PL sleep sofa
'We sleep on the sofa'.
c. *women* *shui* *ta* *yige* *xingqi*.
1PL sleep it one-CL week
'Let's have a sleep as long as a week!'
d. *women* *shui* *le* *yige* *xingqi* *shafa*
1PL sleep PERF one-CL week sofa
'We have slept on the sofa for a week'.

Figure 3.1

a. *women* *chi* *le*.
1PL eat PERF
'We've had meals'.
b. *women* *chi* *mian*.
1PL eat noodle
'We eat noodles'.
c. *women* *chi* *ta* *shiwan* *mian*.
1PL eat it ten-bowl noodle
'Let us eat ten bowls of noodles!'
d. *women* *chi* *guo* *yige* *yue* *mian*.
1PL eat EXP one-CL month noodle
'We ate noodles for a month'.

Figure 3.2

women *shui* *shafa* *shui* *le* *yige* *xingqi*.
1PL sleep sofa sleep PERF one-CL week
'We have slept on the sofa for a week'.

Figure 3.3

(*yige xingqi* 'a week' in Figure 3.1c and *shiwan mian* 'ten bowls of noodle' in Figure 3.2c), and for this reason, the indefinite NPs are treated as 'quasi-object NPs' in the literature on Chinese linguistics (see Zhu 1982; Ma 1983; Yuan 2003b). As another type of construction, sentences such as the one in Figure 3.1d are used to emphasize the length of performing some act. So it should be interpreted as "the state of us sleeping on the sofa lasted one week", suggesting that the temporal expression, which is usually treated as an adjunct, is at least semantically obligatory. Even in an alternative verb-copying construction such as Figure 3.3, the temporal expression is still obligatorily used. For this reason, the whole construction is generally analyzed as a VOVC structure in the literature (see Li and Thompson 1981; Li and Shi 1997 *inter alia*).

Liisa	*muisti*	*matkan*	*vuoden*.
LiisaNOM	remembered	tripACC	yearACC

'Liisa remembered the trip for a year'.
(Data from Maling (1993), quoted from Marten 2002: 60)

Figure 3.4

Tom-i	*mikwuk-ul*	*twu*	*pen-ul*	*pangmwun-hay-ss-ta*.
Tom-NOM	America-ACC	two	times-ACC	visit-do-PST-DEC

'Tom visited America two times'.
(Wechsler and Lee 1996)

Figure 3.5

Locative and temporal expressions in Figure 3.1 and Figure 3.2, albeit usually treated as adjuncts, appear to function more as complements than just as modifiers of the verbs in these cases, thus blurring the argument-adjunct distinction to some extent (see Marten 2002 for discussion of obligatorily used adverbs and adverbial clauses in English).

Moreover, cross-linguistic data lend support to the proposal that arguments and adjuncts can be treated alike in some cases. The parallelism of arguments and adjuncts can be seen in the Finnish example (Figure 3.4) and the Korean example (Figure 3.5) that follow, where duration/frequency, locative phrases and object NPs all receive accusative case, explicitly indicating that these expressions are treated alike.

Clearly, verbal underspecification as illustrated earlier makes it problematic to provide a decontextualized representation of the argument structure associated with these verbs.[2] Of course, one may give the same verb a distinct entry on a case-by-case basis, for example, *shui* in Figure 3.1a and *chi* in Figure 3.2a, a one-place predicate; *shui* in Figure 3.1b and *chi* in Figure 3.2b, a two-place predicate; and arguably *shui* in Figure 3.1c–d and *chi* in Figure 3.2c–d, a three-place predicate. However, but this is undesirably done in an *ad hoc* fashion.

As a matter of fact, the phenomenon of verbal underspecification is not particular to Chinese, but seems universal across languages. As has been discussed in the literature (e.g., Goldberg 1995, 2004, 2006; Jackendoff 1997, 2002), verbs are not transitive or intransitive in nature, and some object argument of the so-called transitive verbs does not need to be expressed obligatorily under certain discourse condition, as illustrated by the examples in Figure 3.6 (taken from Goldberg 2006, p.196). By contrast, some of the so-called intransitive verbs can take overt objects in some communicative context (Johnson and Goldberg 2013, p.1440). As discussed in Goldberg (2006), the existence of the constructions in Figure 3.6 and Figure 3.7 appear to support the claim that the underlying motivation for the expression of arguments is pragmatic at the root.

a. Tigers only **kill** at night.
b. Pat **gave** and **gave**, but Chris just **took** and **took**.
c. The chef-in-training **chopped** and **diced** all afternoon.
d. "She could **steal** but she could not **rob**" (from the Beatles song "She Came in through the Bathroom Window").

Figure 3.6

a. The people of this small town . . . have been unable to **pray** Mrs. Smith's two little boys home again.
b. His thousands of travelling fans . . . had **roared** him into the Thomas and Mack Center ring.
c. She tried to avoid **blinking** the tears onto her cheeks.
d. I actually had a moth go up my nose once. I . . . **coughed** him out of my mouth.

Figure 3.7

The range of facts presented earlier, as has been discussed in Marten (2002, p.2), demonstrate that the information concerning verbal subcategorization is generally underspecified, and "the establishment of predicate-argument structure is just part of the overall task of the hearer to assign an interpretation to the incoming utterance". This is essentially a process of pragmatic enrichment, which enables hearers to construct *occasion-specific* conceptual representations of an utterance relative to context and to determine procedurally the structure of verb phrases.

The phenomenon of verbal underspecification raises a number of interesting semantic and syntactic questions. With regard to sentences such as the ones in Figure 3.1 and Figure 3.2, one question that inevitably arises is how to characterize the mapping between syntactic structures onto logical representations of examples such as Figure 3.1d to Figure 3.2d, which is often taken to be of some mismatch nature (see Huang 1991, 1997, 1998 *inter alia*). Although there are various approaches available (e.g., lexical-functional grammar, head-driven phrase structure grammar, aside from generative grammar) which have consolidated their methodology in ways that are sometimes similar, we still see seemingly unstoppable disputes over the relationship between syntax and semantics within a grammar and the nature of the mappings between them.

Verbal underspecification as manifested in sentences in Figure 3.1 and Figure 3.2 is, therefore, a typical phenomenon at the interfaces of syntax with semantics and pragmatics. Specifically, it is, on the one hand, a reflex of the interaction between the lexicon, syntax and pragmatics, and on the other, a syntactic reflex of the general semantic underspecification of lexical items. One of the theoretical challenges posed by these data is to seek a simple, universal mapping from syntactic structures onto semantic representations, irrespective of the idiosyncratic behaviour of some verbs. The flexibility of using

verbal expressions in Chinese seems to suggest that verbs are not transitive or intransitive in nature and hence do not always provide a fixed syntactic structure of propositions, for it is in the context that they appear that determines the verb-complement arrays. This naturally leads us to adopt a dynamic perspective – that is, the representation of predicate-argument structure can be established dynamically at the level of propositional form, which is constructed incrementally with the aid of all complements presented, and the combination of a predicate with its complements is subject to pragmatic inferences aside from selectional restrictions.

In this chapter, I investigate the possibility of exploring a direct mapping between syntactic structures and semantic representations, with special reference to the phenomenon of verbal underspecification in Chinese. Unlike many theories of syntax that define grammaticality in terms of decontextualized representations of syntactic structure, DS as a parsing-based model of syntax allows the interaction between lexical, structural and pragmatic information during the syntactic process, which makes it the ideal grammar formalism to explore the phenomenon at issue. The organization of this chapter is as follows. Section 2 presents a critical review of how various approaches deal with the mapping between syntactic structures onto semantic representations and discuss their disadvantages. Section 3 develops a dynamic analysis of verbal underspecification with respect to Chinese. Some concluding remarks are given in section 4.

2 Previous analyses

A central issue concerning verbal underspecification in Chinese is how to characterize the argument structure associated with the relevant verb. Another issue related to this central one is how to analyze the temporal expressions such as duration and frequency phrases, whose counterparts in English, as shown by the translations of Figure 3.1c–d and Figure 3.2c–d, are usually treated as adjuncts. In the literature, there has been little systematic work on the 'indeterminacy' of the verbal syntax as a whole, although there exist a number of works on some specific constructions. With regard to sentences such as the ones in Figure 3.1d and Figure 3.2d, several relevant analyses have been proposed (see Ernst 1994; Huang 1991, 1997, 1998 *inter alia*; Tang 1994). With regard to sentences such as the ones in Figure 3.1c and Figure 3.2c, there exists another set of analyses (see Zhu 1982; Ma 1983; Iljic 1987; Lin 1994; Lin and Zhang 2006 *inter alia*). I will first do a brief review of the first set of syntactic analyses, with a focus on those of movement nature, and then the second set.

All the analyses in the first set do not directly address the syntactic status of the duration and frequency phrases used in Figure 3.1d to Figure 3.2d in terms of argumenthood and adjuncthood, but mainly focus on the configuration of V-Duration/Frequency-O in these sentences. Let us begin with Tang's (1994) analysis. Having noticed the distribution of duration and frequency phrases – namely, sometimes following direct objects as in Figure 3.8a and sometimes

a. *wo* *jiao* *zhongwen* *sanshi* *nian* *le*.
1SG teach Chinese thirty year PERF
'I have taught Chinese for thirty years'.
b. *wo* *jiao* *le* *sanshi* *nian* *zhongwen*.
1SG teach PERF thirty year Chinese
'I have taught Chinese for thirty years'.

Figure 3.8

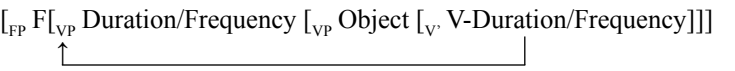

Figure 3.9

preceding direct objects as in Figure 3.8b, Tang follows Larson (1988) and proposes that direct objects are projected in the specifier position of VP, and the verb is moved to a higher functional head. Moreover, she proposes that duration and frequency phrases can be adjoined to VP, as shown in Figure 3.9.

As can be seen in Figure 3.9, when the verb is raised to the functional head F, the duration/frequency-object order as displayed in Figure 3.8b is derived. As for the derivation of the object-duration/frequency order exhibited in Figure 3.8a, Tang, following Larson's (1988) idea that oblique expressions may be base-generated as the complement of V, proposes that duration phrases can also be projected under the minimal V' as the complement of V. The problem with Tang's analysis is that it does not clearly tell us when a duration/frequency phrase should be adjoined to VP and when they should be base-generated as the complement of V. Also, Tang's analysis appears to suggest that duration/frequency phrases have a dual status: they are arguments if they follow the NP object as in sentences such as the one in Figure 3.8a, but adjuncts if they precede the NP object as in Figure 3.8b. This seems to be against our intuition: while the duration/frequency phrase in Figure 3.8b, when following the verb directly, can be argued to be an argument-like expression (note that they are obligatorily used in this particular type of construction as discussed in section 1), they are usually taken as adjuncts when following the direct object, given that they are not obligatorily used in this sort of sentences (which is analogous to their English translations). Furthermore, as Lin (2007) correctly points out, analyses like Tang's would apply blindly to any type of verb phrase, but this is empirically not true. For instance, if the object NP is a full noun phrase rather than a bare noun, only the V-O-Duration/Frequency order is possible, as shown in Figure 3.10.

Huang (1991, 1997) correctly identifies the V-Duration/Frequency-Object configuration in sentences such as the ones in Figure 3.1d to Figure 3.2d as displaying some sort of syntax-semantics mismatches because, syntactically,

a.	*wo*	*jiao*	*zhe-men*	*ke/zhe-ge*	*xuesheng*	*sanshi*	*nian*	*le*.
	1SG	teach	this-CL	course/this-CL	student	thirty	year	SFP
	'I have taught this course/this student for thirty years'.							
b.	**wo*	*jiao*	*le*	*sanshi*	*nian*	*zhe-men*	*ke/zhe-ge*	*xuesheng*
	1SG	teach	PERF	thirty	year	this-CL	course/ this-CL	student
	'I have taught this course/this student for thirty years'.							

Figure 3.10

a.	*ta*	*kan-le*	*san*	*tian*	*(de)*	*shu*.
	3SG	read-PERF	three	day	('s)	book
	'He read (books) for three days'.					
b.	*ta*	*chang-le*	*liang*	*ci*	*(de)*	*ge*.
	3SG	sing-PERF	two	time	('s)	song
	'He sang twice'.					

Figure 3.11

the duration/frequency phrase appears to modify a non-event-denoting noun, but semantically, they actually have quantification over the event expressed by the verb phrase V-O. He attempts to explain away the syntax-semantics discrepancy by proposing a verb movement analysis, also based on the conception of VP shell proposed by Larson (1988). The verb raising analysis of sentences such as the ones in Figure 3.11 (from Huang 1997, p.57) is shown in Figure 3.12 (from Huang 1997, p.58).

Huang analyzes the topmost verb position in the VP shell as an abstract eventuality predicate indicating the event type of the verb. Sentences such as the ones found in Figure 3.11 are derived from a structure of gerundive nominalization, whose verbal head has moved out of the gerund VP into the position of the higher light verb DO. Hence *san tian*, 'three days', in Figure 3.11a does not modify the bare object *shu* 'book' but the gerund I-bar *kan shu* 'see book'. After the verb has raised through the intermediate nominal I(nfl) to the empty verb position associated with the abstract eventuality predicate DO, and after the perfective aspect marker *le* has been lowered, the surface form of the sentence is then obtained.

There are a number of potential problems with Huang's analysis. First, his hypothesis concerning gerundive nominalization is rather counter-intuitive. The distribution of duration and frequency phrases, as Tang (1994) has noticed, is quite flexible – that is, they sometimes follow direct objects as already shown in Figure 3.8a and sometimes precede direct objects as shown in Figure 3.8b. His analysis of the verb phrases in Figure 3.11 as gerundive nominalization seems stipulative, because it cannot account for the generation of sentences

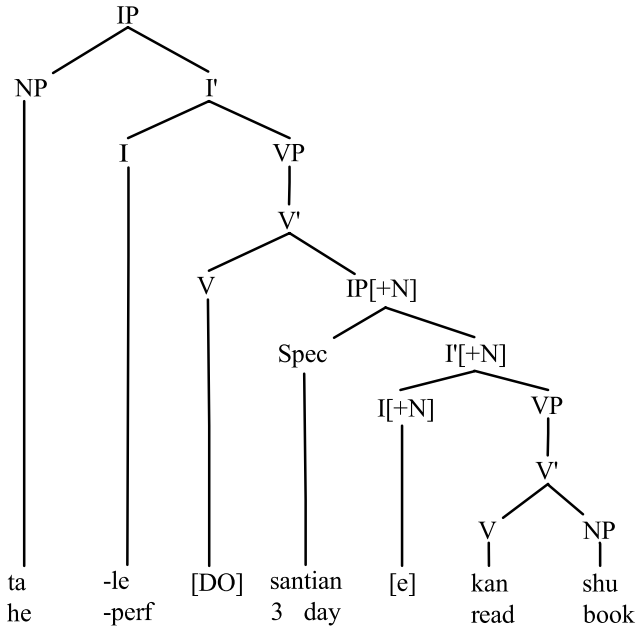

Figure 3.12 The verb raising analysis of Figure 3.11a

a.	*ta*	***kan***	*shu*	***kan***	*le*	*san*	*tian*.
	3SG	read	book	read	PERF	three	day
	'He read (books) for three days'.						
b.	*ta*	***chang***	*ge*	***chang***	*le*	*liang*	*ci*.
	3SG	sing	song	sing	PERF	two	time
	'He sang twice'.						

Figure 3.13

in the configuration [V+O+Duration/Frequency] (e.g., (Figure 3.8a) *Wo jiao zhongwen sanshi nian le* 'lit. I teach Chinese thirty years PERF'). Second, as pointed out in Paul (2000), Huang's version of the verb-raising analysis, which resulted in numerous modifications of Larson's original analysis, is far from self-evident and would run into many difficulties if applied to a closely related construction, the verb-copying construction as in Figure 3.13, which is 'derived' from Figure 3.11 and where each verb takes a complement.

Sentences such as the ones in Figure 3.13 would pose some problems for the VP shell analysis, such as how to accommodate the two occurrences of the same verb in the VP shell and what determines the relative order of the bare object and the duration/frequency phrase. Analyses such as Huang's, just like

Tang's, are highly construction particular and explanatorily inadequate if they are applied to closely related constructions.

Now we turn to the second set of analyses proposed to account for sentences such as the ones in Figure 3.1c and Figure 3.2c. This set of analyses focus on the distribution, interpretation and function of the third-person pronoun *ta*, 'it', which is used as an expletive element. Chao (1968) is perhaps the first to have addressed the non-referential behaviour of *ta*, calling this pronoun a "dummy direct object". Similarly, Zhu (1982) and Ma (1983) treat the expletive constructions such as Figure 3.2c as ditransitive constructions. Their ditransitive analysis should be plausible with respect to sentences such as Figure 3.2c, repeated as Figure 3.14a, especially if one adopts a constructionist approach (see Goldberg 1995, 2006). Unfortunately, they do not go further to discuss another type of expletive construction such as Figure 3.14b, where the duration/frequency is obligatorily used (i.e., its omission would render the sentence ungrammatical as shown in Figure 3.14c), and hence can arguably be treated as an argument-like adjunct in this particular construction, as discussed in section 1.

Based on the distributive properties of the non-referential *ta* – that is, it occurs between a verb and a numeral indefinite (i.e., the post-*ta* NP cannot be definite) as can be seen in all the examples given earlier – Lin and Zhang (2006) further propose that the expletive in question is a nonspecific determiner, since it is inherently nonspecific in its semantics, which is analogous to the nonspecific determiner *any* in English. According to Lin and Zhang, *ta* as a nonspecific determiner heads a DP projection and selects a nominal.[3] A question that naturally arises is, if expletive *ta* and a following NP is a DP constituent with a nonspecific interpretation, it cannot account for why this DP can only appear in postverbal position, but not preverbal subject position. To account for this puzzle and the puzzle that the verb preceding *ta* cannot take any aspect marker, Lin and Zhang further propose that the expletive is a clitic, and hence it must be encliticized into a verb root, rather than any element that has aspectual features. As discussed in Wu and Matthews (2010), while it is plausible to treat *ta* as D, Lin and Zhang's construal of this expletive pronoun as clitic may raise some complications. In non-clitic languages such as

a. *women* *chi* *ta* *shiwan* *mian*.
   1PL eat it ten-bowl noodle
   'Let us eat ten bowls of noodles!'
b. *women* *chi* *ta* *yige* *yue* *mian*.
   1PL eat it one-CL month noodle
   'Let us eat noodles for a month!'
c. **women* *chi* *ta* *mian*.
   1PL eat it noodle
   'Let us eat noodles!'

Figure 3.14

a.	*ni*	*bixu*	*pao*	*diao*	*ta*	*ji*	*jin*	*rou*.
	2SG	must	jog	off	it	several	catty	flesh
	'You must jog to lose some weight'.							
b.	*wo*	*xiang*	*da*	*tong*	*ta*	*jige*	*guanxi*.	
	1SG	want	break	open	it	several	relations	
	'I would like to establish a network'.							

Figure 3.15

Chinese, there is no evidence that the pronominal form in question is bound to the verb. The fact that expletive *ta* not only follows a bare verb but also occurs with a verbal phrase containing a resultative element, as shown in Figure 3.15, strongly suggests that this morpheme may not be an enclitic.

Furthermore, though various definitions of clitic as a technical term have been proposed, it is widely held that a clitic is usually prosodically deficient and hence phonologically bound to its host, and can form an accentual unit in combination with its host (see Klavans 1995 for the categorical specification of the hosts of clitics). Unlike *'em* in *I see'em* in English, the Chinese *ta* is neither prosodically deficient nor phonologically bound to the verb as evidenced by the fact in Figure 3.15, but instead is fully and articulately pronounced in all cases noted earlier.

In summary, the 'non-canonical' argument structure associated with common verbs such as *shui* 'sleep' and *chi* 'eat' in Chinese appears to be an epiphenomenon of verbal underspecification. Such phenomena pose a serious challenge to the projectionist view of the relation between lexicon and syntax, according to which the number of syntactic arguments is determined by the lexical semantics of the verb, as captured in *theta* theory (Chomsky 1981, 1995). Apparently, verbal underspecification involving 'unselected' argument-like complements is not purely a syntactic phenomenon, which is why analyses adopting a syntactocentric perspective would run into various problems.

The 'flexibility' of using various types of verbs, as manifested in Chinese examples (Figure 3.1 and Figure 3.2) and English examples (Figure 3.6 and Figure 3.7), strongly supports the view that verbs, like all words, address mental concepts and the exact mental concept addressed by a lexical item is constructed on the fly in the context in which it occurs (see, among others, Sperber and Wilson 1995; Carston 2002). To provide an adequate account of the phenomenon at issue, we need to adopt a dynamic approach that allows the interaction between lexical, structural and pragmatic information during the syntactic process.

3 A dynamic analysis

One of the central issues of tackling verbal underspecification is, as mentioned in section 2, how to characterize the predicate-argument structure (both canonical and non-canonical) associated with relevant verbs. To tackle this issue

from a dynamic, parsing-based perspective, a few words about native speakers' intuition about the interpretation of verbs are in order.

Over the past six decades, it has been generally agreed among Chinese grammarians (see Gao 1948; Wang 1954; Chao 1968 among others) that it would be rather difficult to determine the transitivity of Chinese verbs. Based on a comprehensive discussion of their usages, Gao (1948/2011, pp.213–214) goes as far as to claim that "no clear-cut distinction can be made between transitive verbs and intransitive ones in Chinese", for most of them can be used interchangeably in terms of transitivity. Wang (1954), another authoritative grammarian, claims further that one cannot determine the transitivity of Chinese verbs by means of the criteria used for determining the transitivity of verbs in other languages. Due to the lack of inflectional morphology in Chinese (note that Chinese has no prefixes nor suffixes nor number markers nor case markers nor agreement markers nor tense markers),[4] there lies a possibility that such a language tends to take advantage of this central property and enjoys a considerable freedom in its grammatical system. As far as syntactic configuration and semantic composition are concerned, Chinese verbs in general enjoy a higher degree of flexibility than their English counterparts.[5]

The flexibility of using Chinese (including its verbs) has engendered a lot of controversy over the issue concerning the basic structure of this language. Some linguists (e.g., Li and Thompson 1976, 1981) assert that Chinese is undergoing a change from SVO towards SOV, whereas others (e.g., Sun and Givón 1985) claim that Chinese is, generally speaking, a typical SVO language like English. Taking all the structural properties of Chinese sentences into account, I would argue, as already discussed in chapter 1, that Chinese does not have a rigid SVO word order like English, but does have a rigid SV construction at its very heart, with the remaining elements freely ordered with respect to this, according to the communicative contexts.

As a consequence, the flexibility of using verbs in Chinese renders the predicate-argument structure hardly predicable during the course of communication, suggesting that at the time of processing a verb, hearers would have to adopt a 'wait-and-see' strategy – that is, they would wait until the whole sentence is uttered and see if the heard string should make sense to them, based on their knowledge of the particular language being used. As will be shown shortly, this kind of intuition should and can be reflected in the dynamic approach.

First, let us consider the parse of those sentences in Figure 3.1 and see how the argument structures associated with this common verb can be characterized. The analysis of (Figure 3.1a) *women shui le*, 'we went to bed', a canonical intransitive construction, begins as usual with a requirement to construct a propositional structure. The standard rules of Introduction and Prediction can then apply to introduce a full propositional template. This allows the parse of the subject NP *women* 'we', which as a first-person pronoun projects a metavariable **U** whose semantic value is identified with *shuohuaren*, 'speakers', as shown in the tree in Figure 3.16.

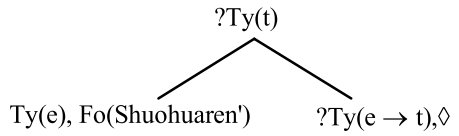

Figure 3.16 Parsing *women* 'we'

$(e^* \rightarrow t)$

Figure 3.17

Subsequent to the construction of the subject node, the pointer then moves to the functor node, requiring it to be developed, as can be seen in Figure 3.16. The verb *shui* 'sleep' is in turn processed. Given the indeterminacy of verbs' argument structure, we need to find a way to sort out the problem of their type specification. Based on the earlier discussion of the structural properties of Chinese, its verbs in particular, we can, following Marten (2002), treat them as underspecified as to type, characterized as in Figure 3.17 by means of the Kleene star operation, whose specification is fixed only by *the structural context* in which the potential arguments are introduced.

The basic idea is that both arguments and adjuncts can be syntactically optional (as shown in Chinese examples in Figure 3.1 and Figure 3.2 and English examples in Figure 3.6 and Figure 3.7)), and verbs can thus be analyzed as underspecified in that they structurally underspecify the number of Ty(*e*) expressions taken to include both semantically selected NPs and semantically unselected yet syntactically expressed NPs, the latter of which can be treated as optional arguments. With the introduction of optional arguments, the concept addressed by the lexical verb is pragmatically enriched. Therefore, the incremental interpretation of a verb phrase can be seen as a case of enriched semantic composition – a compositional process that may be subject to pragmatic reasoning (see Jackendoff 1997, 2002; Zhang 2005).

The formulation in Figure 3.17 explicitly encodes the likelihood of adding Ty(e) expressions optionally. The starred *e* could minimally stand for zero, as in the case of weather verbs. It follows from this formulation that after the verbal underspecification is resolved, the starred type of predicates reduces to an ordinary type specification which has already been employed in the DS system – e.g., Ty(t), Ty(e → t), Ty(e → (e → t)), Ty(e → (e → (e → t))), as will be demonstrated shortly.

Having sorted out the problem with the analysis of verbs with respect to the type assignment, let us return to the parse of the sentence under discussion. In the light of the earlier discussion, verbs such as *shui* 'sleep', which are usually construed as intransitive out of context, can be temporarily described as Ty(e* → (e → t)), meaning that minimally these intransitive verbs need one

IF ?Ty(e → t)
THEN make(<↓*>), put (Fo(Shui'), Ty(e*→(e →t))), go(<↑*>, ?Ty(e →t))
ELSE abort

Figure 3.18 Lexical entry for *shui* 'sleep'

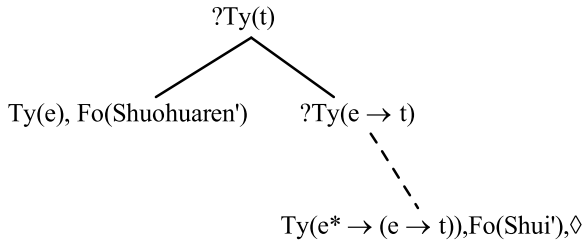

Figure 3.19 Parsing *women shui*

argument to form a proposition. To capture the intuition that at the time of processing verbs hearers usually take a 'wait-and-see' strategy, we treat the verb *shui* as projecting a locally unfixed node, by adapting the rule of *Adjunction introduced in the preceding section. Its final position in the tree should be identified after all the following expressions (arguments and argument-like adjuncts) are introduced into the tree. The lexical entry for *shui* 'sleep' can thus be given in Figure 3.18, and the parse state involving the verb can be illustrated by the dotted branch in Figure 3.19.

If there should be no lexical input after the parse of the verb *shui* 'sleep', the type of underspecification of this verb would be resolved – that is, it is a one-place predicate – by merging the unfixed node with the open predicate node. This is in fact the derivation of Figure 3.1a *women shui le*. The tree can then be completed, which will yield a well-formed propositional form *Fo(shui'(Shuohuaren'))*. In the case of Figure 3.1b–d, the tree would have to be expanded to allow the parse of the postverbal expressions. Consider the parse of (Figure 3.1b) *women shui shafa* 'we sleep sofa', which is a particular type of construction as discussed in preceding sections and where the verb *shui* seems to be used transitively. Subsequent to the parse of the verb, which results in the projection of the unfixed predicate node, the pointer moves back to the one-place predicate node. The standard rule of Introduction and Prediction can apply again to introduce a pair of nodes, with one requiring the Ty(e) expression and the other a two-place predicate. The postverbal NP *shafa* 'sofa' can then be processed. As a Ty(e) expression, it satisfies the requirement on the internal argument node, as shown in Figure 3.20.

Since there is no lexical input subsequent to the parse of *shafa* 'sofa', the unfixed node projected by the verb *shui* 'sleep' can then merge with the two-place predicate node, meeting the requirements of both nodes: the former needs

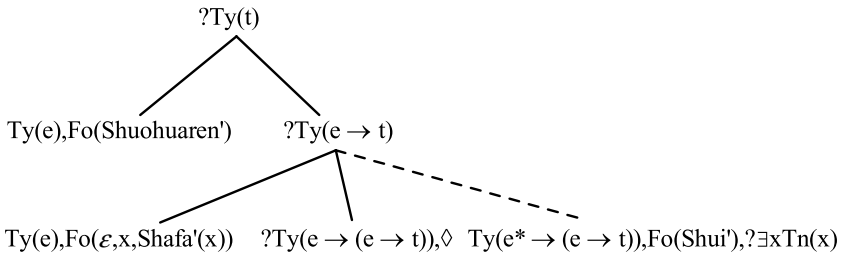

Figure 3.20 Parsing (1b) *women shui shafa*

a fixed node and the latter a logical formula. Completion of the tree in Figure 3.20 gives rise to a propositional form $Fo(Shui'(\varepsilon, x, Shafa'(x))(Shuohuaren'))$, which denotes the speakers' sleeping state at a certain period of time, which involves two participants – namely, *women* 'we' and *shafa* 'sofa'. Compared with *mian* 'noodle' in Figure 3.2b, *women chi mian* 'we eat noodles', which is a selected internal argument or logical object of the verb *chi* 'eat', the postverbal locative NP *shafa* 'sofa' in Figure 3.1b, *women shui shafa* (lit. 'we sleep sofa') appears to be an unselected internal argument from the generative perspective, especially viewed from the principles such as the θ-criterion and the Projection Principle (Chomsky 1981) and Uniformity of Theta Assignment Hypothesis (Baker 1988). As Zhang (2005) points out from a constructionist perspective, unselected arguments are licensed in terms of an enriched view of conceptual combination and pragmatic inferences, suggesting that no abstract syntactic mechanisms need to be invoked for such phenomena.

In what follows, I examine some complex data as sentences (Figure 3.1c–d and Figure 3.2c–d) and see if they can be accommodated by the proposed DS account, under which verbs are taken as projecting an unfixed node, which would be ultimately fixed till all Ty(e) expressions are processed. Consider Figure 3.1c and Figure 3.2c first, which contain the expletive use of the pronominal form *ta* 'it'. From a constructionist perspective (see Goldberg 1995, 2006), such sentences should be viewed as a particular construction, because it appears to be a conventionalized pairings of form and function: the occurrence of *ta*, albeit devoid of lexical content, produces the strength-of-feelings effect, as mentioned in section 2. Although it is an expletive pronoun, I follow Wu and Matthews (2010) and still treat it as a Ty(e) expression, as all noun phrases in the DS system are taken to project a term. Figure 3.21 shows the parse state subsequent to the parse of the verb *shui* 'sleep' and the non-referential *ta*.

As can be seen in Figure 3.21, *ta* projects a metavariable **V** as an interim value, whose value can be instantiated by a term established in previous context, or a term projected by a postverbal expression. In the context of (Figure 3.1c) *women shui ta yige xingqi* 'let us sleep as a long as a week', for example, there is no term that can serve as a substituend for the metavaraible so that there is only one possibility of instantiating its value – namely, by the parse of a

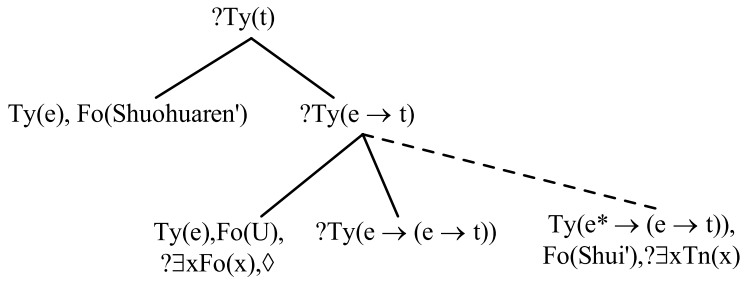

Figure 3.21 Parsing *women shui ta*

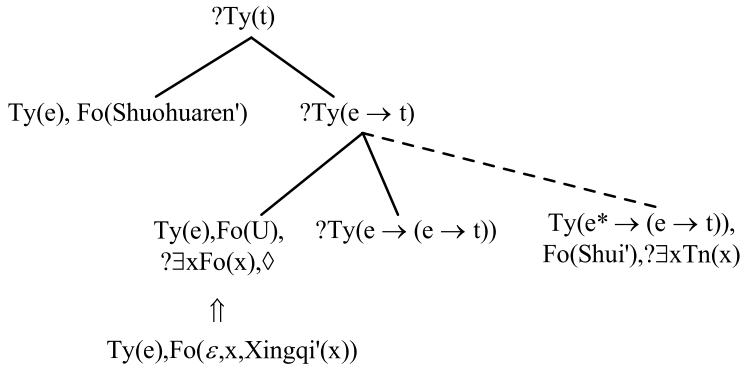

Figure 3.22 Parsing *women shui ta yige xingqi* (lit. 'we sleep it one week')

post-*ta* expression, the indefinite NP *yige xingqi* 'a week'. Technically, a node of Ty(e) can be created by a second step of applying the computational rules of Introduction and Prediction. As has been discussed in the DS literature (see Kempson and Kiaer 2010; Chatzikyriakidis and Kempson 2011), given that nodes in a DS tree are all uniquely identified, one can go through a process of building any given node more than once and nothing would go wrong, as long as the decorations are compatible. The reapplication of the rules of Introduction and Prediction as a fully legitimate process allows the parse of the post-*ta* indefinite temporal expression *yige xingqi* 'a week'. The newly created Ty(e) node annotated with the formula value ($\varepsilon, x, Xingqi'(x)$) then overlays the Ty(e) node already constructed – namely, the one decorated by a metavariable **V**, as shown in Figure 3.22.

Here an empirical question that may arise is, is there any justification for associating the expletive use of *ta* with the following indefinite expression? When discussing the distributional properties of *ta* 'it' (i.e., it occurs between a verb and a numeral indefinite), I have pointed out in section 2 that the Chinese expletive requires an associate in the particular construction containing

a. *women* *chi* *ta* ***shiwan*** ***mian***.
1PL eat it ten-bowl noodle
'Let us eat ten bowls of noodles!'
b. *women* *chi* *ta* ***yige*** ***yue*** *mian*.
1PL eat it one-CL month noodle
'Let us eat noodles for a month!'
c. **women* *chi* *ta* ***mian***.
1PL eat it noodle
'Let us eat noodles!'
d. **It** was possible **that Peter won the prize**.

Figure 3.23

it – namely, the indefinite expression following it, as illustrated by Figure 3.14 and repeated as Figure 3.23.

The kind of association between the expletive use of *ta* and the post-*ta* indefinite expression is to some extent analogous to the kind of association between the expletive use of *it* and a post-*it* clausal string in the English construction (Figure 3.23d) (see Cann et al. 2005, pp.194–198 for the analysis of sentence extraposition). Therefore, there is justification for substituting the matavariable projected by the expletive *ta* with the term projected by the following indefinite NP *yige xingqi* 'a week'. In the case of (Figure 3.2c) *women chi ta shiwan mian* (lit. 'we eat it ten-bowl noodle'), it is the term $Fo(\lambda x,\ x \in \cup\cap\ mian \wedge MEAS(x) = \langle 10, wan \rangle)$ projected by the numeral phrase *shiwan mian* 'ten-bowl noodle' that replaces the metavariable projected by the expletive pronoun.[6]

Let us return to the parse of Figure 3.1c. Since there is no lexical input following the parse of the post-*ta* numeral phrase, the unfixed node projected by the verb *shui* 'sleep' can then merge with the two-place predicate node, as has already been seen earlier. Completion of the tree yields a well-formed propositional form $Fo(Shui'(\varepsilon, x, Xingqi'(x))(Shuohuaren'))$, as shown by the tree in Figure 3.24, which is exactly the same as the output of parsing a canonical sentence *women shui yige xingqi* (lit. 'we sleep one week') – namely, the *ta*-less counterpart of Figure 3.1c. As for Figure 3.2c, *women chi ta shiwan mian* (lit. 'we eat it ten bowls of noodles'), it is parsed in exactly the same fashion. Here we may have a glimpse of how the emphatic effect produced by the expletive pronoun is captured through the dynamic parsing analysis: compared with their *ta*-less counterparts, the occurrence of an expletive pronoun in sentences such as Figure 3.1c and Figure 3.2c appears to require additional processing effort; that is, its occurrence forces the hearer to search for a possible substituend. The search task is a rather difficult one, for the identification of the expletive *ta*'s associate (e.g., *yige xingqi* 'a week' in Figure 3.1c and *shiwan mian* 'ten bowls of noodles in Figure 3.2c) seems more time consuming than the identification of the referential *ta*'s referent (e.g., *Wangwu shui le*, *bie darao ta* 'Wangwu slept. Don't disturb him'). Hence arises the sort of strength-of-feeling effect, as discussed in section 2.

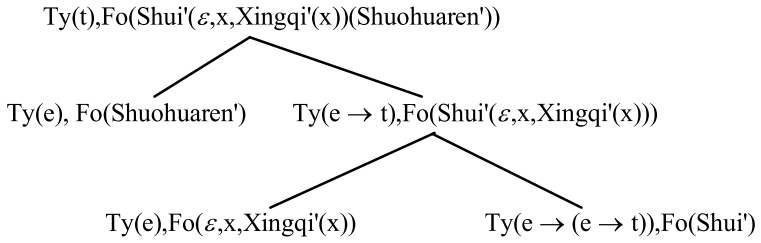

Figure 3.24 The final result of parsing *women shui ta yige xingqi* (lit. 'we sleep it one week')

a.	*women*	*shui*	*le*	*yige*	*xingqi*	*shafa*.
	1PL	sleep	PERF	one-CL	week	sofa
	'We slept on the sofa for a week'.					
b.	*women*	*chi*	*guo*	*yige*	*yue*	*mian*.
	1PL	eat	EXP	one-CL	month	noodle
	'We ate noodles for a month'.					

Figure 3.25

With the successful characterization of Figure 3.1c and Figure 3.2c, we should have no difficulty applying the dynamic analysis to sentences such as Figure 3.1d and Figure 3.2d, which are repeated as Figure 3.25a–b.

The whole process of parsing Figure 3.25a, for instance, can be characterized as in Figure 3.26, where the verb *shui* 'sleep' initially projects an unfixed node and then merges with the three-place predicate node, subsequent to the parse of the object NP *shafa* 'sofa'.

Completion of the tree in Figure 3.26 will yield a well-formed propositional form $Fo(Shui'(\varepsilon, y, Shafa'(y)(\varepsilon, x, Xingqi'(x))(Shuohuaren'))$. As for (2d) *women chi guo yige yue mian* (lit. 'we ate a month noodles'), it is once again parsed in the same fashion, which yields a well-formed propositional formula $Fo(Chi'(\varepsilon, y, Mian'(y)(\varepsilon, x, Yue'(x))(Shuohuaren'))$. A question arises as to whether the reverse orderings of the postverbal expressions in Figure 3.25a–b would lead to distinct logical structures. Different orderings of argument expressions and argument-like adjunct expressions, as shown in Figure 3.27, would give rise to seemingly distinct yet totally equivalent logical structures.

As has already been discussed in Tang (1994) (see section 2), both orderings – namely, Verb-Object-Temporal/Locative Expressions and Verb-Temporal/Locative Expressions-Object, are in general acceptable to native speakers, as already illustrated by the two examples in Figure 3.10 and repeated as Figure 3.28.

Sentences such as Figure 3.27 and Figure 3.28 prove to a large extent the flexibility of using the Chinese languages and the feasibility of adopting an

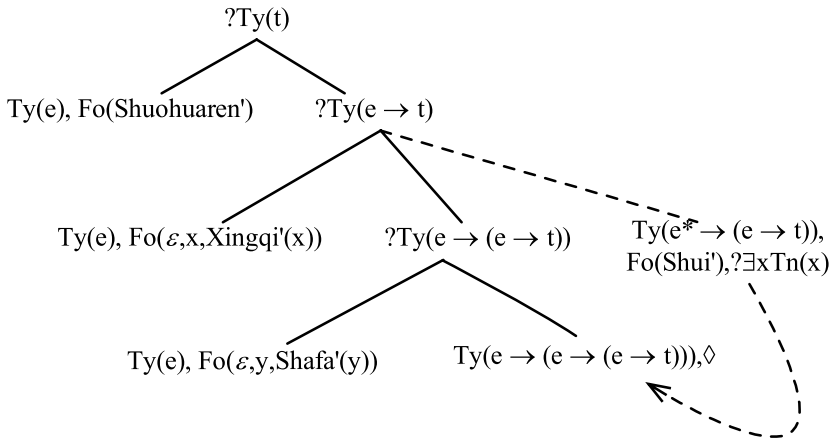

Figure 3.26 Parsing *women shui le yige xingqi shafa* (lit. 'we sleep one week sofa')

a.	*women*	*shui*	*le*	*shafa*	*yige*	*xingqi*.
	1PL	sleep	PERF	sofa	one-CL	week
	'We slept on the sofa for a week'.					
b.	*women*	*chi*	*guo*	*mian*	*yige*	*yue*.
	1PL	eat	EXP	noodle	one-CL	month
	'We ate noodles for a month'.					

Figure 3.27

a.	*wo*	*jiao*	*zhongwen*	*sanshi*	*nian*	*le*.
	1SG	teach	Chinese	thirty	year	SFP
	'I have taught Chinese for thirty years'.					
b.	*wo*	*jiao*	*le*	*sanshi*	*nian*	*zhongwen*.
	1SG	teach	PERF	thirty	year	Chinese
	'I have taught Chinese for thirty years'.					

Figure 3.28

incremental parsing-based analysis of strings to characterize cases of verbal underspecification.

4 Summary

Verbal underspecification is a problematic linguistic phenomenon, since it demonstrates the complex, subtle interaction between lexical, structural and pragmatic information during the syntactic process. Within the DS framework which allows the interaction between semantics, structure and pragmatics during the parsing process, I have successfully characterized the verbal

underspecification in Chinese and demonstrated that a parsing-based dynamic approach can offer a more adequate solution to the non-canonical argument structure phenomenon than syntactocentric approaches. Specifically, I have shown that just like semantically selected expressions, semantically unselected yet syntactically expressed expressions contribute to the semantic composition for which no abstract syntactic mechanisms need to be invoked.

The dynamic account proposed here is consistent with the enriched view of conceptual combination in the sense that it takes seriously the interaction of grammar and context and directly reflects the incrementality of semantic interpretation relative to context. What is distinct about the DS approach adopted in this chapter is that it not only provides a formal tool for the characterization of the structural properties of language (e.g., the predicate-argument structure associated with verbs) but also provides an account for the functional properties associated with some particular grammatical construction (e.g., the strength-of-feelings effect expressed by expletive *ta* construction).

With the successful characterization of the verbal underspecification phenomenon, I have shown how a direct mapping between syntactic structures and semantic representations is made possible within a parsing-oriented grammar formalism, which defines both representations of content and context dynamically and structurally.

Notes

1 The third-person pronoun *ta* 'it' in sentences such as those in Figure 3.1c and Figure 3.2c is used non-referentially and is therefore called a dummy or expletive object (see, *inter alia*, Chao 1968; Zhu 1982; Ma 1983; Lin 1994; Yuan 2003). Interpretively, sentences such as Figure 3.1c and Figure 3.2c, which are usually volitional, have some special expressive effect, precisely a strength-of-feeling effect (see Chao 1968; Iljic, 1987).

2 It is worth noting that there are a considerable number of verbs in Chinese that behave in a similar fashion. In addition, the patterns exhibited in Figure 3.1c–d and Figure 3.2c–d are very popular in everyday conversation.

3 In cases such as Figure 3.14b, *yige yue* 'a month' forms a constituent with *mian* 'noodle', which further combines with expletive *ta* to form a bigger constituent. Thus the postverbal string could be divided as [ta [yige yue [mian]]].

4 This accounts for why Chinese has been referred to as an isolating language.

5 This can best be illustrated by two well-studied phenomena in Chinese, the so-called [Vt + Non-patient Object] and [Vi + Object] configurations, which are highly productive. Take *chi* 'eat' as an example. It seems that this verb can be followed by various kinds of NPs – e.g., *chi shitang* 'canteen'/*kuaizi* 'chopsticks'/*gongkuan* 'public funds'/*fangzu* 'rental'/*fumu* 'parents'/*shouyi* 'workmanship', which mean 'eat in the canteen', 'eat with chopsticks', 'embezzle public funds', 'live on rentals' and '(still) get fed by parents' and 'live on (one's) workmanship', respectively. Based on search in the corpus of CCL (Centre for Chinese Linguistics, Peking University), possibly the largest corpus of its kind, Li and Wu (2014) found that there are 259 such non-canonical expressions out of the 10,000 [chi 'eat'+NP] samples, taking a percentage of 24.59%. According to the ERP study of Liu et al. (2013), though all of these non-canonical expressions are acceptable to experimental

subjects, the interpretation of some of them would be subject to pragmatic reasoning, especially if these expressions are less familiar.

6 Here I follow Li's (2013) analysis of mensural classifiers in Chinese, in which measural classifiers such as *ping* 'bottle' and *wan* 'bowl' are construed as having a measure function $\lambda n \lambda x.MEAS(x) = \langle n,U \rangle$ of type $\langle e \rightarrow t \rangle$, and a MEAS head combines with a numeral to give a predicate of type $\langle e \rightarrow t \rangle$.

4 Topic constructions

1 Introduction

The topic-comment dichotomy is an alternative binary characterization of sentence structure to the subject-predicate distinction found in traditional linguistics (cf. Crystal 2001). As regards the defining structural property of the Chinese language, it has attracted a great deal of attention since Chao (1968, p.69) made the famous statement that "the grammatical meaning of subject and predicate in a Chinese sentence is topic and comment, rather than actor and action". Chao's equation of subject with topic has caused a lot of discussion regarding the relation between these two grammatical notions. A resulting dichotomy is topic prominence versus subject prominence, which has been frequently used in the literature to distinguish languages such as Chinese from languages such as English (Li and Thompson 1976). While there is a consensus nowadays that both topic and subject exist in Chinese as two distinct notions, there is also a general agreement that topic structure figures prominently in the overall grammar of such a language. The prominence of topic in Chinese can be characterized by the variety of topic constructions, as exemplified in Figure 4.1, where parentheses indicate optionality.[1]

Figure 4.1 and Figure 4.2 represent two kinds of sentences which both contain a single topic, though there exists a difference between them. In Figure 4.1, the topic expression *Zhangsan* is associated with an empty element in the comment clause, an optional pronoun or a lexical noun phrase; in Figure 4.2, *Zhangsan* in the main-clause topic position is associated with an empty element, an optional pronoun or a lexical noun phrase in the subordinate clause nested in the whole comment. In general, Chinese topic constructions of this sort bear a resemblance to their English counterparts in that they encode the topic-comment relation in a syntactic fashion. Yet compared with English, Chinese seems to enjoy more freedom in coding the relation, as shown in Figure 4.3.

Figure 4.3 and Figure 4.4, albeit the same as Figure 4.1 and Figure 4.2 with respect to the number of topics, display distinct structural properties. Figure 4.3 contains a *wh*-word, which grammaticality at least suggests that topicalization in Chinese is not subject to the *wh*-island condition; moreover, it is not

(1) *Zhangsan zhuren ma guo (ta/zhe jiahuo).*
Zhangsan head scold EXP 3SG/this guy
'Zhangsan, the head scolded (him/this guy)'.

Figure 4.1

(2) *Zhangsan Lisi zhidao zhuren ma guo (ta/zhe jiahuo).*
Zhangsan Lisi know head scold EXP 3SG/this guy
'Zhangsan, Lisi knows that the head scolded (him/this guy)'.

Figure 4.2

Zhangsan Lisi xiang zhidao shui ma guo (ta/zhe jiahuo).
Zhangsan Lisi want know who scold EXP 3SG/this guy
'Zhangsan, Lisi wonders who scolded *(him/this guy)'.

Figure 4.3

naxie shu xuesheng du guo hen qiguai.
those book student read EXP very strange
Lit. 'That those books students have read is strange'.
Lit.*'Those books, it is strange that students have read'.

Figure 4.4

zhe-men ke Zhangsan wo jiao le.
this-CL course Zhangsan 1SG teach PERF
Lit. 'This course, Zhangsan I taught'.

Figure 4.5

Lisi wo gaosu le (ta) na-ge difang wo qu guo.
Lisi 1SG tell PERF 3SG that-CL place 1SG go EXP
Lit. 'Lisi, I told (him) that that place I have been to'.

Figure 4.6

subject to the sentential-subject condition either, as shown by the ambiguous Figure 4.4, where the topic can be analyzed as appearing in the topic position of the sentential subject, as indicated by the first translation, or occurring in the topic position of the main clause, as indicated by the second translation.[2]

This is not the whole story, though. In what follows, we can see multiple topic constructions in a single sentence, as exhibited in Figure 4.5, where two separate topic constituents are associated with two separate elements in one simple comment clause and in Figure 4.6, where two distinct expressions,

a.	*jiu-ge*	*miyu*	*Lisi*	*caidui*	*le*	*liu-ge.*
	nine-CL	riddle	Lisi	resolve	PERF	six-CL
	'Of nine riddles, Lisi resolved six'.					
b.	*yuyanxue*	*Zhangsan*	*pianai*	*yuyixue.*		
	linguistics	Zhangsan	prefer	semantics		

Figure 4.7

a.	*zuqiu*,	*Baxi*	*qiuyuan*,	*fengge*	*youmei*.	
	football	Brazil	player	style	elegant	
	'As for football, Brazilian players, (their) style is elegant'.					
b.	*Zhongguo*	*Beijing*	*mingsheng*	*Changcheng*	*zui*	*chuming*
	China	Beijing	places of interest	Great Wall	most famous	the most famous.'
	'China, Beijing, places of interest, the Great Wall is the					
	(Y. Huang 1994/2007)					

Figure 4.8

occupying the topic position of the main and subordinate clauses, respectively, are related to distinct elements. Needless to say, the order of topics is determined by the degree of prominence and, as pointed out by Xu and Langendoen (1985), speakers may have some trouble accepting a sentence with three or more topics,[3] because the constraint on the quantity of topics in one sentence is certainly a matter of pragmatics – i.e., the attempt to emphasize a lot of things at one time would probably result in failure to emphasize anything.

The presentation of topic constructions in Chinese so far is based on a fundamental assumption that the topic is in a predication relation with the comment in the sense of Williams (1980). Syntactically, a position in the comment, lexicalized or non-lexicalized, is anaphorically related to the constituent in the topic position. Topic constructions presented earlier, according to Chafe (1976), can be classified as English-style topic constructions since the topic is subcategorized by the verb. In addition, Chinese has a special type of topic construction, first termed Chinese style by Chafe, in which a topic just specifies the frame of reference for the following comments (Figure 4.7 and Figure 4.8), where no element is co-indexed with the topic.

There appears to be no co-reference relation but an aboutness relation between the topic and the comment, which is considered to be the constraint determining the acceptability of the relevant topic construction (e.g., Chao 1968; Chafe 1976; Li and Thompson 1981; Gundel 1988). The topic expression and the comment clause in Figure 4.7a–b are semantically and/or pragmatically related to each other, while in Figure 4.8a–b, there exists a hierarchy between the topics in terms of domain: the initial or main topic sets the domain,

which is delimited by the subordinate topic(s) which further restricts the applicability of the predication.

To summarize, I have presented a general picture of Chinese topic constructions which can be roughly classified into two types: English style and Chinese style. Both types of topic structure involve a noun phrase dislocated at the left periphery of the clause and hence display left-periphery effects in an obvious fashion. In the next section, I shall provide a critical review of the previous analyses of topic constructions in Chinese.

2 Previous analyses

2.1 The variable analysis

One proposal relating to the analysis of topic construction is the variable analysis proposed by J. Huang (1982, 1984, 1987, 1989). Analogous to Chomsky's (1977) account of the topicalization process, J. Huang (1984) proposes a COMP-to-COMP movement analysis based on his research on zero anaphors in Chinese, which postulates *wh*-movement of a null operator – i.e., an empty topic, to Comp or Spec of CP position – leaving a variable behind it. The central tenet of the variable analysis is that a variable can be locally Ā-bound by a null operator or an empty topic. Such a variable – namely, a trace left by a fronted empty topic, can occur in both subject and object positions. When a zero anaphor occurs in subject position, it is treated either as Ā-bound variable or as a *pro*, if the clause is assumed to be finite, or as a PRO if the clause is assumed to be non-finite. When a zero anaphor occurs in object position, it is treated either as an Ā-bound variable or Ā-bound NP trace.

There are a number of problems with J. Huang's proposal, both theoretically and empirically, as has been argued by some researchers (e.g., Xu and Langendoen 1985; Xu 1986; Xu and Liu 1998; Y. Huang 1991, 1992, 1994, 2000). In the first place, the analysis of an empty category related to an element in TOP as a variable runs into a number of technical problems. As Xu and Langendoen (1985) and Xu (1986) have shown, three arguments can be produced against the treatment of object-zero anaphors as variables: the relation between the zero anaphor and the topic does not obey island constraints and therefore is not subject to subjacency; the relation between the zero anaphor and the topic is not subject to the strong crossover condition (see Postal 1971) – a condition that has subsequently been taken to be diagnostic for variable binding. The two arguments can be illustrated by examples in Figure 4.9 through Figure 4.11 taken from Xu and Langendoen (1985).

In addition, as Y. Huang (1994/2007, 2000) has pointed out, the empty topic analysis appears to pose a serious problem for the generally accepted assumption in government-binding theory that a null operator is moved to Comp or

zhege	*ren*	*wo*	*xiang*	*zhidao*	*shui*	*jian*	*guo.*
this-CL	man	1SG	want	know	who	meet	EXP

*'This man, I wonder who met'.

Figure 4.9

Li	*Ming*	*wo*	*yijing*	*gaosu*	*guo*	e_i	*ni*	*bu*	*xiang*	*jian*	e_i	*le.*
Li	Ming	1SG	already	tell	EXP		2SG	not	want	see		SFP

'Li Ming, I have already told (him) that you don't want to see (him)'.

Figure 4.10

Xiao	*Ming*$_i$	*ta*$_i$	*yiwei*	*mama*	*yao*	*zeguai*	e_i	*le.*
Xiao	Ming	3SG	think	mother	will	blame		SFP

*'Xiao Ming, he thinks mother will blame him'.

Figure 4.11

a. *ø kanjian ø.*
see
b. [$_s$ o_1 o_2 [*ø*$_1$ *kanjian ø*$_2$]]

Figure 4.12

Spec of CP and cannot co-occur with other operators, either overt or null (see Rizzi 1986). Consider Figure 4.12a, which is employed in J. Huang (1984) and from which Figure 4.12b, taken from Y. Huang (1994/2007), can be naturally derived.

Both zero anaphors in Figure 4.12a, according to J. Huang, are variables, with each being Ā-bound by a null operator – namely, an empty topic. If J. Huang were right, nothing would stop Figure 4.12b from being derived from Figure 4.12a, since a variable can be locally Ā-bound by a null operator or an empty topic. The occurrence of the two operators o_1 and o_2 in the COMP position, is obviously a violation of the 'one null operator per COMP' condition.

Empirically, J. Huang's empty topic proposal runs counter to Chinese facts. As J. Huang (1984) himself is aware, an empty topic is a linguistic phenomenon occurring at the discourse rather than the sentence level, and can be licensed only if it is locally identified. The following typical example (Figure 4.13), which is drawn from Tsao (1977), shows that the empty topic requires the salience of the chain-initial topic.

In each of the four sentences, there is a gap or zero anaphor co-indexed with the leftmost NP. Moreover, the leftmost NP forms a topic-comment

neike	*shu*,	ø	*hua*	*xiao*,	ø	*yezi*	*da*,	ø	*hen*	*nankan*,	*(suoyi)*
that-CL	tree		flower	small		leaf	big		very	ugly	so
wo	*mei*	*mai*	ø.								
1SG	not	buy									

'The tree, (its) flowers are small; (its) leaves are big; (it is) very ugly; so I did not buy it'.

Figure 4.13

**pingguo*,	*wo*	*xihuan*	*shuiguo*.	(Hu and Pan 2009, p.375)
apple	1SG	like	fruit	

*'As for apples, I like fruits'.

Figure 4.14

**yuyixue*	*Zhangsan*	*pianai*	*yuyanxue*.
semantics	Zhangsan	prefer	linguistics

*'As for semantics, Zhangsan prefers linguistics'.

Figure 4.15

construction in isolation with any of the four clauses. Hence the four clauses share one identical topic, *neike shu* 'that tree', licensing the deletion of the topic of each clause. In the face of this fact, the assumed existence of an empty topic in the absence of identification of its chain-initial topic is far from plausible (see, among others, Yang and Wu 2015 for a detailed discussion of similar constructions).

Another version of a variable analysis is proposed in Pan and Hu (2008) and Hu and Pan (2009).[4] To characterize the aboutness relation existing in Chinese-style topic constructions, Pan and Hu (2008) initially propose a topic-licensing condition, claiming that "in Mandarin Chinese a topic is licensed if there is a variable in the comment and the set generated by this variable produces a non-empty set when intersecting with the set represented by the topic" (p.1966). To complement this topic-licensing condition, Hu and Pan (2009, p.371) then propose an interpretation condition, which goes like this, "the topic forms a subject-predicate relation with an element inside the comment, with the topic being the predicate and the element in the comment the subject". A variable analysis as such is a significant step forward for an adequate account of Chinese-style topic structures. Specifically, the two conditions proposed can work together to elaborate the aboutness condition existing in sentences such as those in Figure 4.7 and Figure 4.8, and to exclude unacceptable sentences such as those in Figure 4.14 and Figure 4.15.

Nevertheless, the two conditions mentioned earlier, which crucially rely on a variable proposal, cannot account for all Chinese-style topic constructions,

na-chang	*bisai*	*quan*	*cheng*	*dou*	*feng*	*le*.
that-CL	match	whole	city	all	crazy	SFP

'As for that match, the whole city was crazy'.

Figure 4.16

zhe-ci	*zhanyi*	*henduo*	*pingming*	*dou*	*si*	*le*.
this-CL	battle	many	civilians	all	die	EXP

'As for this battle, many civilians were killed'.

Figure 4.17

such as Figure 4.16 and Figure 4.17, for the apparent reason that the topic and the comment in these sentences are pragmatically related. Precisely, the aboutness relation between them is a sort of bridging effect (cf. Matsui 2000).

Given the theoretical and empirical problems discussed, the variable analysis has been shown to be untenable.

2.2 The pragmatic analysis

Being aware of the fact that syntax proper may benefit from transferring some of its explanatory burden to pragmatics, Y. Huang (1994/2007) developed a pragmatic approach to anaphora within the neo-Gricean framework of conversational implicature and attempts to extend it to topic constructions in Chinese. In his pragmatic theory, "anaphora is largely determined by the systematic interaction of two neo-Gricean pragmatic principles, namely the M[anner]- and I[nformativeness]-principles, constrained by a Disjoint Reference Presumption (DRP), information saliency and general consistency conditions on conversational implicature" (p.115). In terms of consistency constraints, any interpretation is subject to the requirement of consistency with the DRP and information saliency, so that "implicatures to co-reference may be preferred according to the saliency of antecedent in line with the following hierarchy *topic* > *subject* > *object*, etc." (p.145).

According to his pragmatic theory of anaphora, Y. Huang postulates an antecedent search procedure for zero anaphors as follows (Y. Huang 1994/2007, pp.149–150):

> In a structure of the sort $[s_2[s_1ø]]$, where ø is a zero anaphor, ø is interpreted as referentially dependent according to the following preference order:
>
> (i) ø is referentially dependent on the local subject; failing which:
> (ii) ø is referentially dependent on the local object; failing which:
> (iii) ø is referentially dependent on both the local subject and the local object (split antecedents); failing which:

(iv) (i)-(iii) is recursively applied to the next, higher clause until the antecedent is found; failing which:
(v) find the nearest antecedent in the discourse, preferably a topic; failing which:
(vi) settle for an 'arbitrary' interpretation.

From a purely logical perspective, Y. Huang's proposal appears to be inconsistent. Specifically, his postulation of an antecedent search procedure is not in agreement with his pragmatic theory of anaphora, a violation of the information saliency conditions. If we follow his pragmatic theory concerning the interpretation of anaphora, the preference order in the assignment of antecedent for a zero anaphor, as pointed out in Chen et al. (2009), should be uncontroversially *topic* > *subject* > *object* rather than the order *subject* > *object* > *topic* determined by the aforementioned procedure, given that the former forms a hierarchical relation in terms of information saliency. As far as topic sentences are concerned, Y. Huang's pragmatic analysis cannot apply to any of them with a zero anaphor, single or multiple (Figures 4.18–4.23).

Zhangsan$_i$ *zhuren ma guo* ø$_i$.
Zhangsan head scold EXP
'Zhangsan, the head scolded (him)'.

Figure 4.18

Zhangsan$_i$ *Lisi zhidao zhuren ma guo* ø$_i$.
Zhangsan Lisi know head scold EXP
'Zhangsan, Lisi knows that the head scolded (him)'.

Figure 4.19

Zhangsan$_i$ *Lisi xiang zhidao shui ma guo* ø$_i$.
Zhangsan Lisi want know who scold EXP
'Zhangsan, Lisi wonders who scolded him'.

Figure 4.20

naxie shu$_i$ *xuesheng du* ø$_i$ *guo hen qiguai.*
those book student read EXP very strange
Lit. 'That those books students have read is strange'.
Lit. *'Those books, it is strange that students have read'.

Figure 4.21

zhe-men *ke*$_i$ *Zhangsan*$_j$ *wo* *jiao* *le* ø$_j$ ø$_i$.
this-CL course Zhangsan 1SG teach PERF
Lit. 'This course, Zhangsan I taught'.

Figure 4.22

Lisi$_i$ *wo* *gaosu* *le* ø$_i$ *na-ge* *difang*$_j$ *wo* *qu* *guo* ø$_j$.
Lisi 1SG tell EXP that-CL place 1SG go EXP
Lit. 'Lisi, I told (him) that that place I have been to'.

Figure 4.23

Lao Wang jixing huai, ø piqi ye huai.
Lao Wang memory poor temper also bad
'Wang, memory is poor and temper is bad'.
(Y. Huang 1994/2007, p.164)

Figure 4.24

Lao Wang xihuan Zhongguo cai, ø wei mei, ø se xiang.
Lao Wang like Chinese dish taste good colour appetizing
'Wang likes Chinese food; it is good in taste and colour'.

Figure 4.25

Lao Wang taoyan da chengshi, ø ren duo, ø kongqi cha.
Lao Wang dislike big city people many air bad
'Wang dislikes big cities: population is large and air quality is bad'.

Figure 4.26

All the zero anaphors in the sentences are referentially dependent on the topic rather than the local subject or object, or the subject or object of a higher clause, for the simple reason that the topic expression as the 'centre of attention' is the most salient of all constituents in the sentence (cf. C. Li and Thompson 1976).

Empirically, Y. Huang's analysis of topic constructions seems untenable as well. To prove his pragmatic apparatus regarding the interpretation of zero anaphors in topic constructions, Y. Huang claims that the topic-zero anaphor in examples such as Figure 4.24 would be I-implicated to be co-indexed with the chain-initial topic *Lao Wang*, because it cannot in general be anteceded by an NP that is lower on the saliency hierarchy.

The aforementioned claim can be falsified by sentences such as the ones in Figure 4.25 and Figure 4.26, where the zero-anaphor topic is co-referential

to the object NPs *zhongguo cai* 'Chinese dishes' and *da chengshi* 'big city', respectively.

To conclude, although the argument against the syntactic analysis like J. Huang's is convincing, and it is true that pragmatics provides a set of complementary principles constraining the interpretation or production of an anaphoric expression, Y. Huang's pragmatic analysis of anaphora needs further refinement, at least with reference to topic constructions.

2.3 The structural analysis

In an effort to provide a precise definition for topic, Shi (2000) attempts to characterize topic constructions in Chinese from a purely structural perspective. His idea is that topic is always related to a position inside the comment and always depends on an element inside the comment for its thematic role since it has no independent thematic role and hence no syntactic function of its own. Shi's generalization about the properties of topic constructions shows that he does not acknowledge the role of semantics nor pragmatics but syntax only, because, according to him, there is a structural dependence relationship between the topic and the comment, which determines the production and interpretation of topic constructions of whatever types. Clearly, this appears to be a big claim implying that there is no necessity of distinguishing topic constructions in terms of English style and Chinese style.

In what follows, I shall demonstrate that Shi's structural characterization of topic construction is an overgeneralization. Specifically, if Shi's structural analysis holds for English-style topic structure, it cannot apply to Chinese-style topic structure where semantics and pragmatics do play a significant role. First, consider Figure 4.27, the best-known, Chinese-style topic sentence first employed in Chao (1968) and then widely cited in the relevant work.

The acceptability of Figure 4.27 as a topic structure, according to Shi (2000, p.393), relies crucially on the occurrence of the connective adverb *xingkui* 'fortunately' which is usually a part of the pair *xingkui* . . . *buran* 'otherwise' and hence allows two possible readings, as illustrated in Figure 4.28a–b, which repeats Shi's examples.

Shi argues that in Figure 4.28a, the initial NP *na-chang huo* 'that fire' is related to the subject position of a main clause, whereas in (Figure 4.28b) it

na-chang	*huo*	*xingkui*	*xiaofangdui*	*lai- de- kuai*.
that-CL	fire	fortunately	fire-brigade	come-DE-fast

'That fire, fortunately the fire-brigade came quickly'.

Figure 4.27

a.	*na-chang*		*huo*	*xingkui*	*xiaofangdui*	*lai-de-kuai*,	*buran*
	that-CL		fire	fortunately	fire-brigade	come-DE-fast	otherwise
	jiu	*hui*	*shao-si*	*bu-shao*	*ren*.		
	really	will	burn-die	not-few	people		
	'That fire, fortunately the fire-brigade came quickly, otherwise (it) would have killed many people'.						
b.	*na-chang*	*huo*	*xingkui*		*xiaofangdui*	*lai-de-kuai*,	*buran*
	that-CL	fire	fortunately		fire-brigade	come-de-fast	otherwise
	na-ci	*women*	*dou*	*hui*	*shao-si*.		
	that time	1PL	all	will	burn-die		
	'That fire, fortunately the fire-brigade came quickly, otherwise we would all have been burnt to death at that time'.						

Figure 4.28

na-chang	*huo*	*xiaofangdui*	*lai-de-kuai*.
that-CL	fire	fire-brigade	come-DE-fast

'At the time of that fire, the fire brigade came quickly'.
(Shi 2000, p.393)

Figure 4.29

?**na-chang*	*hongshui*	*xingkui*	*xiaofangdui*	*lai-de-kuai.*
that-CL	flood	fortunately	fire-brigade	come-DE-fast

'At the time of that flood, fortunately the fire brigade came quickly'.

Figure 4.30

functions as a temporal adverbial of a main clause; namely, it is related to a position taken by the resumptive form *na-ci* 'that time' between the connective adverb and the subject in the main clause. If this connective adverb is deleted from the topic sentence, the initial NP *na-chang huo* 'that fire' in the resulting sentence would become the sentential adverbial, which implies that it is not a topic any more (Figure 4.29).

This argument does not hold up. In the first place, the topicality of Figure 4.27 does not only depend on the adverb but also the semantic properties of the initial NP *na-chang huo* 'that fire' and the NP *xiaofangdui* 'fire-brigade' in the comment. Apparently, they are from the same semantic field, which crucially determines the acceptability of the sentence. If the NP *huo* 'fire' is replaced by another NP such as *hongshui* 'flood' that is not from the same semantic field as *xiaofangdui*, the outcome would be hardly acceptable, even if Shi's construal of the initial NP as the sentential adverbial should be maintained for the simple reason that the resulting sentence is semantically pretty odd – i.e., given our world knowledge that the duty of the fire brigade is to extinguish fire, not water (Figure 4.30).

na-chang	*bisai*	*quan*	*cheng*	*dou*	*feng*	*le*.
that-CL	match	whole	city	all	crazy	SFP

'As for that match, the whole city was crazy'.

Figure 4.31

zhe-ci	*zhanyi*	*henduo*	*pingming*	*dou*	*si*	*le*.
this-CL	battle	many	civilians	all	die	EXP

'As for this battle, many civilians were killed'.

Figure 4.32

Second, even if the initial NP *na-chang huo* can be construed as the adverbial of the sentence, it can still be treated as the topic, which follows the fact that in Chinese, both argument and non-argument can be topicalized (see Chao 1968; Xu and Langendoen 1985). Actually, there are a considerable number of similar sentences where the initial NP introduces the topic about which the comment clause says something relevant, as in Figure 4.16 and Figure 4.17, which are repeated here as Figure 4.31 and Figure 4.32, where the aboutness relation between the topic and the comment is, as mentioned in section 2.2, a kind of bridging effect.

The well formedness of these sentences characteristic of Chinese style lies in the fact that the topic-comment relation satisfies the aboutness requirement, which is a necessary and sufficient condition (see Chafe 1976; C. Li and Thompson 1981; Xu and Langendoen 1985; J. Huang 1987; Gundel 1988; Y. Huang 1994/2007; Wu and Yang 2015; Yang and Wu 2015). However, Shi attempts to explain away this universally acknowledged notion by claiming that syntactically it is not clearly defined. His criticism of aboutness is rather unjustified because the term 'aboutness' is largely a relevance-based pragmatic concept, rather than a syntactic concept.

In the face of the fact that syntax, semantics and pragmatics each play a role in the formation and interpretation of topic structure, Shi's purely structural analysis has been shown to be overgeneralized with regard to the Chinese-style topic structure.

3 A preliminary analysis

Chinese appears to be a language that displays considerable freedom with respect to the articulation of information structure. Like Japanese, which has a grammaticalized particle *wa* explicitly marking a particular expression as a topic, Chinese has a number of particles that exercise the same function, as mentioned in footnote 1. Apart from this, the topicalized element can be characteristically set off from the rest of the clause simply by a pause tone, or an

intonational break, an expression widely employed in the linguistic literature, or in the words of Rizzi (1997), a "comma intonation".[5]

In this section, I shall explore the nature of the left-peripheral expressions in Chinese topic structure from both the interpretive and the descriptive viewpoints, with a goal of providing an effective way of identifying a certain constituent occurring at the left periphery of sentences either as a purely topicalized element, a purely focalized element or an element endowed with the hybrid properties of both topic and focus, from which a precise characterization of Chinese topic structure within the DS framework will eventually be developed.

Given that the topicality of left-peripheral expressions in topic structure characteristic of Chinese style is uncontroversially clear – namely, they are unquestionably expressions with a purely topic effect, as can be evidenced by the fact that these expressions are usually salient in the discourse context – I shall ignore Chinese-style topic structure and instead focus on English-style topic structure.

3.1 Single-topic structure

Before we find a methodology to determine whether a left-peripheral constituent in topic structure is a topic or a focus, we should make a distinction between these two terms, which are notoriously variable within the linguistic literature: formalist or functionalist. Within approaches attempting to tackle these two kinds of phenomena by locating their properties with the grammar, one may find that they are regarded as standardly primitive terms of the grammar (Rizzi 1997), or as distinct layers of information structure (Vallduví 1992). Compared with 'topic', which appears to be unproblematic to identify thanks to both its marked nature and syntactic prominence, 'focus' seems to be problematic because of the uncertainty of its syntactic position, which is why it is sometimes defined in semantic or pragmatic terms (Kadmon 2001).

Consider Figure 4.1, where the leftmost expression can be marked as in Figure 4.33a, morphologically by a pause particle or phonologically by a pause tone. Alternatively, it can be unmarked as in Figure 4.33b, though optionally it may be phonologically stressed.

Intuitively, there seems to exist a significant difference in interpretation between the left-peripheral expression *Zhangsan* in Figure 4.33a and its twin

a. *Zhangsan (a), zhuren ma guo (ta).*
   Zhangsan head scold EXP 3SG
   'As for Zhangsan, the head scolded (him)'.
b. *Zhangsan zhuren ma guo.*
   Zhangsan head scold EXP
   'Zhangsan the head scolded'.

Figure 4.33

a. A: *zhuren* *ma* *guo* *Zhangsan* *ma*?
head scold EXP Zhangsan Q
'Did the head scold Zhangsan?'
B: *Zhangsan* *(a)*, *zhuren* *ma* *guo* *(ta)*.
Zhangsan head scold EXP 3SG
B: *zhuren* *ma* *guo*.
head scold EXP
B: *ma* *guo*.
scold EXP

b. A: *zhuren* *dui* *Zhangsan* *zuo* *guo* *shenme*?
head to Zhangsan do EXP what
'What did the head do to Zhangsan?'
B: *Zhangsan* *(a)*, *zhuren* *ma* *guo* *(ta)*.
Zhangsan head scold EXP 3SG
B: *zhuren* *ma* *guo* *(ta)*.
head scold EXP 3SG
B: *ma* *guo*.
scold EXP

c. A: *zhuren* *zuo* *guo* *shenme*?
head do EXP what
'What did the head do?'
B: **Zhangsan*, *zhuren* *ma* *guo*.
Zhangsan head scold EXP

Figure 4.34

counterpart in Figure 4.33b – namely, the former has a topic reading, while the latter has a focus reading. One effective way to determine whether a constituent has topic or focus effects is to place the relevant sentence under discourse circumstances. For Figure 4.33a to hold, a naturally occurring context would be like Figure 4.34a–b, but not Figure 4.34c.[6]

Clearly, the initial NP *Zhangsan* in Figure 4.33a requires that the same expression should be available or salient in the previous context, as exhibited both in the general question of Figure 4.34a and in the *wh*-question of Figure 4.34b, for the simple reason that the morphological or phonological marker indicates that it is a given term, or it is identifiably a marked topic from which a proposition can be constructed.

In the face of these facts, it is necessary to define the dislocated elements such as *Zhangsan* in Figure 4.33b in its right perspective. Given the fact that the focus reading of an expression is not typically constrained in the sentence-initial position[7] and the fact that its topical property can be highlighted by an expanded context, we call it topicalized focus instead of focalized topic, which should be justified given that from a processing perspective its focality usually weighs over its topicality.[8]

Naturally, the discussion thus far leads us to a conclusion that, from a descriptive perspective, a topic has a single reading, while a topicalized focus has a hybrid reading – namely, its topicality and focality is likely to be on the equal footing in context; from an interpretive perspective, a topic has a

presupposed nature, while a topicalized focus has a nonpresupposed nature (cf. Kiss 2002) – namely, its effect emerges dynamically, albeit syntactically associated with a marked position.

3.2 Multiple-topic structure

As a matter of fact, the term 'multiple topic' might be misleading because in practice, speakers may have trouble accepting a sentence with three or more topics, as pointed out in section 1, although in theory, the quantity of topics could be more than three. Therefore, I shall limit the description and discussion of the so-called multiple-topic structure to sentences with two topics, as exemplified in Figure 4.5 and Figure 4.6, which are repeated here as Figure 4.35 and Figure 4.36, respectively.

The order of topics in a multiple topic construction, as also pointed out in section 1, is determined by the degree of prominence. Intuitively, the leftmost expression as the first topic sets the domain within which a proposition holds. More specifically, it serves as the point of departure from which new information can be expressed. The givenness nature of the first topic can also be proved under discourse circumstances. Sentences such as the one in Figure 4.35, for instance, could be contextualized in a discourse context like the sentence in Figure 4.36, thus showing that the first topic expression should be lexically salient in the previous context.

Clearly, the first topic as old information provides the context for building a proposition which expresses new information. Having had a clear picture of the first topic's function, we are then left with another question: does the second topic have the same topical effect? Interpretively, the second one is distinct from the first one because dynamically it has a different effect, as can be confirmed by the comparison of Figure 4.38a, a canonical answer to the question Figure 4.37, with Figure 4.38b, an unexpected answer, yet of felicity to the question in Figure 4.37.

Apparently, the comment-initial expression *Zhangsan*, the occurrence of which might be unexpected by the hearer, has a focus effect that emerges

zhe-men	*ke*	*(ya)*,	*Zhangsan*	*wo*	*jiao*	*le.*
this-CL	course	PAR	Zhangsan	1SG	teach	PERF

Lit. 'This course, Zhangsan I taught'.

Figure 4.35

Lisi	*(a)*,	*wo*	*gaosu*	*le*	*(ta)*	*na-ge*	*difang*	*wo*	*qu*	*guo.*
Lisi	PAR	1SG	tell	PERF	3SG	that-CL	place	1SG	go	EXP

Lit. 'Lisi, I told (him) that that place I have been to'.

Figure 4.36

ni	*jiao*	*le*	*naxie*	*xuesheng*	*zhe-men*	*ke*	*ma*?
2SG	teach	PERF	those	student	this-CL	course	Q

'Did you teach this course to those students?'

Figure 4.37

a.	*(zhe-men*	*ke*	*ya)*,	*wo*	*jiao*	*le*	*(naxie*	*xuesheng).*
	this-CL	course	PAR	1SG	teach	PERF	those	student
b.	*zhe-men*	*ke*	*(ya)*,	*Zhangsan*	*wo*	*jiao*	*le*,	
	this-CL	course	PAR	Zhangsan	1SG	teach	PERF	
	[Lisi	*wo*	*mei*	*jiao].*				
	Lisi	1SG	not	teach				

Figure 4.38

zhe-men	*ke*	*(ya)*,	*Zhangsan*$_i$	*wo*	*jiao*	*le*,	*ta*$_i$
this-CL	course	PAR	Zhangsan	1SG	teach	PERF	3SG
hen	*xihuan*,	[*ø*$_i$	*shuo, hai*	*ø*$_i$	*xiang*	*ting*].	
very	like		say, again		want	listen	

Lit. 'As for this course, Zhangsan I taught; he liked it very much and would like to take it again'.

Figure 4.39

Lisi	*(a)*,	*wo*	*gaosu*	*le*	*(ta)*	*na-ge*	*difang*	*wo*	*qu*	*guo.*
Lisi	PAR	1SG	tell	PERF	3SG	that-CL	place	1SG	go	EXP

Lit. 'As for Lisi, I told (him) that that place I have been to'.

Figure 4.40

dynamically – a contrastive focus that can bear a contrastive stress (cf. Yuan 1996). Also intuitively, the focused expression *Zhangsan* not only has informational significance but also structural significance in virtue of its marked position – namely, the TOP position of the comment clause. Therefore, this focused expression can possibly have a topic reading in certain discourse context (see Figure 4.39).

Unquestionably, there is justification for distinguishing the second topic from other focused expressions which often occur freely in either the preverbal or the postverbal position. Just like the leftmost expressions in single-topic structure, the second topic also has the hybrid properties of both topic and focus, and thus we can reasonably analyze it as a topicalized focus, given that from a processing point of view, its focality usually weighs over its topicality.

The distinction between the two leftmost constituents in terms of topic and focus is easily identifiable in multiple-topic structure consisting of a main clause and a subordinate clause. Consider Figure 4.6, which is repeated here as Figure 4.40.

a. *Lisi* *(a)*, *wo* *gaosu* *le* *(ta)* *na-ge* *difang*$_i$ *wo* *qu* *guo*,
Lisi PAR 1SG tell PERF 3SG that-CL place 1SG go EXP
ø$_i$ *hen* *hao* *wan.*
very good fun
Lit. 'As for Lisi, I told (him) that that place I have been to; it is great fun'.

b. *Lisi* *(a)*, *wo* *gaosu* *le* *(ta)* *na-ge* *difang* *wo* *qu* *guo*,
Lisi PAR 1SG tell PERF 3SG that-CL place 1SG go EXP
zhe-ge *difang* *wo* *mei* *qu* *guo.*
this-CL place 1SG not go EXP
Lit. 'As for Lisi, I told (him) that that place I have been to; this place I haven't been to'.

Figure 4.41

The leftmost expression *Lisi* in the TOP positon of the main clause, like those expressions with a purely topical property, is generally marked either by a pause particle or a pause tone, which indicates that it is a given term from which a proposition can be established. Contrastively, the dislocated expression *na-ge difang* 'that place' in the TOP position of the subordinate clause, like those expressions with a focal property, is unmarked morphologically and usually receives a hybrid reading – that is, syntactically, it is a topic associated with a marked position, while interpretively it also has a focus effect. Similarly, the hybrid nature of the second topic can be illustrated in an expanded context as in Figure 4.41, where the (a) sentence highlights its topical property and the (b) sentence its focal property.

In view of the observations and discussions, we can draw a conclusion that the leftmost expressions in multiple-topic structure have different interpretations in that the leftmost or the first topic is usually a given term which invariably has a topic effect, whereas the second topic is a new term which interpretively has a focus effect. In the next section, I shall integrate the facts observed and discussed so far into the dynamic account of topic constructions and demonstrate that the variation in interpretation of left-peripheral expressions can be successfully characterized from a left-right dynamics of language processing.

4 A dynamic analysis

In this section, I shall demonstrate how a plausible account of the topic construction in Chinese is couched in the dynamic perspective and how syntax, semantics and pragmatics each play a role in the interpretation as well as the production of this well-discussed grammatical construction. Contrary to the three previous analyses reviewed in section 2, I argue that

(a) Different from the variable analysis proposed by J. Huang (1982, 1984, 1987, 1989), the gap in the comment clause cannot be construed as a variable, but as a pronominal of a sort to be defined.

(b) Different from the pragmatic analysis proposed by Y. Huang (1991, 1994/2007, 1995, 2000), the search for the zero anaphor in topic structure always follows the preference order *topic* > *subject* > *object*, rather than *subject* > *object* > *topic*, because topic is the most salient term.
(c) Different from the structural analysis proposed by Shi (2000), topic is not always syntactically related to an element inside the comment for its thematic role, but sometimes semantically or pragmatically associated with an element inside the comment or the comment as a whole.

To validate the argument, I assume that topic constructions, whether English style or Chinese style, generally respect the aboutness condition and the topic-comment relation can be encoded either syntactically, semantically and/or pragmatically. Interpretively, the leftmost constituent in the TOP position either provides a given term with respect to which some propositional structure is constructed, if it has purely topical properties, or it provides an update term to a given propositional structure if it bears focal as well as topical properties.

4.1 English-style topic construction

To begin with, let us consider English-style topic constructions where, as has been shown in section 1, an initial expression has a relative position in the comment clause, which is occupied by either a gap, a pronoun or a full noun phrase. Gapped topic constructions containing either a purely topicalized element or a topicalized focus, together with gapless topic constructions comprising a resumptive pronoun or a full noun phrase, indicate that there is uncertainty with respect to the status of the left-peripheral NP.

4.1.1 Single topic construction

Let us first deal with the gapped topic construction. Consider Figure 4.1, which is repeated here as Figure 4.42, in which *Zhangsan* in the TOP position can be construed as providing a context where it is marked by a pause particle *a* or a pause tone and hence indicated by a comma as in Figure 4.42a, or as in Figure 4.42b, where it does not take a morphological marker nor displays an intonational break, though it may optionally take an emphatic stress.

a. *Zhangsan* *(a)*, *zhuren* *ma* *guo.*
Zhangsan PAR head scold EXP
'As for Zhangsan, the head scolded (him)'.
b. *Zhangsan* *zhuren* *ma* *guo.*
Zhangsan head scold EXP
'Zhangsan the head scolded'.

Figure 4.42

Let us take the parse of Figure 4.42a as an example to demonstrate the sequence of actions step by step. The lexical information of the left-peripheral NP *Zhangsan* gives a reading of Ty(*e)* and the pause particle or intonational break indicates that it sets the frame of reference which the speaker uses to express the comment, hence forcing an analysis of a LINK relation between the first tree with the top node annotated with a formula *Fo(Zhangsan')* of type *e* and the second tree of type *t*, which requires a copy of formula *Fo(Zhangsan')* from the first tree, as shown in Figure 4.43.[9]

After the transition from the initial tree of type *e* to the top node of the propositional tree, the primary structure can then be unfolded. The subject and predicate nodes are introduced through the general computational rules Introduction and Prediction. The partial tree in Figure 4.44 represents the parse state where both the subject and the verb have been parsed.

Here a question naturally arises: How to account for the zero anaphor in this type of topic structure? Recall that Chinese is a radical pro-drop language. The empty object node can therefore be treated as a placeholder projecting a metavariable **U**, whose value can be instantiated from a term in the context. Given the anaphoric relation between the pair of linked structures involving the requirement of a copy of formula, the semantic value of the pointed *Ty(e)* node can only be replaced with *Fo(Zhangsan')* – namely, a shared term, through a pragmatic process of substitution. The process of substitution can be displayed in Figure 4.45.

Having characterized topic structure with a marked topic, let us now turn to those with an unmarked topic, precisely a topicalized focus. By contrast, the

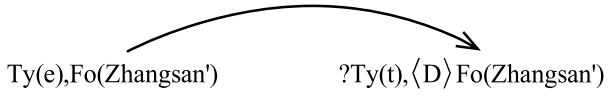

Figure 4.43 Parsing *Zhangsan* and introducing LINKed structures

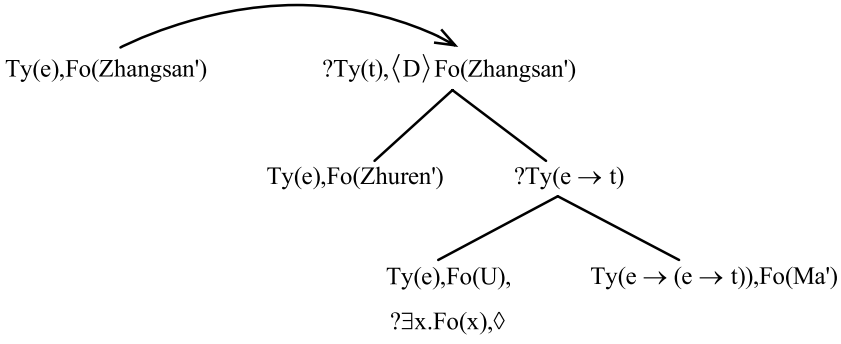

Figure 4.44 Parsing the utterance *Zhangsan(a)*, *zhuren ma guo*

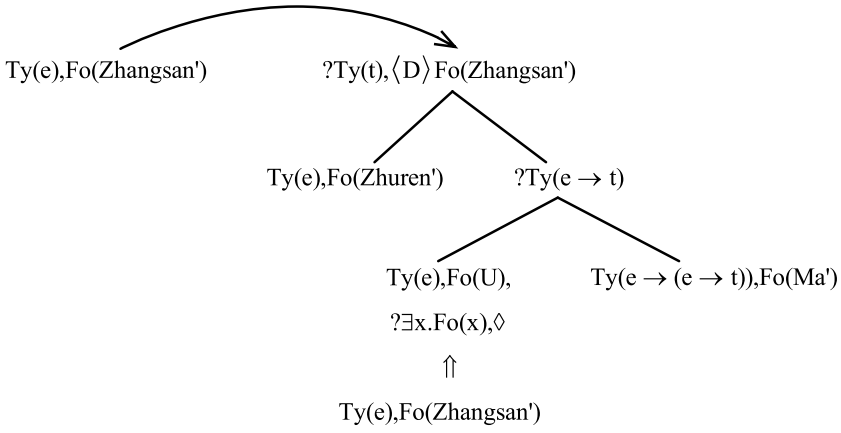

Figure 4.45 Substitution

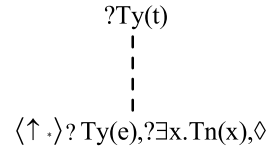

Figure 4.46 Introducing the unfixed node

unmarked nature of the initial expression in Figure 4.42b *Zhangsan zhuren ma guo*, which contrasts with the presupposed status of the remaining material, presents it as the locus of information that dynamically updates the given propositional structure. This naturally leads us to characterize this type of topic structure in the following fashion: (i) the topicalized focus invariably projects an unfixed node with a locational requirement, (ii) the unfixed node is linked to the top node of a tree that is duly decorated with a requirement ?*Ty(t)*, and (iii) the unfixed node will eventually merge within a single tree to yield a complete propositional formula.

To represent sentence Figure 4.42b, a topicalized focus structure, the first step is to create a decorated tree – the top node of which is annotated with a formula of type *t*. What follows introduces the unfixed node with a locational requirement *?∃x.Tn(x)*, indicating that the node lacks a specified treenode address, as illustrated in (Figure 4.46).

The second step is the parse of the leftmost NP *Zhangsan* – the processing of which updates the decoration of the unfixed node with a formula value *Fo(Zhangsan')*, as shown in Figure 4.47 since it fulfils the requirement for an expression of type *e*.

Having parsed *Zhangsan*, the pointer now moves back to the top node of the tree, which allows the comment clause to be parsed in the normal way, as shown in Figure 4.48.

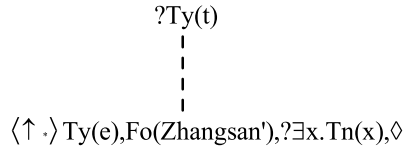

Figure 4.47 Parsing the dislocated NP *Zhangsan*

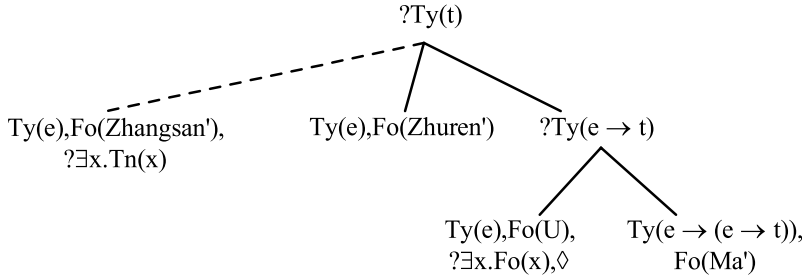

Figure 4.48 Parsing the utterance *Zhangsan zhuren ma guo*

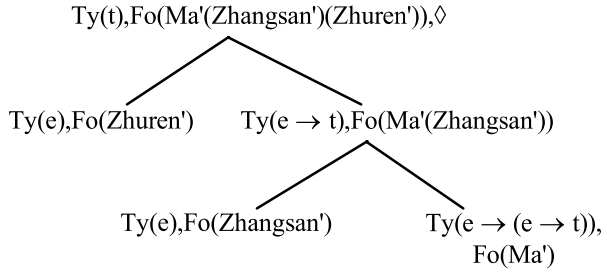

Figure 4.49 Completing the parse

Following convention, the pointer moves to the open argument node, as shown in the tree in Figure 4.48. All words in the string have been processed at this point, and there remains an outstanding unfixed node with a requirement to construct a node of *Ty(e)*. Naturally, the unfixed node projected by the displaced NP *Zhangsan* merges with the pointed argument node, as shown in Figure 4.49. Ultimately, completion of the tree will give rise to a well-formed propositional formula, *Ma'(Zhangsan')(Zhuren')*.

The two strategies, the LINK relation and the unfixed node, can be readily applied to gapless topic constructions with a resumptive pronoun or a full noun phrase.

4.1.2 Multiple topic construction

Now let us consider multiple topic constructions such as Figure 4.5, which is repeated here as Figure 4.50, and see how topic and focus effects are explained in virtue of left-right dynamics.

zhe-men	*ke*	*(ya)*,	*Zhangsan*	*wo*	*jiao*	*le.*
this-CL	course	PAR	Zhangsan	1SG	teach	PERF

Lit. 'As for this course, Zhangsan I taught'.

Figure 4.50

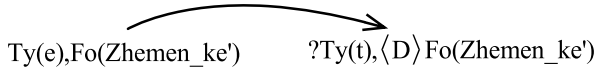

Figure 4.51 Parsing *zhemen ke* and building LINK transition

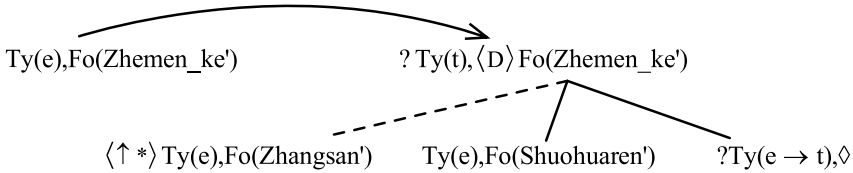

Figure 4.52 Parsing the string *zhemen ke (ya), Zhangsan wo*

As discussed in section 3, the pause particle or tone indicates that the left-peripheral NP *zhemen ke* 'this course' is an external member of the sentence, hence forcing an analysis of a LINK relation between the first tree with only a single node annotated with *Fo(Zhemen_ke')* of *Ty(e)* and the second tree whose top node is decorated with type *t* plus a requirement for a copy of the *Fo* value *(Zhemen_ke')* from the first tree, as shown in Figure 4.51.

The second step is introducing the unfixed node dominated by the top node of the main tree, allowing the comment-initial expression *Zhangsan* to be processed. Figure 4.52 illustrates the parse state where, subsequent to the building of the unfixed node annotated with the formula *Fo(Zhangsan')*, the subject and predicate nodes are introduced, the first of which is decorated with the formulae *Ty*(*e*), *Fo(Shuohuaren')* after the first-person pronoun *wo* 'I' is processed, and the pointer moves to the predicate node, indicating that this is to be built next.

What follows is the parse of the ditransitive verb *jiao* 'teach', which like other action verbs projects an unfixed node since the number of its arguments is underspecified from a dynamic perspective, as can be justified by the fact that it sometimes takes only one argument as in Figure 4.53a, sometimes two arguments as in Figure 4.53b and sometimes two arguments plus one adjunct as in Figure 4.53c.

Subsequent to the processing of the verb that projects an unfixed node annotated with the formulae {*Ty(e*→(e →(e → t))), Fo(Jiao')*}, the pointer moves back to the open functor node, and the computational rules of Introduction and Prediction can apply successively until all the arguments of the verb are parsed. Figure 4.54 shows that since there is no further lexical input, the

a. *zhe-men* *ke* *(ya)*, *wo* *jiao* *le.*
this-CL course PAR 1SG teach PERF
'As for this course, I taught'.

b. *zhe-men* *ke* *(ya)*, *Zhangsan* *wo* *jiao* *le.*
this-CL course PAR Zhangsan 1SG teach PERF
Lit. 'As for this course, Zhangsan I taught'.

c. *zhe-men* *ke* *(ya)*, *Zhangsan* *wo* *jiao* *le* *yi-nian.*
this-CL course PAR Zhangsan 1SG teach PERF one year
Lit. 'As for this course, Zhangsan I taught for one year'.

Figure 4.53

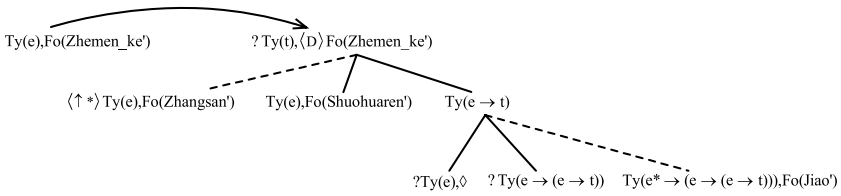

Figure 4.54 Fixing the unfixed argument node

unfixed node projected by the leftmost expression *Zhangsan* merges with this open argument node, satisfying both requirements.

With the treenode address of the unfixed argument node being located, the pointer moves to the two-place predicate node. The modal requirement on the top node of the main tree for a type *e* expression bars the merge of the unfixed predicate node with this open predicate node. The two-place predicate node is developed to have two daughter nodes, again through Introduction and Prediction. The argument daughter is required to be developed first. Given the lack of linguistic input, a metavariable can be assigned, whose value can only be provided by *Fo(Zhemen_ke')* relative to context. The unfixed predicate node then merges with the three-place predicate node, resolving the verb's type underspecification, as displayed in Figure 4.55.

Completion of the second tree will give rise to another independent structure with a propositional formula *Fo(Jiao'(Zhemen_ke')(Zhangsan')(Shuohuaren'))* annotating its top node, reflecting the anaphoric relation between the pair of linked structures involving the requirement of a copy of formula, as illustrated in Figure 4.56.

The same analysis can be readily applied to Figure 4.6, another type of multiple-topic structures in which expressions in the topic position are related to elements in different clauses.

To summarize this section, a dynamic analysis of topic-structure characteristic of English style has been proposed in terms of the LINK and the unfixed treenode relation. The distinction between the marked topic and the unmarked topic or the topicalized focus, which was discussed in section 3, has been

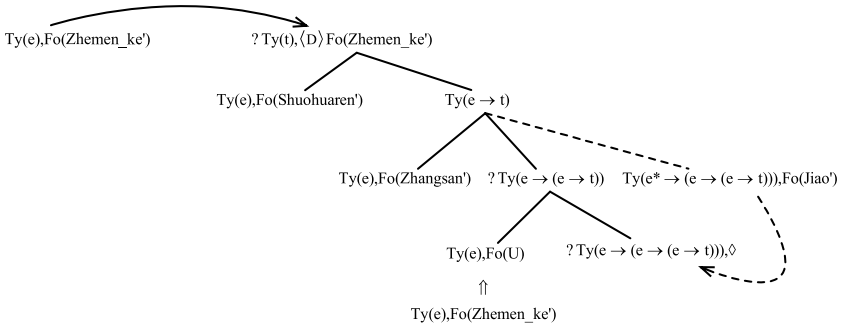

Figure 4.55 Fixing the unfixed predicate node

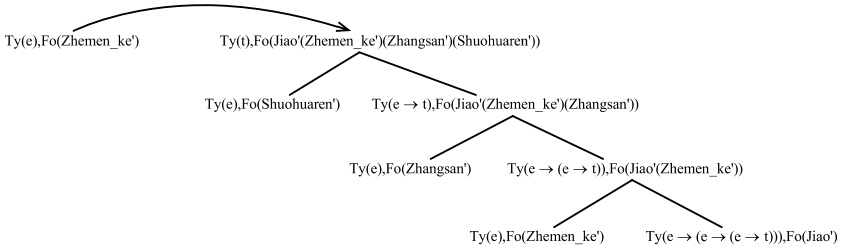

Figure 4.56 Completing the parse of *zhemen ke (ya), Zhangsan wo jiao le*

captured by the two aforementioned strategies. The dynamic analysis has been shown to hold for the complex as well as the general patterns of topic structures. A comprehensive account of topic constructions in Chinese as a whole, of course, requires us to extend the dynamic analysis developed here to those characteristic of Chinese style, which is the task of the next section.

4.2 Chinese-style topic construction

To characterize topic constructions of Chinese style, we face the challenge of how to reflect the aboutness relation between the topic expression and the comment clause. Since there is no element within the comment clause that corresponds to the element in the TOP position, we would only expect to see the construction of a LINK relation between the topicalized expression and the remainder structure. The framework we have adopted so far, however, opens up the possibility that the concepts of a LINK relation and anaphoric processes of construal are logically independent and thus allows the introduction of LINKed structures which impose no requirement for any shared element.

4.2.1 Single topic construction

Topic structure characteristic of Chinese style, just like those characteristic of English style, can also be divided into two types – namely, single-topic

structure and multiple-topic structure. First, let us deal with those containing a single topic. Consider Figure 4.7, which is repeated here as Figure 4.57.

The comment clause in Figure 4.57a contains a numeral *liu-ge* 'six' that is semantically/pragmatically linked to the topic *jiuge miyu* 'nine riddles', because the former is a part drawn from the latter; in Figure 4.57b, the subject *yuyixue* 'semantics' is also semantically linked to the expression *yuyanxue* 'linguistics' in the TOP position, because the former is a branch of the latter, and the relation between the topic and the comment is apparently relevance-based in the sense of Sperber and Wilson (1995).

Given that the topicalized expression serves as a frame or domain of reference within which the comment clause as the main predication holds, we can define a general construction rule to characterize the process of LINK Adjunction between two trees with the first tree providing context for development of the second tree but imposing no requirement on the second one for a copy of its own formula. The transition from the initial independent structure projected by the topic expression to the subsequent propositional structure constructed by the comment clause can be illustrated by the parse of Figure 4.57a. As shown in Figure 4.58, the left-peripheral expression *jiu-ge miyu* 'nine riddles' is analyzed as projecting an independent structure of type *e* to which the unfolding primary structure of type *t* is linked; subsequent to the transition from the first tree, the propositional structure is developed and the main tree can be completed as in canonical structures.

The intuitively identified aboutness relation that holds between the topic and the comment is not directly captured through a LINK relation between the two

a. *jiu-ge miyu Lisi caidui le liu-ge.*
nine-CL riddle Lisi resolve PERF six-CL
'Nine riddles, Lisi resolved six'.
b. *yuyanxue Zhangsan pianai yuyixue.*
linguistics Zhangsan prefer semantics
'Linguistics, Zhangsan prefers semantics'.

Figure 4.57

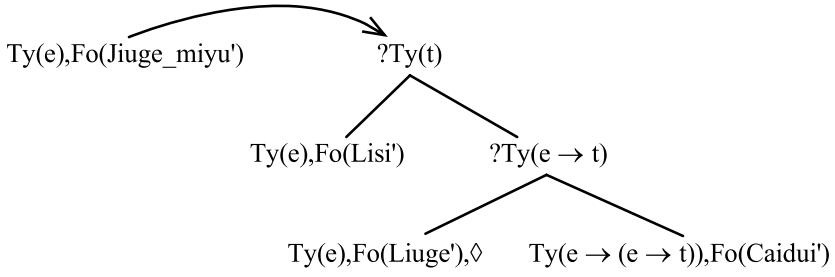

Figure 4.58 Parsing *jiuge miyu, Lisi caidui le liu-ge*

independent structures. The LINK relation in turn allows a pragmatic inference to be derived from the logical formulae associated with the interpretation of each structure. The logical structure of Figure 4.57a, for instance, can be roughly set out as *Fo(Jiuge_miyu')* ⊨ *Fo(Caidui'(Liuge')(Lisi'))*, where ⊨ can be read as 'supports a judgement that . . .' The effect of this is that it is under the context induced by *jiuge miyu* 'nine riddles' that the comment clause *Lisi caidui le liuge* is interpreted – namely, the left-hand side serves as the premise and the right-hand side as the conclusion. If the premise is changed, the conclusion as the result of interpretation may probably not be arrived at. For example, if the topic *yuyanxue* 'linguistics' in Figure 4.57b is changed to *jingjixue* 'economics', the relevant logical structure *Fo(Pianai'(Yuyixue')(Zhangsan'))* is unlikely to be held because semantics is not a branch of economics.

4.2.2 Multiple topic construction

As illustrated in section 4.1, more topics are allowed in Chinese-style topic constructions, provided that the aboutness condition is satisfied. Given that LINK Adjunction is employed in the analysis of single topic constructions as the canonical strategy for projecting some propositional structure, the strategy of constructing a pair of linked structures with the first one imposing no demand on the second one for a copy of its own formula could be used successively to allow the multiple topics to be parsed one after another. Consider Figure 4.8, which is repeated here as Figure 4.59, where pause particles are added to tell the whole story.

Each of the subordinate topics in multiple topic constructions, as pointed out by Y. Huang (2000), has a twofold function: on the one hand, they serve as the target for the preceding topic, and on the other hand, it functions as the frame of reference for the following comment. For instance, *Baxi qiuyuan* 'Brazilian

a. *zuqiu (ma)*, *Baxi qiuyuan (ne)*, *fengge youmei*.
football PAR Brazil player PAR style elegant
Lit. 'Football, Brazilian players, (their) style is elegant'.

b. *Zhongguo (a)*, *Beijing (ne)*, *mingsheng (ma)*, *Changcheng*
China PAR Beijing PAR places of interest PAR Great Wall
zui zhuming.
most famous
Lit. 'China, Beijing, places of interest, the Great Wall is the most famous'.
(Y. Huang 1994/2007)

c. *Yingguo (a)*, *daxue (ma)*, *Niujin Jianqiao (ne)*,
England PAR university PAR Oxford Cambridge PAR
xuesheng (ya) zhiliang gao.
student PAR quality high
Lit. 'England, universities, Oxford and Cambridge, students, quality is high'.

Figure 4.59

player' in Figure 4.59a, is the target of the main topic *zuqiu* 'football', viz. further limiting the domain of predication, and as a second topic further specifying the frame of reference within which the comment clause *fengge youmei* 'style is elegant' holds. As for Figure 4.59b, the main topic *Zhongguo* 'China' targets the second topic *Beijing*, which then targets *mingsheng* 'places of interest', which further limits the applicability of the proposition *Changcheng zui zhuming* 'the Great Wall is the most famous'.

To reflect the aforementioned analysis, the parse of constructions of the sort in Figure 4.59 should be parsed in the way that the separate topics are processed one by one, involving no transfer of information from tree to tree. This principally reflects the characteristics of multiple topic constructions where the topic expressions, main or subordinate, are related to one another at the semantic or pragmatic level. This line of analysis captures both the syntactic and semantic properties of multi-topic structures: syntactically the distinct topics appear to occur independent of one another, yet semantically they work together closely for a proposition built by the comment clause to hold.

Next, I shall demonstrate how Figure 4.59a, a two-topic construction, and Figure 4.59b, a four-topic construction can be characterized in terms of tree growth process and how the multiple topic effects can be explained as consequences of basic tree growth processes. As in the derivation of sentences with a single topic, the first action is that the leftmost expression *zuqiu* 'football' creates an independent structure annotated with *Ty(e), Fo(Zuqiu')* and linked to another independent structure decorated with *Tn(n), ?Ty(e)*, as displayed in Figure 4.60.

The next step in the sequence of actions is the processing of the second leftmost constituent *Baxi qiuyuan* 'Brazilian players'. Just like the initial topic, this subordinate topic projects an independent structure. But unlike the initial one, this second topic projects a linked structure to the top node of an unfolding propositional structure. This line of analysis is indeed a reflection of the fact that, to borrow the words of Chafe (1976), a subordinate topic is used to further limit the applicability of the main predication to a more restricted domain. The two-topic effects are displayed in Figure 4.61.

After the transition from the second tree to the primary tree, the unfolding propositional structure can be developed in the same fashion as a canonical sentence. Figure 4.62 displays a fully grown tree.

Notice how the dynamics of the present framework provides a straightforward characterization of the problematic Chinese-style multiple topic constructions. To begin with, the LINK relation fruitfully reflects the aboutness relation between a variety of topics and also between the topics and the comment: the

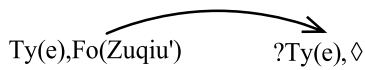

Figure 4.60 Parsing the first topic of Figure4.59a

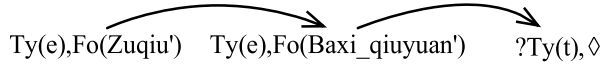

Figure 4.61 Parsing the second topic of Figure 4.59a

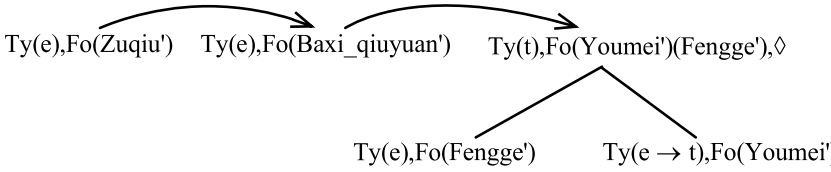

Figure 4.62 Parsing the whole string of Figure 4.59a

‖China‖ ⊨ ‖Beijing‖ ⊨ ‖Places of interest‖ ⊨‖The Great Wall is the most famous‖

Figure 4.63

interpretation of the topicalized expressions as linked structures of *Ty(e)* to the unfolding propositional structure of *Ty(t)* without any requirement for a copy of formula, provides a semantics- or pragmatics-based explanation for the well-formedness condition of the topic construction at issue. In the case of Figure 4.59b, for instance, the leftmost expression *Zhongguo* 'China' first establishes a main domain of reference within which the predication *Changcheng zui zhuming* 'The Great Wall is the most famous' holds, the second leftmost expression *Beijing* then limits the predication to a restricted domain and finally the third leftmost expression *mingsheng* 'places of interest' further limits the predication to a more restricted domain within which the true condition of the proposition is enhanced, or guaranteed, hence complete acceptability of the sentence as a multiple topic construction whose interpretation can also be true and conditionally formalized as follows (Figure 4.63).

To summarize this section, the LINK strategy employed to characterize English-style topic structure has been extended to Chinese-style topic structure. The rule of LINK Adjunction, which has captured the anaphoric relation between topic and comment in English-style topic constructions, has been modified to allow the construction of LINKed structures without imposing any formula-copying requirement. Thus the aboutness relation between topic and comment in Chinese-style topic constructions has been captured.

Now we can get a feel of the extent to which the two notions 'topic' and 'focus' fail to receive sufficient explanation. As has been shown, without setting them against a dialogue background, it would be difficult to provide adequate explanation for these notions. Under the analysis presented here, the two informal concepts 'topic' and 'focus' used in the description of topic structures

can be explained in dynamic terms: topic is shown to provide a point of departure from which the comment clause is developed, so it can be defined as a given term from which a propositional structure is constructed; to the contrary, focus is shown to provide a new term relative to some proposition to be taken as context, so it can be defined as an update term to a given propositional structure (cf. Kempson et al. 2006; Marten 2007).

5 Summary

In this chapter, I have provided a comprehensive account of topic structure, both English style and Chinese style, within the DS framework in which two strategies, linked structures and unfixed node, are available. As far as English-style topic constructions are concerned, the availability of two forms of analysis perfectly reflects the syntactic properties of the left-peripheral expressions – namely, the certainty of the topicalized expressions with purely topical properties and the uncertainty of the topicalized focus expressions with both topical and focal effects. As far as Chinese-style topic constructions are concerned, the line of analysis in terms of LINK relation without a requirement of a copy of the formula from the preceding structure, fruitfully captures the aboutness relation between the topic and the comment in single-topic structure, and between the multiple topics and the comment in multiple-topic structure.

A comparison of the dynamic analysis presented here with previous ones will show how the dynamic approach provides a notable advantage in accounting for complex linguistic phenomena such as topic constructions in Chinese and why an adequate explanation of them cannot be sought in only syntactic, semantic or pragmatic terms, but in a dynamic perspective that combines all three. With the left-to-right dynamics of natural language encoded in the DS formalism, the grammatical machinery required to account for topic constructions is massively simplified and, as a result, a straightforward explanation is provided.

Notes

1 As has been pointed out by Chao (1968) and discussed by Tsao (1979), the topic, but not the subject, may be separated from the rest of the construction by a pause particle such as *a*, *ba, me*, *ne* and *ya*, or a pause tone. According to Chao, the pause particles may be translated into English *as for*. Also, it should be noted that these pause particles, albeit temporarily being ignored in exemplifying topic constructions for the sake of convenience, are preferably used in speech by native speakers, and their linguistic significance will be discussed in section 4.3, since the use of them would result in different information-structural meanings of the expressions marked by them. Additionally, there are also nuances in meaning between the aforementioned particles, which will also be ignored here, since I am chiefly concerned with the syntactic characterization of topic constructions.

2 The ambiguity of sentences such as Figure 4.4 can be attributed to the fact that Chinese lacks both complementizers and expletive pronouns like those in English. However, topic constructions in Chinese, as pointed out in footnote 1, are

in general marked either morphologically or phonologically. Therefore, in actual speech, native speakers would resolve the ambiguity in Figure 4.4 by adding either a pause particle or a pause tone after the initial expression, indicating that it is the topic of the main clause. Otherwise, the dislocated expression is interpreted as the topic of the sentential subject.

3 As will be shown shortly, three or even more topics are allowable in some cases. Yuan (1996) shows that a multiple-topic structure such as Top1 + Top2 + . . . Topn + VP can maximally contain five topics. And in English-style topic constructions, one or two of the topics are quite often temporal or locative NPs, or in Yuan's terminology, situational cases.

4 As will be discussed in sections 3 and 4, from the linear parsing point of view, the gap in the comment clause should not be construed as a variable, but a metavariable (projected by a zero anaphor or a pronominal) which is anaphorically related to the topic expression, given the fact that Chinese is a pro-drop language.

5 It should be noted that although the particles mentioned in footnote 1 are not obligatorily used by Chinese native speakers; namely, they have not been fully grammaticalized as has the Japanese topic marker *wa*, they have been observed to be undergoing a process of grammaticalization (see Fang 1994). Also, it should be pointed out that generally these particles do not figure prominently in Chinese grammar except that they have some discourse or communicative functions.

6 A variety of answers such as those in Figure 4.34 are a reflection of the pro-drop nature of Chinese.

7 As is well known, some constituents like the object NP in a canonical sentence can receive a focus interpretation, and this sort of focus is usually considered the natural focus, as will be explained in footnote 8. Also, Chinese has a syntactic focusing construction, where the focus is encoded in a purely syntactic fashion.

(i)	*zhuren*	*ma*	*guo*	*de*	*shi*	*Zhangsan*.
	head	scold	EXP	DE	is	Zhangsan
	'Who	the	head	scolded	is	Zhangsan'.
(ii)	*ma*	*guo*	*Zhangsan*	*de*	*shi*	*zhuren*.
	scold	EXP	Zhangsan	DE	is	head
	'Who	scolded	Zhangsan	is	the	head'.

8 It is worth mentioning that my definition of the focus element with a topical effect as topicalized focus is in spirit similar to the notion of *huati jiaodian* 'topical focus' coined by Liu and Xu (1998). In related research on 'focus' and 'topic' in Chinese, Liu and Xu reasonably classify 'focus' into three types in terms of the properties [±prominent] and [±contrastive] – namely, Natural Focus, Contrastive Focus and Topical Focus, the first of which takes as background other constituents within the same clause and hence has the property [+ prominent] and [– contrastive], the second of which takes as background the rest of the same clause and also one element of the other clause or other clauses and hence has the property [+ prominent] and [+ contrastive], and, finally, the third of which only takes as background one element of other clauses. Furthermore, Natural Focus usually bears a pitch accent. Same as Natural Focus, Contrastive Focus usually bears a contrastive stress. As for Topical Focus, Liu and Xu argue that it displays not only topicality but also focality, and clauses containing it form a contrast with one another, not only in terms of topical focus but also in terms of the comment.

9 ?<D> in the tree of Figure 4.43 and the following ones is used to mean somewhere down the tree.

5 Passive constructions

1 Introduction

In this chapter, I explore passive constructions in Chinese, which are usually marked by the morpheme *bei*. The issue of *bei* constructions as passive constructions has long been of great interest and is still of great controversy among linguists working on Chinese, and naturally a number of characterizations have been made in the literature. Nevertheless, a unified account of *bei* constructions remains to be achieved, and even the status of the morpheme *bei* itself remains to be articulated. This may be attributed to the fact that *bei* constructions exhibit a surprisingly diverse body of properties as demonstrated in Figure 5.1 through Figure 5.5.

The pair of sentences in Figure 5.1a–b represent the canonical agentive pattern where the pre-*bei* constituent, which is co-referential to the gap in the postverbal object position, acts as the patient and the post-*bei* constituent as the agent;[1] Figure 5.2a–b pertain to the other canonical pattern where the agent is absent because, as in English, it is unnecessary to mention or unknown at least to the speaker; Figure 5.3a–b represent the problematic patterns in which there is an NP in the object position which is termed as 'retained object' within analyses of traditional and generative grammars, as opposed to the canonical patterns in which there is a gap in the object position; Figure 5.4a–b exhibit another problematic pattern, which involves another well-known grammatical structure in Chinese, the *ba* construction; and, finally, Figure 5.5a–b are *bei* sentences with a locative phrase occurring before the morpheme *bei*, and semantically the locative expression appears to be on the same footing as its counterparts in the preceding four patterns.[2]

In this chapter, I investigate issues concerning the *bei* construction and attempt to provide a principled account of its diverse patterns. On the basis of a detailed examination of the basic facts about *bei* constructions, I treat the *bei* construction as a special type of left dislocation and argue that (i) the morpheme *bei* is actually a voice particle devoid of any semantic content, and its fundamental function is to signal that the pre-*bei* argument is the goal of the action; it is by virtue of this peculiar function that *bei* is generally regarded as a marker of passives, and *bei* sentences are universally considered passives in Chinese; (ii) from the typological perspective, the voice behaviour in

a. *Zhangsan bei Lisi da guo.*
Zhangsan BEI Lisi beat EXP
'Zhangsan has been beaten by Lisi'.
b. *Zhangsan bei Lisi ma guo.*
Zhangsan BEI Lisi scold EXP
'Zhangsan has been scolded by Lisi'.

Figure 5.1

a. *fangzi bei chai le.*
house BEI demolish PFV
'The house was demolished'.
b. *chuanghu bei za le.*
window BEI smash PFV
'The window was smashed'.

Figure 5.2

a. *Zhangsan bei Lisi daduan le tui.*
Zhangsan BEI Lisi break PFV leg
'Zhangsan's leg was broken by Lisi'.
b. *Zhangsan bei Lisi jian le toufa.*
Zhangsan BEI Lisi cut PFV hair
'Zhangsan's hair was cut by Lisi'.

Figure 5.3

a. *Zhangsan bei Lisi ba tui daduan le yi-tiao.*
Zhangsan BEI Lisi BA leg break PFV one-CL
'One of Zhangsan's legs was broken by Lisi'.
b. *Zhangsan bei Lisi ba toufa jian le yi-cuo.*
Zhangsan BEI Lisi BA hair cut PFV one-lock
'One lock of Zhangsan's hair was cut by Lisi'.

Figure 5.4

a. *men shang bei haizimen wa le yi-ge dong.*
door on BEI children dig PFV one-CL hole
Lit. 'On the door was dug-a-hole by the children'.
b. *hu li bei cunminmen yang le henduo eyu.*
lake in BEI villagers raise PFV many crocodile
Lit. 'In the lake was raised-many-crocodiles by the villagers'.

Figure 5.5

Chinese is a type of pragmatic voice; and (iii) from the functional perspective, *bei* constructions share certain similarities with topic constructions. Under the dynamic approach, various patterns of *bei* constructions can be successfully characterized in an original and elegant way.

The chapter is organized as follows. Section 2 critically reviews a number of existing analyses of *bei* constructions. Section 3 provides a preliminary analysis of *bei* constructions, particularly the canonical patterns. In section 4, I extend the initial analysis to the problematic patterns. Section 5 summarizes with a conclusion.

2 Previous analyses

Previous analyses of *bei* constructions have of course centred on the particular morpheme *bei*. Although it has been generally acknowledged as the morphological marker of Chinese passive sentences, there has been no consensus so far on the syntactic function and even the part of speech of this passive morpheme. Roughly speaking, there have been three influential analyses in the current literature with respect to the status of the word *bei*.

2.1 The preposition hypothesis

A very popular existing hypothesis is that the word *bei* is a preposition, given the observable fact that what immediately follows it in many cases is an agent NP (e.g., J. Li 1955; L. Li 1980; C. Li and Thompson 1981; J. Zhang 1987; B. Zhang and Hu 1989). The treatment of *bei*, on a par with the preposition *by* in English, has been extensively employed in the work, for instance, of generative linguistics (e.g., Xu and Langendoen 1985; Xu 1986; J. Huang 1993). The advantage with this proposal is that the presence of the agent NP in *bei* sentences such as the ones in Figure 5.1a–b, which are repeated here as Figure 5.6a–b, might receive a natural explanation under the preposition analysis if the predicate could be interpreted as passive.

Nevertheless, verbs in Modern Chinese, as is pointed out in Chao (1968) and Lü (1982), do not show voice distinctions and thus do not exhibit passive meaning directly. Moreover, there is a further disadvantage with this analysis in that the omission of the agent NP would result in the apparent stranding of a preposition, as in Figure 5.2a–b, which is repeated here as Figure 5.7a–b.

As is well-known, however, neither prepositions nor postpositions in Chinese are allowed to be stranded in any type of construction (cf. C. Li and Thompson 1981), as illustrated in Figure 5.8 and Figure 5.9.

a.	*Zhangsan*	*bei*	*Lisi*	*da*	*guo*.
	Zhangsan	by	Lisi	beat	EXP
	‘Zhangsan has been beaten by Lisi’.				
b.	*Zhangsan*	*bei*	*Lisi*	*ma*	*guo*.
	Zhangsan	by	Lisi	scold	EXP
	‘Zhangsan has been scolded by Lisi’.				

Figure 5.6

a. *Fangzi* *bei* *chai* *le*.
house by demolish PFV
The house was demolished'.
b. *chuanghu* *bei* *za* *le*
window by smash PFV
'The window was smashed'.

Figure 5.7

a. *Zhangsan* *cong* **(Beijing)* *lai*.
Zhangsan from Beijing come
'Zhangsan comes from Beijing'.
b. *Lisi* *zai* **(Lundun)* *gongzuo*.
Lisi in London work
'Lisi works in London'.

Figure 5.8

a. **(qiao)* *shang* *you* *yi-ke* *shu*.
bridge on have one-CL tree
'There stands a tree on the bridge'.
b. **(hai)* *li* *piaozhe* *henduo* *chuan*.
sea in float many boat
'There float many boats in the sea'.

Figure 5.9

wo *bei* *da* *le*.
1SG by beat PFV
'I was hit'.
(Xu and Langendoen 1985)

Figure 5.10

In view of this severe restriction on preposition and postposition stranding, some authors, such as Xu and Langendoen (1985), maintain that the morpheme *bei* in the agentless pattern can be regarded as an exception. Accordingly, despite the absence of the agent NP in sentences such as the one in Figure 5.10, they still treat *bei* as the counterpart of the English preposition *by*, although they refer to it as a particle.

As a language where prepositions can be stranded, even English does not allow the appearance of the preposition *by* when the agent is absent, as can be seen in the English translation of Figure 5.10. Furthermore, there are alternative ways in Chinese to form a sentence where *wo* 'I' still maintains the patient status (cf. H. Wang 1983), instead of employing a stranded preposition. For example, we can use the verb *ai* 'get', which can take a nominalized verb or clause as its object (Figure 5.11).

wo	*ai*	*le*	*da*.
1SG	get	PFV	beat

'I got a beating'.

Figure 5.11

These facts strongly suggest that it is questionable to class *bei* as a preposition and equally force us to think the other way around. The data presented earlier naturally lead us to the hypothesis that *bei* as a marker of passives is unlikely to be agent-oriented and any parallels with agentive prepositions found in other languages might be misconceived. Otherwise, we cannot afford a straightforward account of why *bei* sentences, agentive or non-agentive, are universally recognized as passive constructions by linguists of all persuasions. Therefore, it is reasonable to assume that it is more closely connected with the pre-*bei* position than the post-*bei* position. Although it is true that the patient constituent can also be omitted under certain circumstances, its absence is significantly different from that of the agent constituent. Let us compare the following examples (Figure 5.12):

a.

zhe	*jiahuo*	*bei*	*baba*	*da*	*guo*	*duo*	*ci*,	*jiushi*	*bu*	*gai*.
this	guy	BEI	dad	beat	EXP	many	times	just	not	change

'This guy had been beaten many times by Dad, but he just didn't change'.

b.

bei	*da*	*guo*	*duo*	*ci*,	*zhe*	*jiahuo*	*jiushi*	*bu*	*gai*.
BEI	beat	EXP	many	times	this	guy	just	not	change

'Had been beaten many times, this guy just didn't change'.

Figure 5.12

Figure 5.12a has two juxtaposed clauses – one of which is a *bei* clause where both the patient and agent are present. The *bei* clause of Figure 5.12b, which is adapted from Figure 5.12a, has neither a patient nor an agent, but native speakers have no trouble at all figuring out the former, but not the latter without contextual clues. Clearly, the absence of the patient is syntactically motivated, because the *bei* clause and the other one share the same topic *zhe jiahuo* 'this guy'. Contrastively, the absence of the agent is pragmatically motivated, depending on context salience and information structure.

The significant difference concerning the allowable absence between the patient and agent evidently underlies the grammatical function of *bei*, which is in turn related to the grammatical status of the relevant construction. That is, the morpheme as marker of passives is actually patient-oriented rather than agent-oriented. Given the severe restriction on preposition stranding, the preposition analysis is implausible.

2.2 The dual-function hypothesis

In view of the 'distributional' problem of *bei*, a few scholars, such as Lü et al. (1980), postulate that the word *bei* has a double function; namely, it is a

preposition with the presence of the agent NP, but a helping particle with the absence of the agent NP. This analysis, as a matter of fact, implies that there are two *bei* morphemes in Chinese: one functions as the trigger of the agent NP, the other functions as a passive morpheme which occurs immediately before the verb.[3] Alternatively, Shi (1997) presents a two-morpheme hypothesis by modifying Lü et al.'s: the *bei* in passive constructions encodes two different morphemes, one preposition and one passive marker.[4] Shi's postulation is intrinsically the same as Lü et al.'s, except it is more explicit than the latter.

Under the double function analysis, the problems arising from 'distribution' of *bei* disappear automatically, viz. the preposition *bei* could account for agentive cases such as Figure 5.1 because it is supposed to introduce an NP, whereas the helping particle *bei* could account for agentless cases such as Figure 5.2, because it is supposed to help the verb to get a passive voice. One crucial question that immediately arises from this proposal is, how could the same word *bei* behave so changeably in the same syntax of passive constructions?

I doubt the explanatory power of this sort of analysis, considering the hard fact that *bei* has invariably been placed in its own position – namely, the post-patient position, no matter whether the agent NP is present or absent. For this reason, it is amply justified to say that the problematic morpheme is not a variable but an invariable item of the passive construction. What is employed as a variable is the agent NP whose absence or presence, as discussed in the preceding subsection, is pragmatically motivated and hence is unrelated to the grammatical voice of the *bei* construction. On the contrary, it is the occurrence of *bei* that consistently marks the relevant sentences with an overtly passive flavour in an unambiguous way. Consider the following examples (Figure 5.13):

laoshi	*jiao*	*le*	*toufa*.
teacher	cut	PFV	hair

'The teacher cut (someone's) hair'.
'The teacher, (someone) cut his hair'.
(Shi 1997)

Figure 5.13

In Chinese, there are a considerable number of sentences such as the ones in Figure 5.13, which exhibit a great deal of ambiguity with regard to agenthood and patienthood. So they admit two possible interpretations, as illustrated by the English translations. But with the use of *bei*, the resulting sentences are unambiguously passives, where the preverbal NP is unequivocally the recipient of the action, as in Figure 5.14.

Bei's disambiguating capacity provides further convincing evidence for my argument made in subsection 2.1 that the morpheme marking passive

laoshi	*bei*	*jiao*	*le*	*toufa*.
teacher	BEI	cut	PFV	hair

'The teacher had his hair cut'.

Figure 5.14

sentences is more closely related to the patient rather than the agent. Specifically, *bei* consistently assigns the semantic role to the pre-*bei* argument by indicating that it is the recipient of action. This peculiar function of *bei*, so far as I am aware, has been seriously overlooked, although the word in question has been generally accepted as the marker of Chinese passives. If this argumentation is on the right track, *bei*'s grammatical function can provide a very natural explanation of the grammatical status of *bei* constructions of whatever patterns without any special stipulations: *bei* sentences are labelled as passives just because they contain a morpheme, which always signals that the internal argument is fronted, appearing before the marker and interpreted as being acted upon. The affectedness of the patient NP is thus highlighted in a marked manner: the NP preceding *bei* is in general interpreted as the passive recipient of a certain action because of the presence of such a morpheme.[5]

Generally speaking, the morpheme *bei* can translate a sentence from active to passive by means of fronting the object before the subject, which makes passive constructions in Chinese share some similarities with topic constructions (see Wu 2013). The set of sentences in Figure 5.15 and Figure 5.16, which both involve object dislocation, should be treated as instances of topic constructions, with the former resulting from the omission of *bei* in the canonical agentive pattern (Figure 5.1) and the latter resulting from the omission of *bei* in the canonical non-agentive pattern (Figure 5.2).

In fact, there are a wealth of sentences in Chinese like those in Figure 5.16, where a patient NP is apparently fronted in the preverbal position. Although they appear to express a sort of passive meaning, sentences of this type are generally treated as topic sentences with the preverbal NP being construed as the topic (e.g., C. Li and Thompson 1981; J. Huang 1982; A. Li 1990; Shi 2000).[6] This sheds more light on the function of *bei* constructions: the

a. *Zhangsan* *Lisi* *da* *guo*
Zhangsan Lisi beat EXP
'Zhangsan, Lisi has once beaten'.
b. *Zhangsan* *Lisi* *ma* *guo*
Zhangsan Lisi scold EXP
'Zhangsan, Lisi has once scolded'.

Figure 5.15

a. *Fangzi* *chai* *le*.
house demolish PFV
'The house, (someone) demolished'.
b. *chuanghu* *za* *le*
window smash PFV
'The window, (someone) smashed'.

Figure 5.16

A:	*Zhangsan bei . . .*				
B:	*Zhangsan*	*bei*	*zenmo*	*le*	?
	Zhangsan	BEI	how	SFP	
C:	*bei*	*(Lisi)*	*da*	*le*.	
	BEI	Lisi	beat	PFV	
	'(He) was beaten (by Lisi)'.				

Figure 5.17

pre-*bei* patient argument dislocated in the sentence-initial position behaves like the topic of the sentence, whereas the post-*bei* clause serves as a 'comment' on it.

The aforementioned observation and discussion points to the conclusion that the so-called preposition *bei* and the helping particle *bei* are basically one and the same. That is, the word in question has only one single grammatical function – i.e., marking sentences with a passive flavour by giving the information that the pre-marker NP is acted upon in some manner specified by the verb. The one single function of *bei* can be confirmed by the fact that if speakers deliberately pause after *bei* is uttered during the course of conversation, hearers would consistently raise an event-oriented question about what happened to the preceding argument, and the answer to the question could either be an agentive or agentless one, as shown in Figure 5.17.

Zenmo in Figure 5.17 can be construed as 'What happened (to Zhangsan)?' or 'How did someone dispose of (Zhangsan)?', which has a strong disposal sense (cf. L. Wang 1959; C. Li and Thompson 1981; Lapolla 1989). Such an effect is not seen in dialogues involving a simple topic construction such as in Figure 5.15 since the argument status of the initial NP cannot be determined at this early point in the processing of the sentence, and the hearer cannot infer that Zhangsan is the object of the verb. These data show at least one thing: the morpheme clearly signals the function of the pre-*bei* constituent as object or patient. We have no choice but to accept the evidence that the function of *bei* is not to identify the agent of an action. This is convincing proof that *bei*'s grammatical function is not associated with the presence or absence of the agent argument, and there are no two instantiations of *bei* as preposition and helping particle. There is one element whose single function is to mark sentences as passive by giving the information that the pre-*bei* NP is acted upon in some manner specified by the verb.

2.3 The verb hypothesis

In view of the inadequacy of the previous two analyses, a number of authors (e.g., Hashimoto 1968, 1987; Tan 1987; Ting 1998; J. Huang 1999) argue that the puzzling morpheme should be analyzed as a verb, which historically it was, meaning 'receive' in Classical Chinese.[7] This verb analysis is based on the assumption that *bei* as a special verb can take a predicate or clause as its

a. *na-jian* *shiqing* *bei* *ta* *zhidao* *le*.
that-CL matter BEI 3SG know PFV
'That matter was known by him'.
b. [$_{S}$ [$_{NP}$ *na-jian shiqing*][$_{VP}$ *bei* [$_{S}$ [*ta* [$_{VP}$ [*zhidao le* [$_{NP}$ *na-jian shiqing*]]]]]

Figure 5.18

a. *Lisi* *ai/*bei* *le* *mama* *ma*.
Lisi get/BEI PFV mother scold
'Lisi got a scolding of his mother'.
b. *Lisi* *ai-mei-ai/*bei-mei-bei* *mama* *ma* ?
Lisi get-not-get/BEI-not-BEI mother scold
'Did Lisi get a scolding of his mother?'

Figure 5.19

complement. Accordingly, a passive sentence such as the one found in Figure 5.18a has underlying representation in Figure 5.18b (Hashimoto 1987, p.41).

Under the verb analysis, the Chinese passive, unlike its English counterpart, involves a complex sentence: what follows *bei*, according to Hashimoto, is a nominalized sentence with the object omitted. The omission of the object is attributable to the fact that it is identical to the subject, so undergoes deletion. As for the absence of the agent NP, it should be treated as a special case of null subject. Thus all the problems with the previous analyses could be given a satisfactory solution.

The treatment of *bei* as a special verb faces a number of serious problems, though. All the authors claim that the use of *bei* is compatible with some special transitive verbs such as *ai*, *shou*, *zaoshou*, *jingshou*, which all have the similar meaning, 'receive', 'get', 'undergo', 'experience', etc., and all are able to take a complement clause. If it is still used as a verb with the original lexical semantics, *bei* and the aforementioned verbs are supposed to be exactly of the same type. Then, one crucial question arises: why are only the constructions with *bei* interpreted as basic passives, not the constructions with these verbs?

More importantly, there is syntactic evidence against treating *bei* in the same way as these other verbs. For example, all these verbs can take an aspect marker as in Figure 5.19a and can also be used in the V-not-V form as in Figure 5.19b, but *bei* cannot (cf. A. Li 1990 among others).

These facts suggest either that *bei* is not of the same type as those mentioned, even if it is a verb, or it is not a verb at all. That the latter is likely to be the case can be further evidenced by the comparison of *bei* with its variants *rang*, *jiao* and *gei*, which are generally considered to function in the same fashion as *bei* in passive constructions. Although all of the four morphemes can appear in agentive sentences such as the one in Figure 5.20a, yet only *bei* can be used in agentless sentences such as the one in Figure 5.20b. If the

a. *wo* *bei/gei/jiao/rang* *ta* *tou* *le* *liang* *kuai* *qian*.
1SG BEI/GEI/JIAO/RANG 3SG steal PFV two dollar money
'I had two dollars stolen by him/her'.
(C. Li and Thompson 1981)

b. *wo* *bei* *(*jiao/*rang/?*gei)* *tou* *le* *liang* *kuai* *qian*.
1SG BEI JIAO/RANG/GEI steal PFV two dollar money
'I was stolen two dollars'.
(Li and Thompson 1981)

Figure 5.20

morpheme in question is not a verb in Modern Chinese, these facts can be easily accounted for without recourse to the assumption that *bei* is a verb without common verbal properties.

Semantically, the word *bei* has no lexical content at all, other than being a function word used to mark the passive construction, whereas its so-called variants all have a lexical content with independent meanings, besides being capable of marking the relevant constructions with a passive flavour: *rang*, *jiao* and *gei* may appear as full lexical verbs, meaning 'let or allow', 'tell, order' and 'give', respectively. Syntactically, the constructions containing these variants, as pointed out by C. Li and Thompson (1981), may have a different syntactic structure from the *bei* construction, which explains why sentences such as those mentioned earlier unambiguously have a passive reading when marked by *bei*, but they probably have an ambiguous reading when marked by the other three words: so the *gei* sentence in Figure 5.20a could mean 'I stole two dollars for him', the *jiao* sentence 'I told him to steal two dollars' and the *rang* sentence 'I allowed him/her to steal two dollars'. The unacceptability of the non-agentive pattern with these verbs in Figure 5.20b clearly reveals that their verbal properties still play a prominent role, even in passive constructions, because they normally take an NP as direct object.

The sharp contrast between the invariable behaviour of *bei* and the changeable behaviour of its variants provides supportive evidence that *bei* has been grammaticalized from a content word into a function word,[8] while its variants *rang*, *jiao* and *gei* have not.[9] In the face of the aforementioned facts, it is sufficiently clear that the analysis of *bei* as a verb in Modern Chinese is untenable.

In summary, we can ascertain that none of the reviewed analyses provides an adequate account of *bei*. The fact that the passive morphology can appear before either a noun phrase or a verb phrase indicates that it is not a preposition. The differences in the omission of agent and patient arguments indicate that the morpheme is patient-oriented rather than agent-oriented. The differences in syntactic and semantic behaviour between *bei* and other 'passive' morphemes further indicate that the expression is not a verb. I thus conclude that *bei* is a grammatical marker that induces passive interpretation by virtue of identifying the constituent before it as the patient argument of the verb.

3 A preliminary analysis

I shall in this section provide a preliminary analysis of the canonical patterns of *bei* constructions, which is to be taken as a template for treating the problematic patterns. Based on the observations and discussion presented in section 2, I argue that *bei* as a function word is actually a voice marker whose fundamental function is to indicate that the action proceeds in an inverse direction. Because of this lexical effect, the preceding argument is naturally assigned a patient role by *bei*, and hence it becomes the passive recipient of the action.[10] It is this very patienthood-assigning grammatical function that has prompted linguists to accept it uncontroversially as the morphological marker of Chinese passives.[11] In terms of parts of speech, we may call *bei* a voice particle, because it has the defining properties of a particle generalized by Crystal (2001, pp.279–280), "a term used in grammatical description to refer to an invariable item with grammatical function, especially one which does not readily fit into a standard classification of parts of speech".

3.1 Pragmatic voice

The grammatical function of *bei* in inducing dislocation of a recipient expression can best explain why *bei* sentences are considered passives, since the use of this morpheme has the effect of highlighting the semantic aspect of the affectedness inherent in the dislocated patient (cf. Shibatani 1985). Consider the example in Figure 5.21.

The active sentence in Figure 5.21a simply describes a seeing event in which the affectedness of the patient is not salient at all, but with the use of *bei*, the patient has to be fronted to sentence-initial position, which marks the entity as the most prominent argument of the verb. In other words, the syntactic prominence resulting from displacement makes the argument the focus of attention. Since it is marked by the voice particle *bei*, which always signals the message 'attention, please, what precedes me is what has been acted upon', the affectedness of the fronted argument naturally becomes food for thought, which potentially gives rise to a pejorative meaning as it emphasizes the passivity of the patient of the action. Figure 5.21b, for instance, implies the adverse situation *Zhangsan* faced subsequent to the seeing event – i.e., consequently, he might be suspected of doing something bad or might be questioned later. The adverse implication of *bei* sentences is reached via a relevance-based interpretation

a.	*jingcha*	*kanjian*	*le*	*Zhangsan*.	
	police	see	PFV	Zhangsan	
	'The policeman saw Zhangsan'.				
b.	*Zhangsan*	*bei*	*jingcha*	*kanjian*	*le*.
	Zhangsan	BEI	police	see	PFV
	'Zhangsan was seen by the policeman'.				

Figure 5.21

(Sperber and Wilson 1995), which is bolstered by the remnant of the semantics that the verb *bei* once was: the subject of such a verb being the recipient, a non-agentive role.

The aforementioned typical example shows that the pre-*bei* argument has assumed a status of pragmatic salience due to the existence of *bei*.[12] Precisely, *bei* changes the voice of a sentence from active to passive by means of assigning not only a semantic role but also a marked pragmatic status to the pre-*bei* NP, without altering the morphosyntactic or semantic relations between the verb and its arguments. Having had a clear picture of *bei*'s function, we are supposed to have a natural understanding of why sentences with *bei* are called passive constructions, because they have a voice which encodes action notionally devolving from the standpoint of the patient of a transitive verb (cf. Klaiman 1991). This voice is undoubtedly passive, because the verbs occurring in *bei* sentences, in the words of Lyons (1968, p.372), are characterized by "signifying the state of 'being acted upon' or 'suffering the effects of the action'", as can be attested by the fact that they either take a perfective aspect marker *le* or an experiential aspect marker *guo*.

From a typological perspective, the passive voice behaviour in Chinese may be ascribed to pragmatic voice, because it is pragmatically grounded to a large extent, given that *bei* sentences generally express a sense of adversity and highlights the affectedness of the dislocated patient argument (see Wu 2011b for a detailed discussion). This is actually the terminology of Klaiman (1991) who, on the basis of a cross-linguistic survey, introduces a threefold classification of voice types: derived voice (passivization phenomena), basic voice (active-middle systems) and pragmatic voice. According to Klaiman, pragmatic voice as a distinct type is manifested by voice alternations signalling the variable assignment to sentential arguments of some special pragmatic status or salience. Let us consider the example in Figure 5.22 quoted by Klaiman (1991, p.34) from Ayres.

In the (a) sentence, an oblique nominal appears sentence-finally, whereas in the (b) sentence, this argument, stripped of the preposition, is fronted in sentence-initial position. The suffix *–b'e* is an index of instrumental focus which means that the oblique-instrumental argument is the locus of informational salience in the sentence. As for Chinese, its passive voice by and large behaves in a similar fashion to that of the aforementioned Mayan language.

a.	*A-*	*k'oni*	*in*	*ta'n*	*uula*.
	2SG ERG	shoot	1SG ABS	with	sling
	'You shot me with a sling'.				
b.	*Uula*	*a-*	*k'oni*	*–b'e*	*in*.
	sling	2SG ERG	shoot	index	1SG ABS
	'With a sling you shot me'.				

Figure 5.22

a. *ta* *yong* *na-kuai* *bu* *zuo* *le* *yi-tiao* *kuzi*.
3SG with that-CL cloth make PFV one-CL trousers
'He made a pair of trousers with the cloth'.
(L. Li 1980)
b. *na-kuai* *bu* *bei* *ta* *zuo* *le* *yi-tiao* *kuzi*.
that-CL cloth BEI 3SG make PFV one-CL trousers
'The cloth was made into a pair of trousers by him'.
(Li 1980)

Figure 5.23

a. *Zhangsan* *bei* *Lisi* *da* *guo*
Zhangsan BEI Z beat EXP
'Zhangsan has been beaten by Lisi'.
b. *Zhangsan* *Lisi* *da* *guo*
Zhangsan Lisi *beat* EXP
'Zhangsan, Lisi has beaten'.

Figure 5.24

As with the Mayan example in Figure 5.22a, Figure 5.23a has an oblique nominal in sentence-final position, whereas in Figure 5.23b, the nominal stripped of the preposition is fronted in sentence-initial position. Just like the suffix *–b'e*'s assignment of informational salience to the oblique-instrumental argument, *bei* signals the assignment of pragmatic salience to the pre-*bei* argument – i.e., the cloth has been used, possibly in an improper way.

By comparison, the voice behaviours in Chinese and Mayan share at least two characteristics: (i) the voice change from active to passive entails no alternation in morphosyntactic relations between the verb and its nominals and (ii) the voice change from active to passive involves "the assignment to sentential arguments of some salience whose basis is in the situation of speaking, or pragmatic salience" (Klaiman 1991, p.35).

3.2 Left dislocation

From the functional perspective, as was briefly discussed in section 2, *bei* constructions share certain points of similarity with topic constructions, which has also been noticed in Hashimoto (1968), Lapolla (1989), Y. Huang (2000) and others. Compare *bei* sentences of Figure 5.1a–b, which is repeated here as the (a) sentences of Figure 5.24 and Figure 5.25 with their *bei*-less counterparts and the (b) sentences of Figure 5.24 and Figure 5.25.

The similarity between the (a) sentence and the (b) sentence is striking: (i) syntactically, the constituent *Zhangsan*, whether in *bei* constructions or topic constructions, is left dislocated in sentence-initial position and (ii) semantically, *bei* sentences are truth-conditionally the same as topic sentences.

a. *Zhangsan* *bei* *Lisi* *ma* *guo*
Zhangsan BEI Lisi scold EXP
'Zhangsan has been scolded by Lisi
b. *Zhangsan* *Lisi* *ma* *guo*
Zhangsan Lisi scold EXP
'Zhangsan, Lisi has scolded'.

Figure 5.25

a. *men* *shang* *bei* *haizimen* *wa* *le* *yi-ge* *dong*.
door on BEI children dig PFV one-CL hole
Lit. 'On the door was dug-a-hole by the children'.
b. *men* *shang*, *haizimen* *wa* *le* *yi-ge* *dong*.
door on children dig PFV one-CL hole
'On the door, the children dug a hole'.
c. *haizimen* *zai* *men* *shang* *wa* *le* *yi-ge* *dong*.
children LOC door on dig PFV one-CL hole
'The children dug a hole on the door'.
d. *haizimen* *ba* *men* *shang* *wa* *le* *yi-ge* *dong*.
children BA door on dig PFV one-CL hole
'The children dug a hole on the door'.

Figure 5.26

a. *hu* *li* *bei* *cunminmen* *yang* *le* *henduo* *eyu*.
lake in BEI villagers raise PFV many crocodile
Lit. 'In the lake was raised-many-crocodiles by the villagers'.
b. *hu* *li*, *cunminmen* *yang* *le* *henduo* *eyu*.
lake in villagers raise PFV many crocodile
'In the lake, the villagers raised a of crocodiles'.
c. *cunminmen* *zai* *hu* *li* *yang* *le* *henduo* *eyu*.
villagers LOC lake in raise PFV many crocodile
'The villagers raised a lot of crocodiles in the lake'.
d. *cunminmen* *ba* *hu* *li* *yang* *le* *henduo* *eyu*.
villagers BA lake in raise PFV many crocodile
'The villagers raised a lot of crocodiles the lake'.

Figure 5.27

This generalization turns out to be correct, even if we look at more data such as the most problematic pattern (Figure 5.26).[13]

The (a) sentences are *bei* sentences with a locative phrase occurring before the voice marker and functioning as the topic of the sentence, while the (b) sentences, resulting from the omission of *bei*, are clearly topic sentences with the locative phrase serving as the topic.[14] These two types of sentences still have in common the aforementioned syntactic and semantic attributes. Compared with the canonical sentences in Figure 5.26c–d and Figure 5.27c–d, one of which is a *ba* sentence, both the passive sentences in Figure 5.26a and Figure 5.27a and

topic sentences in Figure 5.26b and Figure 5.27b can be treated as a species of left-dislocation structure.

As far as grammatical status is concerned, it is not the pre-*bei* NP but the post-*bei* NP that is the subject of the sentence, with respect to the universal subject property generalized by Keenan (1976, p.321) that "b(asic)-subjects normally express the agent of the action, if there is one". Structurally, what precedes *bei* functions as the topic of the sentence and what follows *bei* serves as a 'comment' clause providing some information about what happens to the sentence-initial patient, although the flow of articulation need not be cut off after the voice particle (cf. Hashimoto 1968, Lapolla 1989).[15] As a matter of fact, the functional similarity of passivization with topicalization has already been discussed by a number of linguists such as Givón (1979, p.186), who defines passivization as "the process by which a non-agent is promoted into the role of a main topic of the sentence", and Roberts (1998, p.112) who claims that "passivization can be regarded as one way of making a functional topic more prominent syntactically". I can therefore make a claim that passive in Chinese involves the promotion of the patient NP not to the subject but to the (unique) topic, and it is the morpheme *bei* that induces its dislocation to the topic position.

Nevertheless, we should be fully aware that there still exist some crucial differences both in syntax and semantics between passivization and topicalization in Chinese, which precludes the possible conclusion that they should be regarded as entirely the same. Semantically, *bei* sentences as passives generally express a pejorative implication, emphasizing the adverse situation subsequent to the relevant action and the affectedness of the pre-*bei* patient argument.[16] Syntactically, what is passivized can only be the patient argument of a transitive verb, whereas what is topicalized is not subject to this constraint, as illustrated in Figure 5.28a and Figure 5.29a, which are transformed from the active counterparts of Figure 5.28b and Figure 5.29b, respectively.

The ungrammaticality of the (a) sentences contrasts sharply with the grammaticality of the (b) sentences. The former can be accounted for by the fact that

a.	**Lisi*	*bei*	*da*	*guo*	*Zhangsan*.	
	Lisi	BEI	beat	EXP	Zhangsan	
b.	*Lisi*	*ta/zhe*	*jiahuo*	*da*	*guo*	*Zhangsan*.
	Lisi	3SG/this	guy	beat	EXP	Zhangsan

'Lisi, he/this guy has beaten Zhangsan'.

Figure 5.28

a.	**Lisi*	*bei*	*ma*	*guo*	*Zhangsan*.	
	Lisi	BEI	scold	EXP	Zhangsan	
b.	*Lisi*	*ta/zhe*	*jiahuo*	*ma*	*guo*	*Zhangsan*.
	Lisi	3SG/this	guy	scold	EXP	Zhangsan

'Lisi, he/this guy has scolded Zhangsan'.

Figure 5.29

Lisi as the agent cannot occur before *bei* since only the patient is licensed to do so, whereas the latter can be attributed to the fact that NPs in any argument position are in general allowed to be topicalized in Chinese.

To sum up, I claim that *bei* is a functional element that gives rise to a form of pragmatic passive in Chinese. The puzzling morpheme induces the left dislocation of a patient expression into the prominent topic position, thus highlighting its affectedness by the verb, and further signals that this expression is the goal of the action. In the next subsection, I shall provide an analysis within the DS framework.

3.3 The characterization of the canonical patterns

Having spelled out the grammatical characteristics of the *bei* construction, let us now turn to its representation and interpretation. Given that the pre-*bei* constituent is a left-dislocated expression, it is therefore natural to analyze this constituent in terms of an initially unfixed node, with an entirely open dominance relation to the top node as with the topicalized focus in topic constructions dealt with in chapter 4.[17] Parsing the voice marker *bei* then identifies this initially unfixed node as the internal argument of the main verb. In other words, *bei* restricts the location of the node associated with the dislocated pre-*bei* expression in a quite precise fashion, even though it remains strictly unfixed at this point of the parse. This is achieved by imposing an additional two requirements on the unfixed node.

The first requirement is that at some stage in the parsing process, the node has a predicate node as mother as formalized as $?\langle\uparrow_0\rangle Ty(e \rightarrow t)$, which reads 'I must be the argument daughter of a predicate node'. The second restriction has to do with the fact that the node must be identified as the argument daughter of a highest predicate node. This is because the *bei* construction in general does not allow long-distance extraction as illustrated in (Figure 5.30).

This further locality requirement can be represented through the complex modality $?\langle\uparrow_0\rangle\langle\uparrow_{1*}\rangle Tn(a)$, which requires the current node to be the argument daughter of some node that is dominated by Tn(a) solely through functor nodes.[18]

To illustrate the working mechanism underlying the interpretation of *bei* passives, let us first tackle the canonical agentive pattern, with Figure 5.1a *Zhangsan bei Lisi da guo* as an example. The first step is to create an initial tree with a root node that is annotated with a formula of type *t*, as is universal in all parse representations. What follows, as shown in Figure 5.31, utilizes the rule

a.	**Zhangsan*	*bei*	*Lisi*	*zhidao*	*Wangwu*	*da*	*guo*.
	Zhangsan	BEI	Lisi	know	Wangwu	beat	EXP
b.	*Zhangsan*	*Lisi*	*zhidao*	*Wangwu*	*da*	*guo*.	
	Zhangsan	Lisi	know	Wangwu	beat	EXP	

'Zhangsan, Lisi knows that Wangwu has beaten'.

Figure 5.30

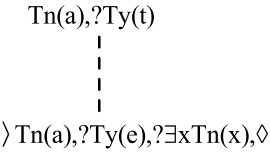

Figure 5.31 Introducing the unfixed node

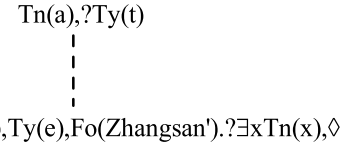

Figure 5.32 Parsing *Zhangsan*

```
IF      (?Ty(t) ∧ Tn(a))
THEN    IF      ⟨↓∗⟩(Ty(e) ∧ Fo(α))
        THEN    go(⟨↓∗⟩Ty(e)); put(?⟨↑0⟩Ty(e → t), ?⟨↑0⟩⟨↑1∗⟩Tn(a));
                go(⟨↑∗⟩?Ty(t))
        ELSE    ABORT
ELSE    ABORT
```

Figure 5.33 Lexical entry for *bei*

of *Adjunction for introducing the unfixed node which allows the parse of the left-peripheral expression *Zhangsan.*

The second step is the parse of the pre-*bei* argument *Zhangsan*, the processing of which updates the decoration of the unfixed node with a formula value *Fo(Zhangsan')* as shown in Figure 5.32 since it fulfils the requirement for an expression of type *e*:

Note here that the node where the pointer sits is still underspecified with respect to its position in the tree. Having parsed *Zhangsan*, the pointer now moves back to the root node of the tree and the voice particle *bei* is then scanned, giving rise to the lexical actions in Figure 5.33 where the trigger is a Ty(t), following from the fact that it determines the grammatical voice of the whole sentence:

Since *bei* provides the information about the specific location of the unfixed node, the third step is further updating its description by adding a specifically positional requirement which secures a place in the tree for the unfixed node, as shown in Figure 5.34:

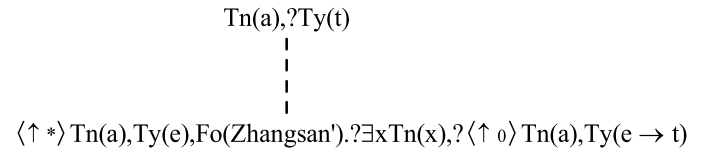

Figure 5.34 Parsing *Zhangsan bei*

After the processing of the voice marker, the parse proceeds as before with nodes for subject and predicate being introduced, allowing the parse of the agent *Lisi* and the verb which projects an unfixed n-place predicate node. Then as we have seen before, the predicate node is unfolded as two further subgoals: to find the content of an internal argument and a two-place predicate, as illustrated in Figure 5.35.

Figure 5.35 is in fact the general characterization of the structural properties of *bei* constructions: the pre-*bei* constituent projects an unfixed node of Ty(e) linked to a tree with a propositional requirement, plus a specifically positional requirement, $?\langle\uparrow_0\rangle Ty(e \rightarrow t)$, $?\langle\uparrow_0\rangle\langle\uparrow^1_*\rangle Tn(a)$, which indicates that it is the dislocated argument of the predicate. This provides a template for analyzing various patterns of *bei* constructions: a left-peripheral argument, characteristically signalled by the voice marker *bei*, will eventually merge with the argument daughter of the one-place predicate to derive a well-formed propositional formula.

Subsequent to the parse of the verb, the pointer first moves to the argument node, which provides the context in which the merge of the pre-*bei* expression takes place, as shown in Figure 5.36.

Then the pointer moves to the open two-place predicate node. If there is more lexical input such as *duo ci* 'many times', as in the utterance *Zhangsan bei Lisi da guo duo ci*, the open predicate node would be unfolded again as two further subgoals. In the case of Figure 5.1a, a merge of the unfixed predicate node takes place, as shown in Figure 5.37, where the tree will be completed to yield a full propositional formula, *Da'(Zhangsan')(Lisi')*.

As for the agentless pattern, it is straightforwardly analyzable. The lack of the agent can be treated as a simple instance of pro-drop, as in some generative

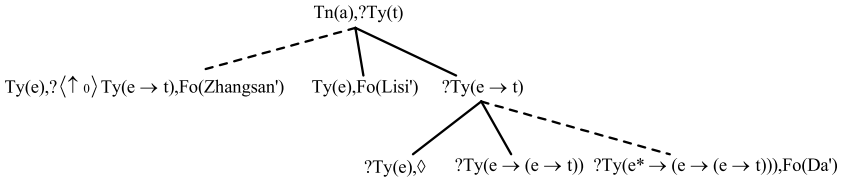

Figure 5.35 Parsing *Zhangsan bei Lisi da guo*

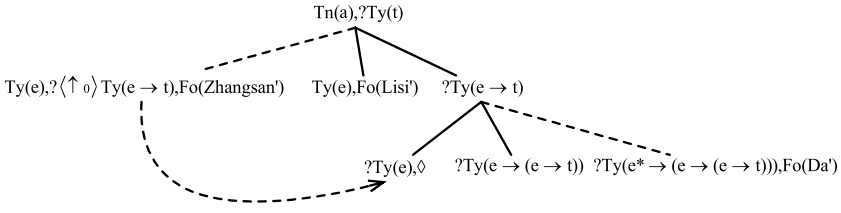

Figure 5.36 Merge of the unfixed argument node

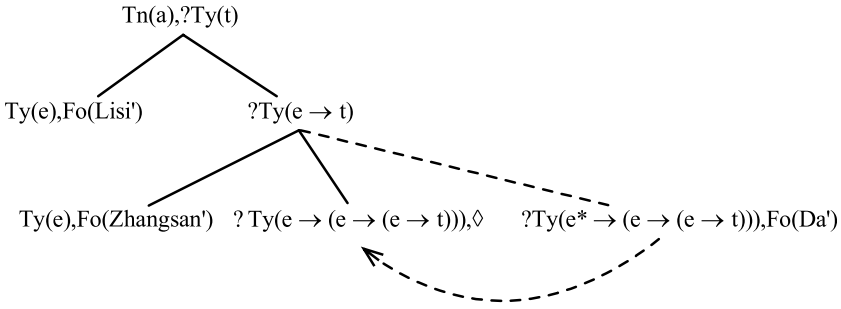

Figure 5.37 Merge of the unfixed predicate node

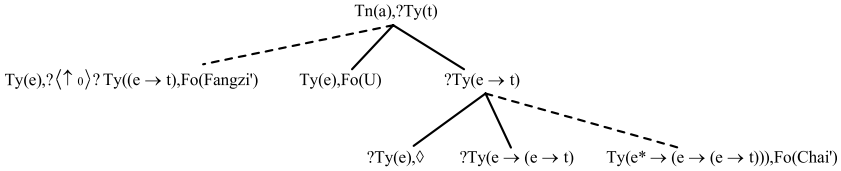

Figure 5.38 Parsing *fangzi bei chai le*

a. *fangzi* *bei* *chai* *le*.
house BEI demolish PFV
'The house was demolished'.
b. *bei* *shui* *chai* *le?*
BEI who demolish PFV
'By whom was (the house) smashed?'

Figure 5.39

account (e.g., Ting 1998). Thus in parsing Figure 5.2a *fangzi bei chai le* 'the house was demolished', after the first two words have been parsed, the pro-drop rule formulated in chapter 2 can be applied to induce a metavariable to satisfy the type requirement, as shown in Figure 5.38.

The metavariable can be replaced by some term in context, either a salient substitute or some arbitrary term standing for 'someone'. In favour of this analysis is the fact that an utterance such as the one in Figure 5.2a, which is repeated here as an agent-oriented question (Figure 5.39), is felicitous.

Also in spoken discourse, native speakers prefer to use a generic NP such as *ren* 'people' in the post-*bei* position instead of a null agent if the agent is unknown to them or unnecessary to specify, as shown in Figure 5.40.[19]

These data imply that the non-agentive pattern has some pragmatic attachments in the sense that the agent, albeit absent in the syntax, might be pragmatically 'present' in the mind of the hearer.

a.	*fangzi*	*bei*	*ren*	*chai*	*Le*
	house	BEI	people	demolish	PFV
	'The house was demolished by someone'.				
b.	*chuanghu*	*bei*	*ren*	*za*	*Le*
	window	BEI	people	smash	PFV
	'The window was smashed by someone'.				

Figure 5.40

Under the dynamic analysis, I have provided a characterization of the *bei* construction that not only captures its relationship with topic constructions but also shows how the passive reading is induced by the explicit encoding that the pre-*bei* expression must be interpreted as the internal argument of the verb, hence the interpretation of the construction as a passive. As has been shown earlier, such an analysis directly accounts for both agentive and agentless patterns without further stipulation and without assumption that the morpheme *bei* has more than one single function. To consolidate this analysis, I shall now explore whether it can extend to the problematic patterns discussed in section 1.

4 Problematic patterns

With the successful characterization of the canonical patterns, we now are in a position to deal with the problematic patterns. As introduced in section 5.1, there are three problematic patterns with the *bei* construction, which all effectively involve the 'retention' of an object, something that should not be permissible if in fact, the voice marker identifies an initial expression as the internal argument of the main verb.

4.1 Bei construction with a retained object (BCRO)

4.1.1 The syntax of BCRO

One of the interesting structural properties of *bei* constructions is that in many cases, when the pre-*bei* NP has already occupied the left-peripheral position, another NP can occur in the right-peripheral position as shown in the problematic *bei* sentences such as the ones in Figure 5.3, which are repeated here as Figure 5.41.

In some analyses within traditional and generative grammars, the pre-*bei* NP is termed the 'moved object' and the NP in the object position the 'retained object'. For convenience of discussion, I maintain this terminology despite the differences in analysis and accordingly refer to this pattern as the *bei* construction with a retained object (henceforth BCRO).

Although there appear to be two objects in the examples offered earlier, their status is intuitively quite different. Apparently, what is being talked about

a. *Zhangsan* *bei* *Lisi* *daduan* *le* *tui*.
Zhangsan BEI Lisi break PFV leg
'Zhangsan's leg was broken by Lisi'.
b. *Zhangsan* *bei* *Lisi* *jian* *le* *toufa*.
Zhangsan BEI Lisi cut PFV hair
'Zhangsan's hair was cut by Lisi'.

Figure 5.41

a. *Zhangsan* *bei* *Lisi* *daduan* *le* *tui*, *(ta)* *bu* *neng* *shangban*.
Zhangsan BEI Lisi break PFV leg 3SG not could go to work
'Zhangsan's leg was broken by Lisi and he couldn't go to work'.
b. *Zhangsan* *bei* *Lisi* *jian* *le* *toufa*, *(ta)* *kanqilai* *hen* *jingshen*.
Zhangsan BEI Lisi cut PFV hair 3SG look very smart
'Zhangsan's hair was cut by Lisi and he/*it looked very smart'.

Figure 5.42

a. *Zhangsan* *de* *tui* *bei* *Lisi* *daduan* *Le*
Zhangsan 's leg BEI Lisi break PFV
'Zhangsan's leg was broken by Lisi'.
b. *Zhangsan* *de* *toufa* *bei* *Lisi* *jian* *Le*
Zhangsan 's hair BEI Lisi cut PFV
'Zhangsan's hair was cut by Lisi'.

Figure 5.43

in this pattern is the moved object such as *Zhangsan* in both Figure 5.41a and Figure 5.41b, not the retained object such as *tui* 'leg' in Figure 5.41a or *toufa* 'hair' in Figure 5.41b. This can be confirmed under some discourse circumstances as in Figure 5.42, which contains two juxtaposed clauses where the pronominal in the second one is anaphorically co-referential to the pre-*bei* NP *Zhangsan* in the preceding one.

If the speaker wants to talk about the entity represented by the retained object, s/he would have to produce utterances such as those in Figure 5.43 – the canonical pattern of *bei* constructions where the so-called retained object is fronted and the moved object is made into a nominal modifier.

In terms of the discourse function, there obviously exists a crucial difference between (Figure 5.42), a BCRO pattern where the topic is certainly the moved object *Zhangsan*, and Figure 5.43, a canonical pattern where the topic has obviously shifted to Zhangsan's leg or hair. This fact forces us to rethink the English translations for sentences such as those found in Figure 5.41 because, strictly speaking, they are only pragmatic inferences drawn from the interpretation of the original utterances. To illustrate this point, let us consider one more example (Figure 5.44).

a. *Zhangsan bei Lisi ma le niang, ta feichang qifen*
Zhangsan BEI Lisi curse PFV mother 3SG very furious
'Zhangsan was cursed-mother by Lisi. He/*She was very furious'.

b. *Zhangsan de niang bei Lisi ma le, ta feichang qifen*
Zhangsan 's mother BEI Lisi curse PFV 3SG very furious
'Zhangsan mother was cursed by Lisi. He/She was very furious'.

Figure 5.44

Figure 5.44a also contains two juxtaposed clauses where the pronominal in the second one should be anaphorically co-referential either to the pre-*bei* NP *Zhangsan* or the object NP *niang* in the preceding one if the latter is referential, given the fact that in speech third-person pronouns in Chinese do not make a difference between masculine and feminine. But the construal of the pronoun *ta* as referring to a female is absolutely unacceptable in the context. Direct to the anaphoric reference to the entity denoted by the retained object *niang* is only possible if the problematic pattern is translated into a canonical one as in Figure 5.44b.

This convincingly proves that interpretively, *niang* 'mother' in Figure 5.44a does not refer to any particular mother but a class of female parents, which can also be supported by the fact that the pre-*bei* argument *Zhangsan* can be freely replaced by any noun phrase with the semantic feature [+Human]. If, for instance, Figure 5.44a is translated into English as 'Zhangsan's mother was cursed by Lisi', it is not only far from equivalent but also possibly misleading, for the reason that the translation implies that Zhangsan's mother was the real victim of the relevant event. On the contrary, it is the pre-*bei* NP *Zhangsan* that is the real victim of the mother-cursing event. As for the victim's mother, her affectedness is purely speculative. This point would become clearer if we could create a scenario in which Lisi shouts abuse at Zhangsan such as 'son of a bitch!'

As regards the translation of this problematic pattern, there seems no better way to find an equivalent pattern in English than to give an explanation by paraphrase as shown earlier.[20] The problem with the translation of Figure 5.41 at least shows that *bei* constructions of this type to a large extent allow a pragmatically 'transparent' interpretation, which apparently arises from the special relationship between the retained object and the moved object, as will be discussed later in subsection 4.1.4.

4.1.2 The semantics of the retained object

On closer examination, I find that the properties of the retained object in sentences such as the ones in Figure 5.41, viz. the lack of anaphoric reference and the inability to act as topic of the sentence, are all properties that have been shown to hold incorporated internal arguments in the sense of Zubizarreta (1987), or in the words of Baker (1988, p.1), "one semantically independent

word coming to be 'inside' another". In other words, the verb and the retained object NP combines into a complex verb, which itself has an internal argument – the pre-*bei* constituent. The lack of anaphoric potential for the retained objects is further reflected in the fact that such an expression cannot be overtly referential. This is shown in the impossibility of modifying it with a demonstrative such as *zhe* 'this' or *na* 'that' as in Figure 5.45.

The unacceptability of Figure 5.45 strongly suggests that the postverbal NP in the retained object construction can only be interpreted as referring to a kind and not to some particular individual. Predictably, a nonspecific indefinite or quantified NP is also allowed to occur in the retained object position since neither of them takes reference to any particular entity, as exemplified in Figure 5.46.

The combination of the verb and the retained object is, as a matter of fact, interpreted in the same fashion as the compound verbs such as *ma-ren* (lit. scold-people) 'scold' and *da-ren* (lit. beat-people) 'beat', where the bare NP *ren* is an internal object without any particular reference. Given the well-known fact that Chinese bare nouns can occur in any argument position and can have a variety of interpretations as discussed in chapter 1, the semantic behaviour of the object NP certainly begs one question – that is, why does it only have a restricted reading?

The answer is quite straightforward but illustrates the importance of context on the construction of a special grammatical structure. From the parsing point of view, the pre-*bei* expression or the moved object has already been identified as the internal argument by the voice marker. The NP encountered after the verb cannot, therefore, be the primary object of the verb and so must be a modifier of some kind. In view of this, the reading on the retained object is fact pre-determined. Further evidence for the modificational nature of the retained object comes from the fact that adjunct NPs can also appear in such a pattern, as exhibited in Figure 5.47.

Having spelled out the semantics of the retained object in BCRO, I then ascertain that the pre-*bei* NP or the moved object in this problematic pattern,

a.	*Zhangsan	bei	Lisi	daduan	le	zhe/na-tiao	tui.
	Zhangsan	BEI	Lisi	break	PFV	this/that-CL	leg
b.	*Zhangsan	bei	Lisi	jian	le	zhe/na-cuo	toufa.
	Zhangsan	BEI	Lisi	cut	PFV	this/that-lock	hair

Figure 5.45

a.	*Zhangsan*	*bei*	*Lisi*	*daduan*	*le*	*yi/liang-tiao*	*tui*.
	Zhangsan	BEI	Lisi	break	PFV	one/two-CL	leg
b.	*Zhangsan*	*bei*	*Lisi*	*jian*	*le*	*yixie/xuduo*	*toufa*.
	Zhangsan	BEI	Lisi	cut	PFV	some/many	hair

Figure 5.46

a.	*Zhangsan*	*bei*	*Lisi*	*daduan*	*le*	*yi-hui*	*tui*.
	Zhangsan	BEI	Lisi	break	PFV	one-time	leg
	'Zhangsan's leg was broken once by Lisi'.						
b.	*Zhangsan*	*bei*	*Lisi*	*jian*	*le*	*liang-ci*	*toufa*.
	Zhangsan	BEI	Lisi	cut	PFV	two-time	hair
	'Zhangsan's hair was cut twice by Lisi'.						

Figure 5.47

as in the canonical patterns, is still the patient, yet of the complex predicate leg-breaking in Figure 5.41a or hair-cutting in Figure 5.41b. The interpretation of the sentences in Figure 5.41 should thus rather be "Zhangsan was the object of leg-breaking by Lisi" and "Zhangsan was the object of hair-cutting by Lisi". The pre-determined nature of the semantics of the retained object is another piece of evidence supporting the DS stance stated in chapter 2 that human language processing is context-dependent and the change of context is word by word as well as sentence by sentence.

4.1.3 The active counterpart of BCRO

The reason why I call BCRO one of the problematic patterns should be clear now, since it is more problematic to characterize than the canonical patterns. From the interpretive point of view, the pre-*bei* constituent in this problematic pattern cannot be reconstructed as easily as the one in the canonical patterns where there is clearly a gap in the postverbal object position. For the pattern at issue, there appears to be no place for this so-called moved object to go to since the object position has been already occupied by the retained object. At this point, one may raise a related question, that is, what is the active counterpart of the pattern under discussion given *bei*'s presupposition that the preceding argument is still the patient of the complex predicate?

Although it is an undeniable fact that not all passives can be translated into actives, or vice versa, we are likely to provide an active counterpart for sentences of this problematic pattern. Following the idea of L. Wang (1959) among others that generally a *bei* sentence can be turned into a *ba* sentence, we are able to put passive sentences such as those in Figure 5.43 into active ones with a *ba* construction, as illustrated in Figure 5.48.

This translation rule can also be extended to other puzzling cases of the same pattern, such as *bei* constructions with two numeral phrases, one of which acts as the moved object and the other the retained object. Compare the following passive-active pairs (Figures 5.49 and 5.50).[21]

The translation from *bei* constructions into *ba* constructions at least shows that there is a close relationship between these two types of grammatical structure. It appears that both constructions are chained to the leftward dislocation: the affected object NP is first fronted in the preverbal position, which gives rise

a.	*Lisi*	*ba*	*Zhangsan*	*daduan*	*le*	*tui*.
	Lisi	BA	Zhangsan	break	PFV	leg
	'Lisi broke Zhangsan's leg'.					
b.	*Lisi*	*ba*	*Zhangsan*	*jian*	*le*	*toufa*.
	Lisi	BA	Zhangsan	cut	PFV	hair
	'Lisi cut Zhangsan's hair'.					

Figure 5.48

a.	*wu-ge*	*li*	*bei*	*Lisi*	*chi*	*le*	*san-ge*.
	five-CL	pear	BEI	Lisi	eat	PFV	three-CL
	'Three of the five pears were eaten by Lisi'.						
b.	*Lisi*	*ba*	*wu-ge*	*li*	*chi*	*le*	*san-ge*.
	Lisi	BA	five-CL	pear	eat	PFV	three-CL
	'Lisi ate three of the five pears'.						

Figure 5.49

a.	*jiu-ge*	*miyu*	*bei*	*Lisi*	*caidui*	*le*	*liu-ge*.
	nine-CL	riddle	BEI	Lisi	resove	PFV	six-CL
	'Six of the nine riddles were resolved by Lisi'.						
b.	*Lisi*	*ba*	*jiu-ge*	*miyu*	*caidui*	*le*	*liu-ge*.
	Lisi	BA	nine-CL	riddle	resolve	PFV	six-CL
	'Lisi resolved six of the nine riddles'.						

Figure 5.50

to the *ba* construction, and further fronted in sentence-initial position, which gives rise to the *bei* construction. For immediate purposes, I shall not necessarily provide a detailed discussion of this issue.[22]

4.1.4 The characterization of BCRO

On the basis of the earlier discussion, we are able to formalize the pattern at issue by encoding the idea that the so-called moved object NP is still the patient argument of the main predicate, exactly the complex predicate. What is crucial to the characterization of this problematic pattern is of course the parsing of its complex verb. Consider the analysis of Figure 5.3a *Zhangsan bei Lisi daduan le tui*. The first three words in the string are parsed as we have seen before: the left-dislocated NP 'Zhangsan' decorates an unfixed node with type and formula information, the voice particle *bei* imposes locality restrictions on this node and *Lisi* is analyzed as the subject. Then the verb *daduan* 'break' is parsed, whose lexical entry for the verb *daduan* 'break' can be defined as follows in Figure 5.51.

The treatment of the verb *daduan* 'break' as projecting an unfixed node in the context of Figure 5.3a reflects the psychological reality that the hearer is in

The lexical entry for *daduan*

IF	?Ty(e → t)
THEN	make(⟨↓$_*$⟩); go(⟨↓$_*$⟩); put(Ty(e* → (e → (e → t))); Fo(Daduan′)); go(⟨↑$_*$⟩); make(⟨↓$_1$⟩); go(⟨↓$_1$⟩); put(Ty(e → (e → t))); go (⟨↑$_1$⟩); make (⟨↓$_0$⟩); go (⟨↓$_0$⟩); put (?Ty(e))
ELSE	ABORT

Figure 5.51

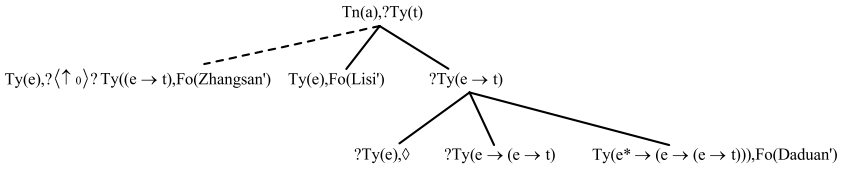

Figure 5.52 Parsing *Zhangsan bei Lisi daduan le*

a wait-and-see state. In other words, psychologically, there is justification for such a treatment of the verb: when the verb is accessed, the hearer immediately knows that the verb must be followed by something else, because it cannot semantically select the pre-*bei* patient NP as its internal argument; otherwise, it would give rise to a logical formula *Daduan'(Zhangsan')*, which is pragmatically anomalous. Subsequent to the parse of the verb, general construction rules then create the internal argument and two-place predicate nodes as previously and the unfixed node merges with the former position, necessarily satisfying the locality requirement, as shown in Figure 5.52.

Subsequent to the fixing of the unfixed node, general construction rules unfold two further subrequirements to allow for the parse of the retained object NP *tui* 'leg'. The pointer then moves to the functor node with which the unfixed predicate node merges since there is no further input. The verbal underspecification is finally resolved as Ty(e → (e → (e → t))), as shown in Figure 5.53, where the tree will be completed to yield a complete propositional formula *Fo(Daduan')(Tui')(Zhangsan')(Lisi')*.

The dynamic analysis can be straightforwardly extended to other puzzles of the same pattern. The interpretation of the *bei* construction with two numeral phrases such as Figure 5.49a, for example, can be represented in a tree as in Figure 5.54, where there is no outstanding requirement.[23]

For a complete success of the characterization of BCRO, there is nonetheless a great need to generalize the relationship between the so-called moved object and the retained object. It has been generally agreed that the relation between the two objects is not random, but confined to possessor-possessee as in Figure 5.34, kinship as in Figure 5.37 and part-whole as in Figure 5.49. On the basis of this observation, A. Li (1990) proposes that the relationship between the two NPs can be schematized as NP_2+de+NP_1, where NP_1 is the

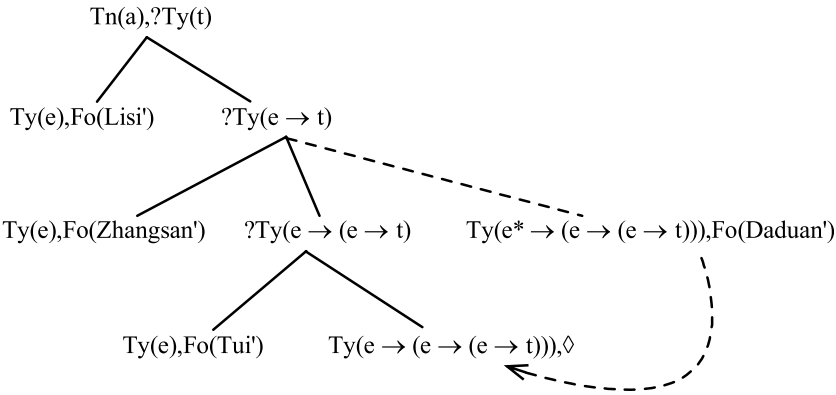

Figure 5.53 Parsing *Zhangsan bei Lisi daduan le tui*

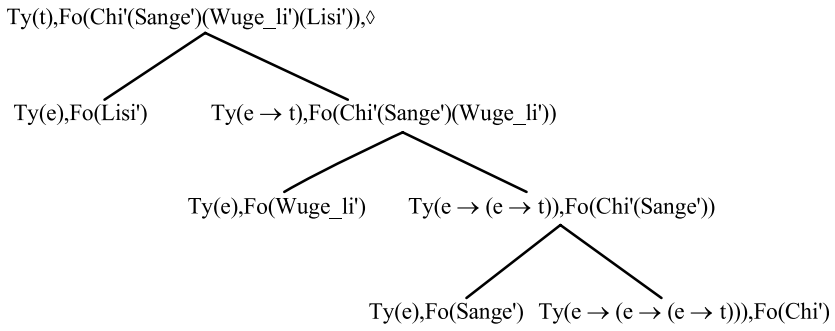

Figure 5.54 Parsing *wu-ge li bei Lisi chi le san-ge*

retained object and NP_2 the moved object. This generalization, as pointed out by Shi (1997) among other authors, is too restrictive to be accurate. Consider the following examples where the two objects cannot be expressed in the form formulated by A. Li (Figure 5.55).

The relationship between the two NPs is another manifestation of BCRO's problematic facets. What appears to be happening is that a weak relation between the retained and moved objects is derived from the concept denoted by the predicate or complex predicate. Precisely, their bilateral relation can only be established vis-à-vis their unilateral relation with the verb or complex verb: the retained object in any case is subject to the selectional restriction of the verb, while the moved object in any case is subject to the selectional restriction of the complex verb composed of the verb and the retained object (cf. Shi 1997). In a sense, the relation between the moved object NP and the retained object NP is similar to the aboutness relation discussed in the preceding chapter: the former as a given term sets the context in which the latter has to be related to it. This generalization does capture the interactive relation between the two NPs.

a. *na-kuai* *bu* *bei* *ta* *zuo* *le* *yitiao* *kuzi.*
that-CL cloth BEI 3SG make PFV one-CL trousers
'The cloth was made into a pair of trousers by him'.
b. **na-kuai* *bu* *de* *yitiao* *kuzi* *bei* *ta* *zuo* *le*
that-CL cloth 's one-CL trousers BEI 3SG make PFV
(L. Li 1980)
c. *yifu* *bei* *huo* *shao* *le* *yi-ge* *kulong.*
clothes BEI fire burn PFV one-CL hole
'The clothes were burned a hole by fire'.
d. **yifu* *de* *yi-ge* *kulong* *bei* *huo* *shao* *le*
clothes 's one-CL hole BEI fire burn PFV
(Li 1980)

Figure 5.55

a. *Zhangsan* *bei* *Lisi* *ba* *tui* *daduan* *le* *yi-tiao*.
Zhangsan BEI Lisi BA leg break PFV one-CL
'One of Zhangsan's legs was broken by Lisi'.
b. *Zhangsan* *bei* *Lisi* *ba* *toufa* *jian* *le* *yi-cuo*.
Zhangsan BEI Lisi BA hair cut PFV one-lock
'One lock of Zhangsan's hair was cut by Lisi'.

Figure 5.56

4.2 Bei construction with an embedded ba construction (BCBC)

We now turn to another *bei* construction involving an embedded *ba* construction and show how we can adapt the analysis of the canonical patterns to account for this problematic pattern as well. Differently from BCRO where there is an object in the postverbal position, BCBC has an object marked by *ba* in the preverbal position, as illustrated in Figure 5.4, which is repeated as Figure 5.56.

Before we tackle this problematic pattern, we have to provide a preliminary analysis of *ba* constructions within the DS framework.

4.2.1 Ba construction

Unlike *bei*, there has generally been a consensus on the grammatical function of *ba*; i.e., it is a meaningless marker of fronted object since the post-*ba* NP is usually the direct object of the verb, as exemplified in Figures 5.57 and 5.58.

Compared with their counterparts in the canonical sentences, the post-*ba* noun phrases in *ba* sentences are dislocated preverbally, albeit very locally. Therefore, it is reasonable to analyze the post-*ba* NP as projecting an unfixed node. Since this possibility is induced by parsing *ba*, we may assume that it is the lexical actions of this morpheme that construct an unfixed node within the predicate structure, as in Figure 5.59.[24]

a. *Zhangsan* *ba* *fangzi* *mai* *le*.
Zhangsan BA house sell PFV
'Zhangsan sold the/his house'.
b. *Zhangsan* *mai* *le* *fangzi*.
Zhangsan sell PFV house
'Zhangsan sold the/his house'.

Figure 5.57

a. *Zhangsan* *ba* *qiche* *diu* *le*
Zhangsan BA car lose PEV
'Zhangsan lost the/his car'.
b. *Zhangsan* *diu* *le* *qiche*.
Zhangsan lose PFV car
'Zhangsan lost the/his car'.

Figure 5.58

Lexical entry for *ba*

IF	?Ty(e → t)	
THEN	IF	⟨↓∗⟩⊥
	THEN	make(⟨↓∗⟩); go(⟨↓∗⟩); put(?Ty(e), ?⟨↑0⟩Ty(e → t), ?∃x.Tn(x))
	ELSE	ABORT
	ELSE	ABORT

Figure 5.59

a. **Zhangsan* *mai* *le* *ba* *fangzi*.
Zhangsan sell PFV BA house
b. **Zhangsan* *diu* *le* *ba* *qiche*.
Zhangsan lose PFV BA car

Figure 5.60

The actions of *ba* project an unfixed node with a type *e* requirement just in case there is nothing else within the predicate domain at this point of parse. This is to ensure that the verb has not been yet parsed, thus accounting for the ungrammaticality of sentences such as the ones in Figure 5.60.

One may suggest that *ba* should project a fixed node rather than an unfixed one, since the unfixed object node is local. The analysis of the object marker as projecting a fixed node (i.e., make-go-put ⟨↓0⟩) would have a problem with the following data in which a predicate adverb can occur between the *ba*-marked object NP and the main verb that is analyzed throughout the book as being invariably triggered by a one-place predicate node ?*Ty(e → t)*.

Zhangsan	*ba*	*Lisi*	*yansudi*	*piping*	*le*	*yidun*.
Zhangsan	BA	Lisi	seriously	criticize	PFV	once

'Zhangsan seriously criticized Lisi once'.

Figure 5.61

wo	*ba*	*na-ben*	*shu*	*renzhendi*	*du*	*guo*	*liangbian*
1SG	BA	that-CL	book	carefully	read	EXP	twice

'I have carefully read the book twice'.

Figure 5.62

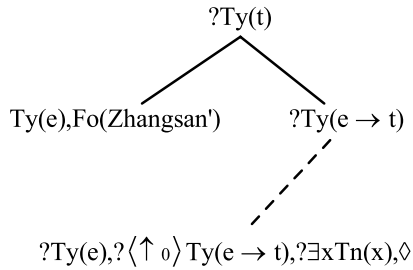

Figure 5.63 Parsing *Zhangsan ba*

So it is reasonable to treat the fronted object marker *ba* as projecting an unfixed node, although fairly local. Furthermore, as with the *bei* construction, there is a restriction on the final position of the unfixed node to be the argument daughter of the predicate node. The parse of a sentence such as Figure 5.57a, therefore, is quite straightforward. The subject and predicate nodes are created and the subject is then parsed, leaving the pointer at the open predicate requirement. At this point, *ba* is parsed to give a structure shown in Figure 5.63.

The pointer is now at a node with a requirement for a type *e* expression and so the post-*ba* object NP can be processed. After the unfixed node is developed, the pointer moves back to the functor node. This allows the verb to be parsed, which results in the projection of an unfixed predicate node. Then through the general construction rules, the construction of an argument and two-place predicate nodes takes place. The unfixed Ty(e) node merges with the argument position, as shown in Figure 5.64.

If there is further lexical input such as *yi-ban* 'half' after the verb as in *Zhangsan ba fangzi mai le yi-ban*, the three-place predicate node would have two further requirements. In the case of Figure 5.57a, the unfixed predicate node merges with the functor node, resolving the verb's type underspecification. Completing the semantic tree ultimately yields a full propositional formula as *Mai'(Fangzi')(Zhangsan')*.

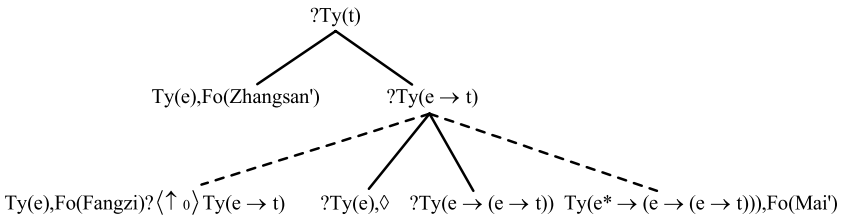

Figure 5.64 Parsing *Zhangsan ba fangzi mai le*

a.	*Zhangsan*	*ba*	*qiche*	*jia*	*le*	*you*.
	Zhangsan	BA	car	add	PFV	petrol
	'Zhangsan refilled the/his car'.					
b.	*Zhangsan*	*chang*	*ba*	*lang*	*dangzuo*	*gou*.
	Zhangsan	often	BA	wolf	take-for	dog
	'Zhangsan often takes wolves for dogs'.					

Figure 5.65

4.2.2 Ba construction with a retained object

As has been noticed by a number of linguists (e.g., L. Wang 1959; C. Li and Thompson 1981), there is a parallelism in many regards between *ba* constructions and *bei* constructions, which may account for why passive sentences of the pattern BCRO can be translated into active ones with a *ba* construction, as illustrated in subsection 4.1.3. *Ba* sentences parallel *bei* sentences at least in two aspects. Syntactically, *ba* constructions, just like *bei* constructions, can also have a noun phrase in the postverbal object position, as demonstrated in Figure 5.65.

Semantically, the post-*ba* NP in the two sentences of Figure 5.65, just like the pre-*bei* NP, is subject to the selectional restrictions of the complex verb formed from the verb plus the following NP. The resulting sentences would be anomalous if the post-*ba* NPs *che* 'car' and *lang* 'wolf' are replaced by, say, *shouji* 'mobile phone' and *niao* 'bird', respectively, because the mobile phone does not need refilling and the class 'birds' does not resemble the class 'dogs'.

In addition, as C. Li and Thompson (1981) point out, there is a semantic constraint on the interpretation of the post-*ba* noun phrase; namely, it can either have a referential reading as shown in the English translation of Figure 5.65a or a generic reading as shown in the English translation of Figure 5.65b. Furthermore, the postverbal or retained object NP in this complex pattern of *ba* construction, just like its counterpart in the problematic pattern of *bei* construction addressed in the preceding subsection, is usually interpreted as referring to a kind, as *you* 'oil' in Figure 5.65a. Sentences of the same sort can also take an adjunct phrase, as shown in Figure 5.66.

a.	*Zhangsan*	*ba*	*qiche*	*jia*	*le*	*yi-hui*	*you*.
	Zhangsan	BA	car	add	PFV	one-time	petrol
	'Zhangsan refilled the/his car once'.						
b.	*Lisi*	*ba*	*meigui*	*jiao*	*le*	*san-bian*	*shui*.
	Lisi	BA	rose	pour	PFV	three-time	water
	'Lisi watered the roses three times'.						

Figure 5.66

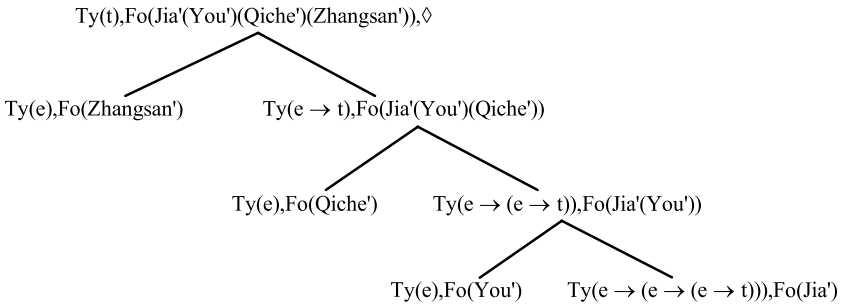

Figure 5.67 Completing the parse of *Zhangsan ba qiche jia le you*

As for the characterization of *ba* construction with a retained object, presumably it is in the same fashion as the canonical *ba* construction. Figure 5.67 shows that the parse of Figure 5.65a is completed, resulting in the annotation of the root node with a complete propositional formula *Jia'(You')(Qiche')(Zhangsan')*.

After a fruitful exploration of *ba* constructions, let us now return to the analysis of *bei* constructions containing a *ba* construction (BCBC). Presumably, the characterization of this pattern would be more problematic than the one we have tackled in subsection 4.1. However, the successful characterization of BCRO and the relevant *ba* construction should provide some insights into the analysis of BCBC. It goes without saying that what is crucial in the parse representation of this pattern is the parse of the *ba* construction. In light of the work I have done so far, I assume that the *ba* construction embedded within the *bei* construction must be subject to the twofold restrictions (see L. Wang 1959 for a detailed discussion). Specifically, on the one hand, it is constrained by its own rule that a *ba* construction normally requires the presence of the agent NP, which explains why the following *bei* sentences are ungrammatical (Figure 5.68).

On the other hand, it is constrained by the rule of *bei* constructions that the retained object NP does not have a particular reference because of *bei*'s grammatical function as discussed in subsection 4.1, which explains why the following *bei* sentences are ill formed (Figure 5.69):

a.	**Zhangsan*	*bei*	*ba*	*tui*	*daduan*	*le*	*yi-tiao*.
	Zhangsan	BEI	BA	leg	break	PFV	one-CL
	'One of Zhangsan's legs was broken'.						
b.	**Zhangsan*	*bei*	*ba*	*toufa*	*jian*	*le*	*yi-cuo*.
	Zhangsan	BEI	BA	hair	cut	PFV	one-lock
	'One lock of Zhangsan's hair was cut'.						

Figure 5.68

We have, in the preceding subsection, characterized *ba* as requiring the term projected by its following NP to be analyzed as the internal argument of the main predicate. DS by its dynamic nature, however, allows different actions to be triggered in different contexts, in particular the context provided by the

a.	**Zhangsan*	*bei*	*Lisi*	*ba*	*zhe-tiao*	*tui*	*daduan*	*le*.
	Zhangsan	BEI	Lisi	BA	that-CL	leg	break	PFV
	'Zhangsan had that leg of his broken by Lisi'.							
b.	**Zhangsan*	*bei*	*Lisi*	*ba*	*na-cuo*	*toufa*	*jian*	*le*.
	Zhangsan	BEI	Lisi	BA	that-lock	hair	cut	PFV
	'Zhangsan had that lock of his hair cut by Lisi'.							

Figure 5.69

partial tree representing the content of the string at a certain point. When *ba* occurs in a string containing *bei*, at the point at which the former expression is parsed, the hearer already knows that the internal argument position is to be occupied by the term projected by the pre-*bei* expression. Any interpretation of the post-*ba* expression as occupying the same position is thus unlikely to be entertained. To achieve this effect, we can revise the lexical entry for the *ba* in this problematic pattern as follows (Figure 5.70):

The extra clauses here cause a check to see whether there is a node dominated by the top node, which carries an unsatisfied requirement to be the

IF ?Ty(e → t)

THEN IF ⟨↓$_*$⟩⊥

THEN IF ⟨↑$_1$⟩⟨↑$_*$⟩⟨↓$_*$⟩ ?⟨↑$_0$⟩Ty(e → t);

THEN make(⟨↓$_*$⟩); go(⟨↓$_*$⟩); put (?Ty(e), ?⟨↑$_0$⟩Ty(e → (e → t)), ?∃x.Tn(x));

ELSE make(⟨↓$_*$⟩); go(⟨↓$_*$⟩); put (?Ty(e), ?⟨↑$_0$⟩Ty(e → t), ?∃x.Tn(x));

ELSE ABORT

ELSE ABORT

Figure 5.70

internal argument of a predicate, shown as $\langle\uparrow_1\rangle\langle\uparrow_*\rangle\langle\downarrow_*\rangle ?\langle\uparrow_0\rangle Ty(e \rightarrow t)$, which reads as 'my immediately dominating node dominates a node with an internal argument requirement'. In this context, a requirement is added to the projected unfixed node that it must be dominated by a two-place predicate node shown as $?\langle\uparrow_0\rangle Ty(e \rightarrow (e \rightarrow t))$. In any other context, the unfixed node is dominated by a one-place predicate. So it is only in BCBC sentences that a post-*ba* NP will be interpreted as providing the content for an indirect object. This successfully accounts for the unacceptability of the string in Figure 5.71a, where *Zhangsan* cannot be construed as the indirect object of the verb and *tui* cannot be the direct object. Compare with the grammaticality of Figure 5.71b, with a pronoun in possessor position and *Zhangsan* construed as a true topic.[25]

Given the revision of the actions induced by parsing *ba*, an analysis of the sentence in Figure 5.56a *Zhangsan bei Lisi ba tui daduan le yitiao* should be fairly straightforward. Parsing the first five words gives rise to a partial tree in Figure 5.72, following the analysis already specified.

After the post-*ba* NP *tui* is parsed, the pointer moves back to the functor node. The parse then continues with the verb *daduan* projecting an unfixed predicate node, followed by unfolding the fixed argument and functor nodes dominated by the predicate node. At this point, the unfixed node decorated by *Fo(Zhangsan')* merges with the internal argument node, as shown in Figure 5.73.

Subsequent to the fixing of the unfixed node projected by the pre-*bei* NP, the pointer moves to the two-place predicate node which has further requirements for a three-place predicate and a term. The unfixed node decorated by *Fo(Tui')* merges with the latter position, satisfying its locality requirement, as shown in Figure 5.74.

Subsequent to the fixing of the unfixed ty(e) node projected by the post-*ba* NP, the pointer moves to the three-place predicate node, which is further

a.	**Zhangsan*	*Lisi*	*ba*	*tui*	*daduan*	*le.*		
	Zhangsan	Lisi	BA	leg	break	PFV		
b.	*Zhangsan*	*Lisi*	*ba*	*ta*	*de*	*tui*	*daduan*	*le.*
	Zhangsan	Lisi	BA	he	's	leg	break	PFV
	'Zhangsan, Lisi broke his leg'.							

Figure 5.71

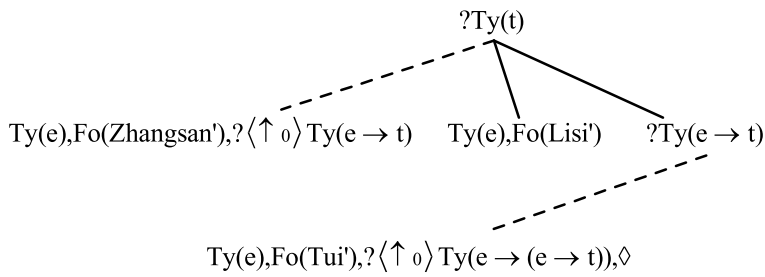

Figure 5.72 Parsing *Zhangsan bei Lisi ba tui*

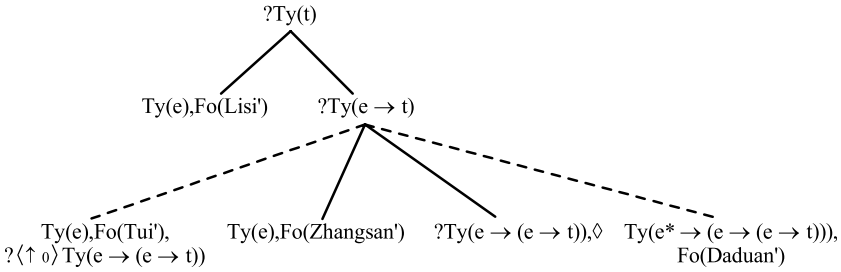

Figure 5.73 Fixing the unfixed node projected by the pre-*bei* NP

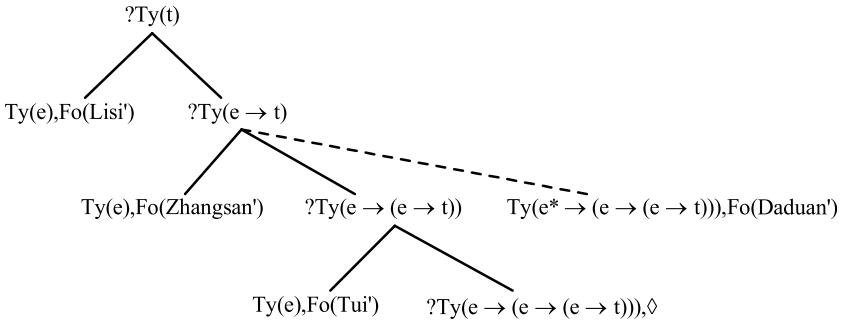

Figure 5.74 Fixing the unfixed node projected by the post-*ba* NP

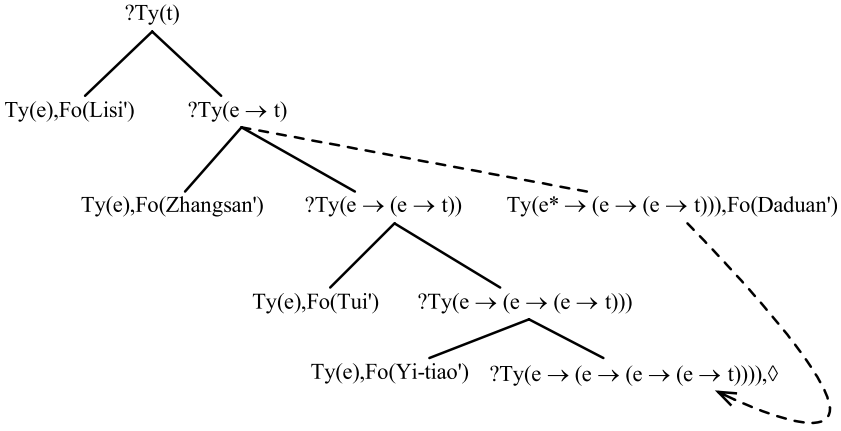

Figure 5.75 Fixing the unfixed predicate node

elaborated with another pair of argument and functor nodes. What comes next as input is the indefinite pronoun *yi-tiao* 'one', which satisfies the argument type requirement. Since there is no further input, the unfixed predicate node merges with the four-place predicate node, as in Figure 5.75.

The tree complies to give the formula value *Daduan'(Yitiao')(Tui')(Zhangsan')(Lisi')*, showing a hierarchy among the argument nodes. With the addition of each argument, the predicate becomes more and more complex: first, the verb semantically selects the rightmost argument, the postverbal indefinite pronoun and combines with it to form a complex predicate which then semantically selects the post-*ba* object NP as its argument, which in turn combines with the complex predicate to form another complex predicate, which once again selects an argument – the pre-*bei* patient NP – as its internal argument, which in turn combines with the more complex predicate to form a much more complex predicate which finally selects the agent NP as its argument. I do not here go into the details of this propositional structure, but the discussion of the general interpretation of *bei* and *ba* constructions noted earlier provides the core of the analysis.

4.3 Bei construction with a locative patient (BCLP)

Finally, we turn to another problematic pattern of *bei* constructions, which are different from the two problematic patterns addressed in subsections 4.1 and 4.2, as a locative phrase fronted prior to the voice marker *bei*, as has been already seen in Figure 5.5, which is repeated as Figure 5.76.

If we treat the locative expression *men shang* 'on the door' and *hu li* 'in the lake' as an adjunct phrase as in traditional grammar, we may face a theoretical problem because, in principle, the pre-*bei* constituent is analyzed as projecting a node with a requirement for a type *e* expression, as we did in all the analyses of *bei* constructions of various patterns, canonical or problematic. To provide a principled account of *bei* constructions, we are required to reconsider the traditional distinction between arguments and adjuncts.

4.3.1 PP as arguments

For immediate purposes, I shall limit the discussion here to the argument-like properties of prepositional phrases. The issue of argument-adjunct dichotomy certainly involves the traditional notion of subcategorization that entails a distinction between arguments, which are defined as obligatory because they are subcategorized, thus necessarily expressed nominal expressions which are in a strict relationship to the verb, and adjuncts, which are defined as optional because they unobligatorily add further information about time, place, purpose

a.	*men*	*shang*	*bei*	*haizimen*	*wa*	*le*	*yi-ge*	*dong*.
	door	on	BEI	children	dig	PFV	one-CL	hole
	Lit. 'On the door was dug-a-hole by the children'.							
b.	*hu*	*li*	*bei*	*cunminmen*	*yang*	*le*	*henduo*	*eyu*.
	lake	in	BEI	villagers	raise	PFV	many	crocodile
	Lit. 'In the lake was raised-many-crocodiles by the villagers'.							

Figure 5.76

and manner and so on. Morphologically, arguments tend to be marked with nominative and accusative case in some inflectional languages, while adjuncts are often introduced by a preposition or marked as adverbs in many languages.

However, as has been briefly discussed in chapter 2, the distinction between arguments and adjuncts, which may have been useful as a rough-and-ready criterion, is not as clear as that implied by such a strict subcategorization. As has been observed and discussed by a lot of researchers (e.g., McConnell-Ginet 1982; Chierchia 1989; Grimshaw 1990; Jackendoff 1990; Hukari and Levine 1995), adjuncts sometimes behave in the same fashion as arguments. In the English examples that follow (Figure 5.77), the prepositional phrases in Figure 5.77a–b appear to be obligatory arguments of the predicate and are hence generally analyzed as direct complements of the predicate whose lexical semantics selects the particular preposition and those in Figure 5.77c–d seem to have a strong connectivity with the predicate, though they are optional.

As has been discussed in chapter 3, there is also ample cross-linguistic evidence that adjuncts have their case overtly marked in the same manner as arguments (e.g., Maling 1989, 1993; Andrews 1990; Kim and Maling 1993; Wechsler and Lee 1996). In case-marking languages such as Finnish and Korean, for instance, some adverbial expressions, which may be corresponding to prepositional phrases in English, are on a par with noun phrases in terms of case assignment.

a. The singer put the flowers onto the floor.
b. The footballer resides in the lake district.
c. The squirrel ran to the castle.
d. The cat pushed the ball to me.

Figure 5.77

a.	*Kansa*	*luotti*	*Kekkoseen*	*vuoden*.	
	People-NOM	trust-PST-3SG	Kekkoseen-ACC	year-ACC	
	'People trusted Kekkoseen for a year'.				
b.	*Mina*	*luen*	*kirjan*	*kolmannen*	*kerran*.
	I(NOM)	read	book-ACC	third	time-ACC
	'I read the book for a third time'.				

Figure 5.78

a.	*Tom-i*	*twu*	*sikan-tongan-ul*	*tali-ess-ta*.
	Tom-NOM	two	hours-period-ACC	run-PST-DEC
	'Tom ran for two hours'.			
b.	*Tom-i*	*isip*	*mail-ul*	*tali-ess-ta*.
	Tom-NOM	twenty	miles-ACC	run-PST-DEC
	'Tom ran twenty miles'.			
	(Maling 1993)			

Figure 5.79

Given the fact that sometimes adjuncts such as prepositional phrases behave in the same fashion as arguments, both semantically and syntactically, it seems inappropriate to analyze the PP as having the type of a predicate modifier. Therefore, we may reasonably assume that it is behaving like a term and hence can be analyzed as a Ty(e) expression. The main idea is that dynamically verbs structurally underspecify the number of Ty(e) expressions, including both NPs and PPs with which they may combine to form a verb phrase.

4.3.2 The characterization of BCLP

We now return to the analysis of the problematic pattern at issue. As indicated earlier, a prepositional (or postpositional phrase) phrase can be considered as some expression of type *e*. The locative phrase prior to the voice marker *bei* therefore gives rise to a Ty(e) expression, which is completely consistent with the account of other patterns of *bei* construction. The parsing strategy employed in interpreting this type of *bei* sentences is intrinsically the same as that used to tackle the problematic patterns BCRO and BCBC: (i) the PP initially projects an unfixed node with a specific positional requirement, $?\langle\uparrow_0\rangle Ty(e \rightarrow t)$ and (ii) the unfixed node finally merges with the internal argument position of the predicate.

Given the previous discussion, an analysis of the *bei* sentence in Figure 5.76a *men shang bei haizimen wa le yige dong* should also be straightforward. Parsing the first four words yields a tree structure as in Figure 5.80, where the pre-*bei* locative projects an unfixed argument node and the verb an unfixed predicate node, and after the unfolding of a pair of nodes, the former merges with the argument node, satisfying its locality requirement.

Then the parse continues with the further elaboration of the two-place predicate with another pair of argument and functor nodes. What comes as input is the noun phrase *yi-ge dong* 'one hole', which satisfies the argument type requirement. Since there is no further lexical information, the unfixed predicate node merges with the three-place predicate node, thereby resolving its type underpsecification. Compilation of the tree yields a propositional formula annotating the top node of the tree as in Figure 5.81.

With the pre-*bei* PP analyzed as a Ty(e) expression, BCLP is formalized in the same fashion as BCRO and BCBC. Thus a principled account of *bei* constructions is provided.

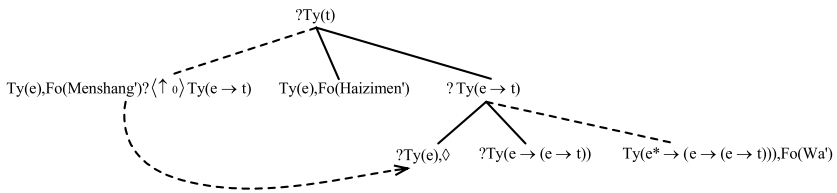

Figure 5.80 Parsing *men shang bei haizimen wa (le)*

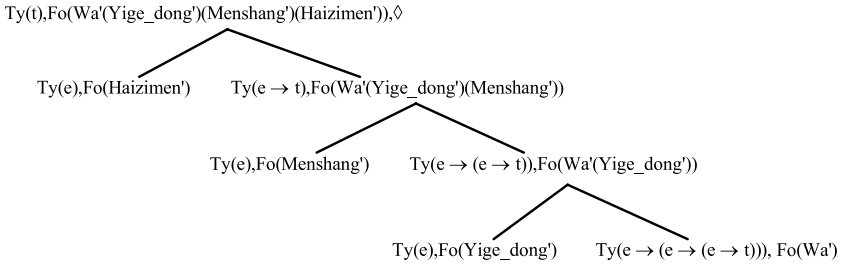

Figure 5.81 Completing the parse of (76a)

5 Summary

On the basis of a detailed examination of the basic facts about *bei* constructions, I have shown that syntactic, semantic and pragmatic information interacts in the formation and interpretation of this special grammatical structure. I have argued that unlike its variants *rang*, *jiao* and *gei*, which can still be employed as verbs with independent meanings, the morpheme *bei* has been grammaticalized from a lexical category into a functional category, precisely a voice particle that consistently signals that the preceding argument is the passive recipient of the action. By virtue of this peculiar function, *bei* has been uncontroversially regarded as the marker of passives, although it is very controversial when it comes to the question of what this marker really is. From the typological point of view, *bei* constructions as passives can be classed as pragmatic voice because of the nature of its pragmatic salience; from the functional point of view, *bei* constructions basically share certain similarities with topic constructions both in syntax and semantics.

Technically, I have attributed the *bei* construction to left-peripheral phenomena, and have defined a principled approach in terms of the linked structure into which an unfixed node can be introduced. Specifically, the pre-*bei* constituent as a left-dislocated argument invariably projects an unfixed node with a locational requirement, and it is linked onto a type-*t*-requiring structure. Under the dynamic approach, I have successfully characterized the structural properties of *bei* constructions of various patterns in a straightforward way, unlike other analyses in which arbitrary stipulations have often been made in a costly way. The successful characterization of this grammatical construction has demonstrated how syntax, semantics and pragmatics go hand in hand in the interpretive process of natural language.

Notes

1 The terms ‘agent’ and ‘patient’ are used throughout this book in the sense of Andrews (1985, p.68), who defines the former as “a participant which the meaning of the verb specifies as doing or causing something, possibly intentionally”, and the

latter as "a participant which the verb characterizes as having something happen to it, and as being affected by what happens to it".

2 There are another two patterns of *bei* sentences mentioning. One is illustrated as in (i)–(ii), where a well-formed object clause occurs before the morpheme *bei*. The other is exhibited as in (iii)–(iv), where the *bei* sentence appears to be a pivotal construction – a subtype of a serial verb construction.

(i)	*Zhangsan*	*he*	*jiu*	*(zhe-jian shi)*	*bei*	*Lisi*	*faxian le*.	
	Zhangsan	drink	wine	this-CL matter	BEI	Lisi	find	PFV
	'That Zhangsan drank wine was found by Lisi'.							
(ii)	*Lisi*	*tao-xue*	*(na-jian shi)*		*bei*	*mama*	*zhidou*	*le*.
	Lisi	play-truant	that-CL matter		BEI	mum	know	PFV
	'That Lisi played truant was known by his mother'.							
(iii)	*Zhangsan*	*bei*	*taitai*	*bizhe*	*jie*	*le*	*jiu*.	
	Zhangsan	BEI	wife	force	swear	off	PFV	wine
	'Zhangsan was forced to swear off drinking by his wife'.							
(iv)	*Lisi*	*bei*	*laoban*	*pai*	*dao*	*nanfang*	*gongzuo le*.	
	Lisi	BEI	boss	send	to	south	work	PFV
	'Lisi was sent by his boss to the south to work'.							

Although I have not addressed them in this chapter, the dynamic analysis of the five typical patterns can be extended to them.

3 In this regard, Lü et al.'s treatment of *bei* as a helping particle is very close to the inflection hypothesis made by Goodall (1992), who claims that *bei* should be treated as the realization of the inflection feature 'passive', and its function is to mark a passive sentence, analogous to that of the English passive morpheme *–en*. Goodall's analysis is not discussed here since it is less popular than the three reviewed. Its lack of popularity, I suppose, is due to the impossibility of *bei* having an inflection feature, given the well-known fact that Chinese is not an inflectional language.

4 Shi (1997) attributes the so-called two *bei*s to the phenomenon of haplology. His explanation is that, "every passive sentence is marked with the passive morpheme *bei*. If the agent NP is also present, it appears in an adjunct phrase headed by the preposition *bei*. When two *bei*s occur in the same sentence, the second *bei* is deleted by the process of haplology" (p.49). This is apparently a special stipulation, given that the 'change' of *bei*'s status in 'different' positions has no syntactic motivation, which is pointed out by Hashimoto (1987) and admitted by Shi himself (p.46).

5 Because its presence determines the grammatical voice of the whole sentence, *bei* cannot be left out together with the pre-*bei* patient argument when the latter is omitted in a proper context, as demonstrated in Figure 5.12b.

6 Sentences of this type are not my concern, but they constitute evidence that Chinese passives are formed in such a way that in a sense a patient interpretation of the pre-*bei* constituent overlays a topic structure with the pre-marker NP functioning as the topic of *bei* sentences.

7 It should be pointed out that although all the authors listed here treat *bei* as a verb, they take different approaches. Hashimoto takes the non-movement approach as presented here, whereas Tan adopts lexical-functional grammar, and Ting and J. Huang the government-binding framework. Also, it should be noted that some authors' analyses are inconsistent in their relevant work. For instance, J. Huang (1988) argues for the dual function analysis, J. Huang (1993) among other papers treats *bei* as a preposition on a par with the English preposition *by* and

J. Huang (1999) is against the prepositional analysis and for the verb analysis of *bei* instead.

8 The articulation of *bei* as a function word would certainly require another chapter. However, a brief introduction to *bei*'s grammaticalization process should be of some help to the clarification of the issue under discussion. According to L. Wang (1989, p.279), the appearance of *bei* constructions may be dated back to the end of the Warring Periods (475–221 B.C.), where *bei* is used as a verb meaning the same as those verbs such as *zaoshou* and *mengshou* 'receive', and where there is no agent NP after the verb *bei*. This usage had lasted until the Han dynasty (206 BC–AD 220):

(i) *jin* *xiongdi* *bei* ***qin***. (Hanfeizi)
now brother BEI attack
(L. Wang 1989, p.279).

Around the end of the Han dynasty, *bei* constructions see the optional appearance of the agent NP, which is placed after *bei* and before an objectless verb.

(ii) *Liangzi* *bei* ***Su*** ***Jun*** ***hai***. (Shishuoxinyu)
Liangzi BEI Su Jun kill
(L. Wang 1989, p.281).

In the Tang dynasty (AD 618–907), *bei* sentences see a new pattern – i.e., *bei* construction with a retained object, where an NP appears in the postverbal position and where the aspect marker *zhe* clearly proves that *bei* has lost its verbal properties, different from *ai* and *zaoshou* 'receive', which take a nominalized complement clause where the verb is disallowed to take any aspect markers.

(iii) *niangzi bei* ***wang lang*** ***dao zhe*** ***choumao***. (Chounuyuanqibianwen)
lady BEI Wang Master say DUR ugly face
(L. Wang 1989, p.282).

In the Song (960–1279) and Yuan dynasties (1279–1368) following Tang, *bei* constructions see new developments in that the morpheme *bei* could appear in sentence-initial position, emphasizing the adversity subsequent to the relevant action. This pattern, albeit rarely used in Modern Chinese, provides convincing evidence that *bei* is not likely to be a preposition.

(iv) *bei* ***ni*** ***sha*** ***le*** ***si-zhi*** ***laohu***. (Shuihuzhuan)
BEI you kill PFV four-CL tiger
(L. Wang 1989, p.285).

The boldface in the aforementioned examples shows that the post-*bei* constituent has been gradually enriched from a single verb to an objectless clause and finally to a complete clause. These facts have undoubtedly demonstrated that the word *bei* has gradually lost its lexical semantics and assumed the grammatical characteristics of a function word.

9 Although it seems outside the purview of this inquiry to seek an answer to a very interesting question as to why the sentences with these variants are also used and considered passives, a few words should be useful to help understand the nature of

bei constructions. The interpretation of the *rang, jiao* and *gei* sentences as passives, I suppose, is essentially a pragmatic matter. Intuitively, sentences such Figure 5.20a appear to emphasize the point that the patient is not good enough (e.g., careful, clever) to become a victim or passive recipient of the stealing event, since s/he does give the thief a chance to steal his or her money, albeit not on his or her own initiative.

10 It is worth mentioning the analysis of LaPolla (1989) who argues that *bei* is a patient-focus disposal marker. This treatment cannot explain why a patient marker is not left out together when the marked patient is omitted, as shown in Figure 5.12b, so it is more reasonable to analyze it as a voice particle with a special grammatical function, since it really determines the grammatical voice of the sentence, as mentioned in footnote 5. The advantage of treating *bei* as a voice marker rather than just a patient-focus marker is quite obvious: as will be shown later in the tree displays, the trigger for this passive morpheme is invariably a *Ty(t)*, which is in accordance with the fact that it is responsible for the grammatical voice of the whole sentence.

11 My treatment of *bei* as a voice particle which consistently assigns the patient role to the pre-*bei* NP and highlights its affectedness, I think, is diachronically justified as far as the original function of *bei* as a verb is considered. As is illustrated in footnote 8, when originally used as a verb, *bei* constructions always see the occurrence of an NP with a patient status in the pre-*bei* position, but not an agent NP in the post-*bei* position. It is about 400 years later that *bei* constructions see the optional occurrence of an agent NP.

12 It is worthwhile to mention the fact that although traditionally *bei* constructions generally have a pejorative implication, a very small number of *bei* sentences in Modern Chinese, as discussed in C. Li and Thompson (1981, pp.496–497), are more or less free of such pragmatic commitments because of the influence of translation from Indo-European languages to the Chinese language.

13 The word *zai* in the (c) sentences is a marker of the prepositional phrase and *shang* ‘on’ specifies the location of the hole and *li* ‘in’ the location of the crocodile.

14 This is compatible with the Chinese fact that PP as well as NP in both A and A’ positions can appear in the topic position (cf. Xu and Langendoen 1985).

15 Hashimoto (1968) has referred to the pre-*bei* NP as a topic expression and Lapolla (1989) has further provided very insightful discussions about the topic nature of the pre-*bei* NP and similarities and differences between topicalization and passivization in Chinese, though they did not go beyond this point to explain the typological nature of the voice behaviour in Chinese. In addition, the treatment of the pre-*bei* patient argument as topic and the post-*bei* agent argument as subject involves another well-discussed issue – i.e., the distinction between topichood and subjecthood. Readers are referred to C. Li (1976) and C. Li and Thompson (1981) for a detailed discussion.

16 It is important to point out that the use of topic structure and passive structure in Chinese is very subtle because of the similarity between them. Consider the following example:

(i) *neifeng xin bei wo jiao Lisi qing Wangwu tuo ta meimei jizou le*.
that letter BEI 1SG tell Lisi ask Wangwu request 3SG sister send PFV
‘That letter was told-Lisi-to-ask-Wangwu-get-his-sister-to send by me’
(J. Huang 1999, J. Huang et al. 2009).

At a first glance, sentences such as the aforementioned are seemingly not so bad, although native speakers rarely use them in everyday conversation. However, under a careful scrutiny, the formation of such sentences is highly doubtful. First, J. Huang argues for a verb analysis and treats *bei* as a verb which has the same meaning as

verbs such as *ai* 'get', *shou* 'receive', *jingshou* 'experience' and *zaoshou* 'undergo' as mentioned in section 2 and admitted by the author himself. It should be borne in mind that in Chinese none of these verbs allows the syntactic structure of the aforementioned example – i.e., a serial verb construction involving four verbs (cf. A. Li 1990, p.201 for discussion). Second, it should also be borne in mind that the crucial difference between topicalization and passivization in Chinese, as agreed among linguists, including the author himself, is that apart from the topical effect of the pre-marker NP, the latter in general conveys a sense of adversity and highlights the affectedness of the fronted patient. Yet in the earlier example, there is apparently a lack of affectedness of the pre-*bei* NP: from the perspective of the speaker (*wo* 'I' here), in what sense is the letter (adversely or positively) affected by a justified sending action which involves so many helpers? Rather, native speakers would express the same idea by using a topic structure – i.e., deleting *bei*, as follows:

(ii) *neifeng xin wo jiao Lisi qing Wangwu tuo ta meimei jizou le.*
that-CL letter 1SG tell Lisi ask Wangwu request 3SG sister send PFV
'That letter, I told Lisi to ask Wangwu get his sister to send (it)'.

As has been pointed out in Wu (2013), this is a typical example of confusing 'passivization' with topicalization. Of course, it is reasonable to assume that the fact that *bei* sentences normally do not appear in a serial verb construction involving multiple verbs is diachronically related to the original function of *bei* as a verb meaning 'receive'.

17 The pre-*bei* constituent functions in the same fashion as the topicalized focus discussed in the preceding chapter. For simplicity, I generally refer to it as a topic expression, though there are still some differences between the pure topic, which is a given term, and the *bei*-marked element, which is an update term. Also, see Cann and Wu (2011) for an alternative analysis, which is of the nature of event semantics.

18 One counterexample to the stipulation of the locality requirement is that marginally *bei* sentences have a serial verb construction such as the following:

(i) *Zhangsan bei Lisi kai qiang da si le.*
Zhangsan BEI Lisi open gun shoot dead PFV
'Zhangsan was shot dead by Lisi'.
(ii) *Zhangsan bei Lisi fang huo shao si le.*
Zhangsan BEI Lisi set fire burn dead PFV
'Zhangsan was burned to death by (the fire set) Lisi'.

This type of sentences do not pose a serious problem, since the conjoined verbs *kai-qiang-da-si* 'shoot dead' and *fang-huo-shao-si* 'burn to death' can be treated as an idiom-like complex predicate where the object *qiang* 'gun' and *huo* 'fire' are incorporated nouns which can neither be topicalized or passivized (see A. Li 1990; Wu 2013). For simplicity, the locality constraint will be suppressed in the tree descriptions.

19 One conceivable problem comes from a few fixed expressions such as *bei-bu* (BEI arrest) and *bei-po* (BEI force), which involve two bound morphemes. It would become unnatural if an agent NP such as *ren* is inserted between the two components, as in **bei ren pu* and **bei ren po*, because the verbal morphemes are from Archaic Chinese where monosyllabic words are used independently (cf. Packard 1998). In Modern Chinese, native speakers have to say *daipu* 'arrest' and *qiangpo* 'force'. These limited expressions are taken as exceptions and treated as lexical compound passives by Ting (1998) among other authors.

20 One may propose that sentences such as Figure 5.41 can be translated into English by using the *have . . . done* construction, as employed in the literature.

(i)	*Zhangsan*	*bei*	*Lisi*	*daduan*	*le*	*tui*.
	Zhangsan	BEI	Lisi	break	PFV	leg
	'Zhangsan had his leg broken by Lisi'.					
(ii)	*Zhangsan*	*bei*	*Lisi*	*jian*	*le*	*toufa*.
	Zhangsan	BEI	Lisi	cut	PFV	hair
	'Zhangsan had his hair cut by Lisi'.					

If the translations in (i)–(ii) has the advantage in that they keep the pre-marker NP as the topic (in the general sense), the translations in this chapter have the advantage in that they maintain the voice of the original sentence. Comparatively, it is more important to be equivalent to the grammatical voice of the original.

21 Note that if the voice marker *bei* is omitted, the resulting sentences would turn into well-formed topic constructions.

22 It has also been a problematic issue in Chinese grammar to characterize the relationship between these two well-known grammatical structures. L. Wang (1959) has initially observed that the object NP can be fronted by *ba* only when it is affected by the action of the verb. If this observation is correct, the post-*ba* NP and the pre-*bei* NP share at least one semantic property in that both of them are generally subject to the affectedness condition. This may account for why generally *ba* constructions and *bei* constructions are intertranslatable.

23 The two numerals can be labelled as different types, the one in the specifier position as Ty(e → e) and the other one in the argument position as Ty(e) since it behaves like an indefinite pronoun.

24 One of the consequences of a dynamic analysis of *ba* constructions is that it will allow the immediate occurrence of a *ba*-less object NP right before the verb, as exhibited in (i)–(ii).

(i)	*Zhangsan*	*fangzi*	*mai*	*le*.
	Zhangsan	house	sell	PFV
	'Zhangsan sold the/his house'.			
(ii)	*Zhangsan*	*qiche*	*diu*	*le*.
	Zhangsan	car	lose	PFV
	'Zhangsan lost the/his car'.			

As has been discussed in chapter 1, sentences of this sort are quite commonplace in Chinese.

25 The sharp contrast between the ungrammaticality of Figure 5.71a and the grammaticality of Figure 5.72b indicates that *bei* does define the internal argument node. As for the topic sentence in Figure 5.71b, the initial NP has a LINK relation with the comment clause where the pronoun *ta* 'he' has to be construed as *Zhangsan*.

6 Copular constructions

1 Introduction

In the preceding two chapters, I have provided two forms of analyses employing the DS concepts of LINKed structure and unfixed node for topic constructions and passive constructions. In this chapter, I explore another well-known grammatical construction in Chinese, copular construction, where *shi* is generally considered a copular morpheme corresponding to 'be' in English. The problem with analyzing the copular morpheme *shi* 'be' in Chinese is that it appears in a range of constructions which yield a variety of interpretations.[1] As shown in the following examples, *shi* can occur in a predicative construction as in Figure 6.1, an emphatic construction as in Figure 6.2 and an elliptical construction as in Figure 6.3.

In Figure 6.1 where the copular morpheme is followed by an indefinite NP, it induces a predicative reading; in Figure 6.2 where the postcopular expression is a VP, it gives rise to an emphatic reading; in Figure 6.3 where nothing follows the copular morpheme, it yields an elliptical reading which can be completed by the VP in the previous utterance, and hence sentences such as Figure 6.3 can also be called VP-ellipsis constructions (Xu 2003). The fact that the interpretation of a clause containing *shi* may vary according to the post- or pre-copular expression indicates that the copular morpheme is crucially dependent on the local linguistic context for its meaning.

The context-dependent nature of interpreting the Chinese copula strongly suggests that it has semantically underspecified content which requires to be pragmatically enriched. This points to a hypothesis that the copular morpheme is an anaphoric expression, which appears to have the characteristics of pronouns. Parallel to a pronoun, *shi* has an anaphoric function in that it takes its value from context, either from the copular clause itself or from the discourse context – namely, the interaction of the copular morpheme with the properties of its associates. The central thesis of this chapter is, then, that the account of *shi* should be couched in terms of semantic underspecification and pragmatic enrichment.

Mulan shi yi-ge yanyuan.
Mulan SHI one-CL actress
'Mulan is an actress'.

Figure 6.1

Mulan shi xihuan Faguo-cai.
Mulan SHI like French dish
'Mulan does like French food'.

Figure 6.2

Mulan xihuan Faguo-cai. Wangwu ye shi.
Mulan like French dish Wangwu also SHI
'Mulan likes French food. Wangwu does too'.

Figure 6.3

2 Previous analyses

In the relevant literature, there have been few attempts to reconcile those different interpretations of the copular constructions (Figure 6.1 and Figure 6.3), except for Chao's (1968) proposal that the morpheme *shi*, whether in the predicative or the emphatic construction, is always a copula (see also Hashimoto 1969; Li and Thompson 1981). Instead, there have been many attempts to tackle the so-called emphatic construction. Existing analyses are mostly interested in spelling out the categorical status of the morpheme *shi* in sentences such as Figure 6.2, thus construing it as a focus marker (e.g., Teng 1979), a focus adverb (e.g., Huang 1982) or a modal verb (e.g., Shi 1994). Recently, Cheng (2008) has proposed that *shi* is a copula, which selects a small clause with a subject and a predicate, whereas Huang et al. (2009) have claimed that *shi* in an emphatic sentence such as Figure 6.2 is not the same morpheme as *shi* in a predicative sentence such as Figure 6.1.

At first glance, the analysis of *shi* as a focus marker seems quite appealing, since most of the focused expressions in the emphatic construction just immediately follow the morpheme at issue. For example, compared with its position in the canonical sentence Figure 6.4a, the focused element just remains in situ with *shi* simply being appended before it, be it a subject NP, a temporal expression, a locative expression, a VP or a whole clause, as shown in Figure 6.4b–f, respectively.

The emphatic construction in Chinese is distinct in that although most of the Chinese emphatic sentences functionally correspond to a cleft construction in English as shown by the translations, they do not involve syntactic reordering, unlike their English counterparts. Obviously, the emphasized element

a. *Wangwu zuotian jian le Lisi.*
Wangwu yesterday see PERF Lisi
'Wangwu met Lisi yesterday'.

b. *shi Wangwu zuotian jian le Lisi.*
SHI Wangwu yesterday see PERF Lisi
'It was Wangwu who met Lisi yesterday'.

c. *Wangwu shi zuotian jian le Lisi.*
Wangwu SHI yesterday see PERF Lisi
'It was yesterday that Wangwu met Lisi'.

d. *Wangwu zuotian shi zai jiuba jian le Lisi.*
Wangwu yesterday SHI in pub see PERF Lisi
'It was in the pub that Wangwu met Lisi yesterday'.

e. *Wangwu shi jian le Lis*i.
Wangwu SHI see PERF Lisi
'Wangwu did meet Lisi'.

f. *shi Wangwu zai jiuba jian le Lisi, bu shi*
SHI Wangwu in pub see PERF Lisi not SHI
zai gongyuan jian le Wangwu
in park see PERF Wangwu
'It was the case that Wangwu met Lisi in the pub, not that Lisi met Wangwu in the park'.

Figure 6.4

in Chinese remains in situ: the morpheme *shi* is simply inserted immediately before the intended focus, without changing the word order of the relevant sentence.[2] This is, however, not the whole story, because the realization of the emphatic construction in Chinese is not only through the occurrence of *shi* but also through the phonological or prosodic prominence of the intended focus. In actual speech, the emphasized expression usually takes an emphatic stress as in Figure 6.4b–d, which can be said to have a 'narrow focus', or shows some prosodic changes as in Figure 6.4e-f, which can be said to have a 'broad focus' (see Ladd 1980). This fact strongly suggests that the emphatic effect in Chinese is achieved not entirely through syntactic means, but through the interaction between syntax, pragmatics and prosody (see Wu 2005).

The in situ characteristic of the emphasized expression could easily lead to a focus marker hypothesis. However, there is a significant piece of evidence against the analysis of *shi* as a focus marker – that is, the morpheme in question still maintains verbal properties in that (i) it is negated like a matrix verb and (ii) it is questioned in the V-not-V form like a matrix verb. This fact strongly suggests that *shi* in the emphatic construction is not a grammatical word but still a matrix, copular verb (see Hashimoto 1969; Li and Thompson 1981 *inter alia*). Consider the negative and interrogative forms of example Figure 6.2, as given in Figure 6.5a–b.

As for the analysis of the morpheme *shi* as an adverb, there exists some evidence that it parallels some adverbs in a certain fashion. Adverbs such as *yiding* 'surely' and *keneng* 'possibly', for example, can in general appear before

a. *Mulan* *bu* *shi* *xihuan* *Faguo-cai*.
Mulan not SHI like French dish
'It is not the case that Mulan likes French food'.
b. *Mulan* *shi* *bu* *shi* *xihuan* *Faguo-cai*?
Mulan SHI not SHI like French dish
'Does Mulan like French food or not?'

Figure 6.5

a. [] *Wangwu* [] *zuotian* [] *zai* *jiuba* [] *jian* *le* *Lisi*.
Wangwu yesterday in pub see PERF Lisi
'Surely/Possibly, Wangwu met Lisi in the pub yesterday'.
b. *?*yiding* *bu* *yiding* *Wangwu* *zuotian* *zai* *jiuba* *jian*
surely not surely Wangwu yesterday in pub see
le *Lisi*?
PERF Lisi

Figure 6.6

a. *Zhangsan* *hui* *qu* *Yingguo*.
Zhangsan will go Britain
'Zhangsan will go to the UK'.
b. *Zhangsan* *hui* *qu* *Yingguo* *ma*?
Zhangsan will go Britain Q
'Will Zhangsan go to the UK?'

Figure 6.7

any constituent, except the postverbal object NP. Although they can be inserted in any slot of a canonical sentence such as Figure 6.6a, and can also be negated in the same way as *shi* is, it is generally unacceptable for these adverbs to be questioned in the same way as *shi* is, especially when they appear sentence-initially as shown in Figure 6.6b.

Shi (1994) explores the possibility of classifying *shi* into other types of verbs rather than a copular verb. He argues that *shi* is a modal verb and denotes confirmation.[3] When it comes to supportive evidence for his analysis of *shi* as a modal verb, Shi (1994) states that although modal verbs in Chinese usually occur between the subject and the matrix verb as in Figure 6.7a–b, some other modal verbs can appear in sentence-initial position and also can take the V-not-V form as in Figure 6.8a–b.

But this does not hold for most of the modal verbs in Chinese. As a matter of fact, most modal verbs behave like *hui* 'will' in Figure 6.7, which cannot appear in sentence-initial position as shown in Figure 6.9. More importantly, the morpheme *shi*, like its English counterpart 'be', can also occur in other types of constructions such as predicative (as in Figure 6.1), equative and specificational constructions (see footnote 1). These facts suggest that it does not make much sense to assign it to the class of modals.

a. *yinggai* *Yaoqi* *qu*. (Shi 1994, p.86, ex.(13))
should Yaoqi go
'It should be the case that Yaoqi goes (there)'.
b. *yinggai-* *bu-* *yinggai* *Yaoqi* *qu*?
should not should Yaoqi go
'Should it or should it not be the case that Yaoqi goes (there)?'

Figure 6.8

a. **hui* *Zhangsan* *qu* *Yingguo*.
will Zhangsan go Britain
b. **hui* *Zhangsan* *qu* *Yingguo* *ma*?
will Zhangsan go Britain Q

Figure 6.9

a. COP [SC [subject] [predicate]]
b. COP [SC [*Mulan*] [*actress*]]

Figure 6.10

Recently, Cheng (2008) has proposed that *shi* in the emphatic construction is the same copular morpheme which can also be used in predicative sentences such as Figure 6.1, whereas Huang et al. (2009) have claimed to the contrary that *shi* in an emphatic construction is not the same morpheme as the copula *shi* in a predicative construction.

Following Stowell's (1983) proposal that all copular sentences involve a small clause which consists of a subject-predicate structure, Cheng argues that the copular morpheme *shi* in Chinese also takes a small clause, as illustrated in Figure 6.10a. Figure 6.10b is a simplified representation of a sentence such as Figure 6.1, which has a nominal predicate. Under Cheng's analysis, 'Mulan' subsequently moves out of the small clause to the matrix Spec, IP position, yielding Figure 6.1.

Cheng further argues that the focus reading connected with *shi* is simply related to its copular/verbal property; furthermore, Chinese allows an in situ focus strategy using phonological prominence, and this strategy interacts with *shi* and its postverbal constituent. Cheng's attempt to reconcile those different interpretations of the copular constructions involving *shi* should be on the right track, yet it still leaves the main job undone, since it fails to spell out the semantics of the copular morpheme, in particular its anaphoric properties, as will be discussed in detail in sections 3 and 5.

When discussing the categorical features of Chinese words, Huang et al. (2009) make a two-morpheme claim about the use of *shi*, based on the fact that when the predicate of a clause in Chinese is an adjectival phrase, the copular verb *shi* 'be' is usually not required as in Figure 6.11a, and if used, a contrastive reading would arise, as in Figure 6.11b.

a. *ta* *hen* *yingyong*.
3SG very heroic
'He is heroic'.
b. *ta* *shi* *hen* *yingyong*.[4]
3SG SHI very heroic
Intended reading: same as the above. (Huang et al. 2009, p.25, ex.(39))

Figure 6.11

a. Did Sam leave?
b. Sam did not leave.
c. Sam left.
d. Sam did leave. (Huang et al. 2009, p.17, ex. (19))

Figure 6.12

Huang et al. stress in a footnote that

> One needs to distinguish the copular *shi* from the emphatic *shi*, which is permitted in this example. The most salient differences between the two morphemes are that the emphatic *shi* must be stressed in this context while the copular *shi* is typically not, and that the emphatic *shi*, as its name implies, is used only to emphasize some constituent after it, either reflecting the assertive attitude of the speaker or bringing out a contrastive interpretation.
>
> (p. 25)

Huang et al.'s two-morpheme claim about *shi* is actually based on their mistaken claim about the auxiliary 'do' in English. When discussing categorical deviation in Chinese, Huang et al. construct the English examples in Figure 6.12 as contrastive evidence and claim (p. 17) that ''the emphatic *did* is not the same morpheme'' as the *did* in Figure 6.12a–b.

This is a mistake which should have been avoided anyway. The 'do' in the emphatic construction Figure 6.12d is exactly the same morpheme as the 'do' in the interrogative construction Figure 6.12a and the negative construction Figure 6.12b. The three constructions are sometimes called *do*-support constructions, in which the dummy 'do' is an auxiliary introduced to permit the formation of the respective construction (see, e.g., Jespersen 1933, pp.504–512; Quirk et al. 1985, pp.77–79; Huddleston and Pullum 2002, pp.92–93). The emphatic/focus effect of sentences such as Figure 6.12d can be derived from relevance-theoretic notions (Sperber and Wilson 1995): the insertion of the dummy 'do' would require the hearer to make extra processing effort to establish the association of this 'unnecessary' word with the VP predicate, thus achieving the effect of emphasis/focus (note that the verb phrase can be simply stressed to achieve the pragmatic effect of focus).

As far as *shi* is concerned, it is true that this morpheme is not always necessarily used in a sentence with an adjectival predicate, and if used, it usually gives rise to a contrastive reading. But as illustrated by Figure 6.12 with the auxiliary 'do', that words can appear in a range of constructions and serve a variety of functions relevant to context does not mean that we have different morphemes. Rather, the so-called emphatic *shi* in Figure 6.11b is the same morpheme as the so-called copular *shi* (see, e.g., Chao 1968, pp.716–721; Lü 1980, pp.434–437; Li and Thompson 1981, pp.147–155; Chao and Han 2007, pp.1249). Moreover, Huang et al.'s claim that the emphatic *shi* and the copular *shi* can be distinguished by stress is far from safe. All my informants report that it is usually the emphasized constituent, but not necessarily the morpheme *shi*, that carries phonological or prosodic prominence (see also Cheng 2008).

To summarize, the obligatoriness of negating or questioning *shi* when the emphatic sentence is translated into a negative one or a question form indicates that the morpheme is neither a focus marker nor a focus adverb, but still used as a matrix verb. The impossibility of most modal verbs appearing in sentence-initial position indicates that it does not make much sense to assign *shi* to the class of modals. Arguing for the relation between the focus reading of the emphatic structure and the verbal property of *shi* is on the right track, yet it still leaves the main job undone, for it fails to spell out a semantic account of the copular morpheme. Like 'do' in English, that *shi* in Chinese can appear in a range of constructions and serve different functions relevant to context does not mean that we have different morphemes.

From an interpretive perspective, all the analyses reviewed here fail to provide an adequate account of the semantic properties of the copular morpheme *shi*, which is largely responsible for the interpretation of the copular constructions Figure 6.1 and Figure 6.3. It is the task of the next section to spell out these properties of *shi*.

3 A preliminary analysis

In this section, I provide a preliminary analysis of the semantic properties of the copular morpheme *shi*, which will be employed as a basis for the characterization of a variety of copular constructions. As mentioned in section 2, the occurrence of *shi* indicates that the postcopular string possibly contains some prominent information; what is emphasized could be a single constituent, the so-called narrow focus; it could also be a whole clause, the so-called broad focus. These two facts strongly suggest that the emphatic or focus effects are achieved not purely through syntactic means, but through the interaction between syntax, pragmatics and prosody. In other words, what is highlighted by speakers is not only a matter of grammar but also a matter of pragmatics – that is, what speakers are trying to communicate on a specific occasion in a specific context. In the case of Chinese emphatic construction, the copula *shi*, thanks to its copular/verbal properties, signals that what follows it needs to be paid attention to. Then depending on context, the focused element can be

pragmatically located by the speaker and later identified by the hearer, since it is usually phonologically stressed or prosodically marked, as mentioned in section 2.

Now, the question arises as to what specific properties *shi* possesses, if it is a copular morpheme uniformly used in a variety of constructions. The fact that the interpretation of a clause containing *shi* may vary according to the post- or pre-copular expression as shown in Figure 6.1 and Figure 6.3, indicates that the morpheme at issue is crucially dependent on the linguistic context for its meaning. The context-dependent nature of interpreting the copula strongly suggests that it has semantically underspecified content which requires to be pragmatically enriched relative to context. Previously unnoticed or neglected is the anaphoric property of *shi*, as displayed in Figure 6.3 – namely, the copular verb and a verb phrase can be anaphorically related. Consider Figure 6.3, which is repeated here as Figure 6.13.

In Figure 6.13, the anaphoric relation between the VP in the preceding clause and the copular verb in the following clause points to a hypothesis that the copular morpheme *shi* is an anaphoric expression which appears to have the characteristics of pronouns. Parallel to a pronoun, the copula has an anaphoric function in that it takes its value from context, either from the preceding clause (e.g., the case of the VP elliptical structure) or from the following string (e.g., the case of emphatic structure). One significant piece of evidence for treating *shi* as sharing the characteristics of pronouns is that the copular morpheme is historically a demonstrative pronoun meaning 'this' (see Wang 1954, pp.353, 1989, pp.184). In his classic work on the history of the Chinese language, Wang points out that the morpheme *shi* used to be employed as a demonstrative in the pre-Qin period (prior to 221BC) when no linking verb was used between a subject and a predicate as shown in Figure 6.14, and it is not until around the first century that *shi* has developed into a linking or copular verb as shown in Figure 6.15.[5]

In Figure 6.14, where the subject NP is usually separated from the predicate by a pause, the morpheme *shi* as a demonstrative refers back to the noun phrase *fu yu gui* 'wealth and nobility' in subject position. In Figure 6.15, the

Mulan	[*xihuan*	*Faguo-cai*]$_i$.	*Wangwu*	*ye*	*shi*$_i$.
Mulan	like	French dish	Wangwu	also	SHI

'Mulan likes French food. Wangwu does too'.

Figure 6.13

fu	yu	gui,	shi	ren	zhi	suo	yu	ye.
wealth	and	nobility	this	people	's	SUO	desire	PAR

'Wealth and nobility, these are what people desire to own'.
(*The Analects* by Confucius)

Figure 6.14

yu	shi	suo	jia	furen	zhi	fu	ye.
I	SHI	SUO	marry	woman	's	father	PAR

'I'm the father of the woman who got married'.
(*Weighing Discourse* by Wang Chong)

Figure 6.15

A:	*wo*	*tingshuo*	*Lisi*	*zai*	*gongyuan*	*jian*	*le*	*Wangwu*.
	1SG	hear-say	Lisi	in	park	see	PERF	Wangwu

'I heard that Lisi met Wangwu in the park'.

B:	*nali.*	*shi*	*Wangwu*	*zai*	*jiuba*	*jian*	*le*	*Lisi*,
	no	SHI	Wangwu	in	pub	see	PERF	Lisi
	bu	*shi*	*Lisi*	*zai*	*gongyuan*	*jian*	*le*	*Wangwu*.
	not	SHI	Lisi	in	park	see	PERF	Wangwu

'No. It was the case that Wangwu met Lisi in the pub, not that Lisi met Wangwu in the park'.

Figure 6.16

morpheme *shi* is inserted as a linking verb between a first-person pronoun subject *yu* 'I' and a nominal predicate *suo jia furen zhi fu* 'the father of the woman who got married'. Here I do not go into the details of the diachronic development of *shi* from a demonstrative pronoun into a copular morpheme. Yet examples such as Figure 6.14 and Figure 6.15 provide convincing evidence for justification of treating the copular morpheme in Modern Chinese as an anaphoric expression. It is owing to the remnant anaphoric property of *shi* that this linking morpheme can be employed in an elliptical construction such as Figure 6.3. Precisely, the Chinese copula *shi* serves as a pro-predicate as best shown in Figure 6.2, which is generally considered an emphatic construction because of the emphatic effects it creates, which are more or less like the contrastive effects of postverbal subjects in Romance languages such as Spanish – e.g., Contestó la pregunta Juan [lit. "answered the question John"] (contrastive construal of John).

As mentioned in footnote 3 and discussed in Li and Thompson (1981), the use of *shi* sometimes serves to affirm some supposition rather than simply report an event, as shown in the dialogue in Figure 6.16 in which Figure 6.4f is used as B and the first clause in B functions as confirmation.

Notice that the construal of the copula *shi* as a predicate pro-form can provide an adequate explanation of why the emphatic construction has an affirmative function. The affirmative function of *shi* is closely associated with the well-discussed emphatic or suspense effects induced by the copula, which emerge from the dynamics of interpreting it – a process being largely analogous to that of pronoun resolution. In general, the underspecified content of a pronoun can be identified from the independent context, or cataphorically – i.e., with the semantic value of a later linguistic expression in the discourse. Like

the cataphoric reading of a pronoun, the interpretation of *shi* is a non-canonical step that is associated with subsequent update from what is part of the construction process and hence associated with emphasis of some sort. The affirmative effect is thus achieved dynamically, as will be characterized and discussed in more detail in section 4.2.

Another advantage of treating *shi* as a predicate pro-form is that it can provide an adequate explanation of why the copula cannot appear before the object NP in the emphatic construction, as mentioned in footnote 2. Because *shi* is a predicate pro-form, it must occur before a verb phrase, even when the object is emphasized. Consider the case where the copula is inserted in the verb phrase as in the form of V + *shi* + NP. From the interpretive point of view, the transitive verb is parsed first. Subsequent to the parse of the verb, the parser requires an object NP to occur as the internal argument of the verb. The occurrence of a copular verb would fail to fulfill this requirement. As a consequence, the parse would collapse.

In this chapter, I attempt to propose a uniform, parsing-based account of various constructions containing *shi*. The central thesis of this chapter is that the Chinese copula is an anaphoric expression which is both semantically and syntactically underspecified. From a parsing perspective, the Chinese copula may not be assigned an interpretation in a straightforward way, but instead may be enriched by contextual information in the same way as a pronoun is parsed.

4 A dynamic analysis

The crux of characterizing Chinese copular constructions lies in a dynamic account of the copula *shi*. In section 3, it was pointed out that the Chinese copula is underspecified in content. That is, its interpretation is crucially dependent on the linguistic context, precisely the post- or pre-copular expression. When there is a predicative expression following the linking morpheme, we get a predicative reading as in Figure 6.1; when there is a VP following the copular morpheme, an emphatic reading arises as in Figure 6.2; when there is no complement following the copular morpheme, an elliptical reading is then yielded as in Figure 6.3. That is, the copular morpheme depends for interpretation on the expressions that it associates with.

As discussed in previous sections, the copular morpheme *shi* behaves like a predicate pro-form, parallel to a pronoun. In the DS system, a pronoun projects underspecified content which is represented by a metavariable of type *e*, but metavariables may be postulated for any type. As regards the copular form *shi*,[6] it can thus be uniformly analyzed as a semantic placeholder, which requires enrichment for interpretation to occur. The enrichment may be provided directly through the parse of expressions that follow the copula as in Figure 6.2, or through substitution of a type (e→t) value fixing the construal of the predicate as in Figure 6.3. Therefore, it is plausible to propose that *shi* projects a metavariable SHI, with an associated requirement to identify some predicate structure. Treating *shi* as an anaphoric expression

shi IF ?Ty(e → t)
THEN put(Ty(e → t), Fo(SHI),? ∃x.Fo(x));
ELSE abort

Figure 6.17

Mulan *shi* *yi-ge* *yanyuan*.
Mulan SHI one-CL actress
'Mulan is an actress'.

Figure 6.18

gives rise to a set of actions as stated in Figure 6.17, reflecting the uniformity of its semantics.

In the case of a pronoun, the content of the metavariable associated with it is instantiated by a process of substitution, usually by a term established in the previous discourse, as demonstrated in the preceding section. As far as Chinese copular constructions Figure 6.1 and Figure 6.3 are concerned, the hearer however has to identify the potential substituend for the metavariable SHI from the context, a post-*shi* sequence as in Figure 6.1 and Figure 6.2, or a previous discourse as in Figure 6.3. The value of the metavariable SHI is therefore subsequently established through an update provided by the parse of a postcopular string or some term constructed from the previous discourse. To capture this update process, we can employ the DS concept of *Adjunction and its variant Late *Adjunction.

With a dynamic analysis of *shi* as projecting a metavariable and a technical tool for identifying its content value from context, we should be able to characterize Chinese copular constructions in a somewhat straightforward way.

4.1 Predicative construction

To see how the parse of different constructions involving *shi* works, let us first consider the predicative construction Figure 6.1, which is repeated here as Figure 6.18, where a nonverbal predicate occurs in postcopular position and the copular morpheme appears to just perform a linking function.

The first two words *Mulan* and *shi* are parsed to decorate the subject and predicate node with Fo(*ι*, x, *Mulan'*(x)) and Fo(SHI), respectively (as the output of Introduction and Prediction) as shown in Figure 6.19, where the pointer moves back to the top node, subsequent to the parse of the copular morpheme.

At this point, the tree cannot be completed because there remains an outstanding formula requirement on the predicate node. The pointer must move back to the incomplete predicate node, thus allowing the application of Late *Adjunction, which provides an unfixed node with type requirement? Ty(e → t) as stated in Figure 6.17 (note that the rule requires that the unfixed node should have the same type of expression as the node from which it is

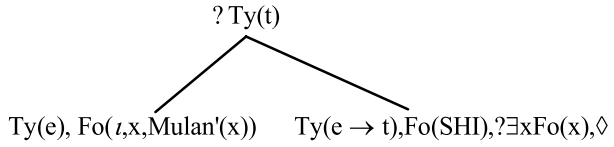

Figure 6.19 Parsing *Mulan shi*

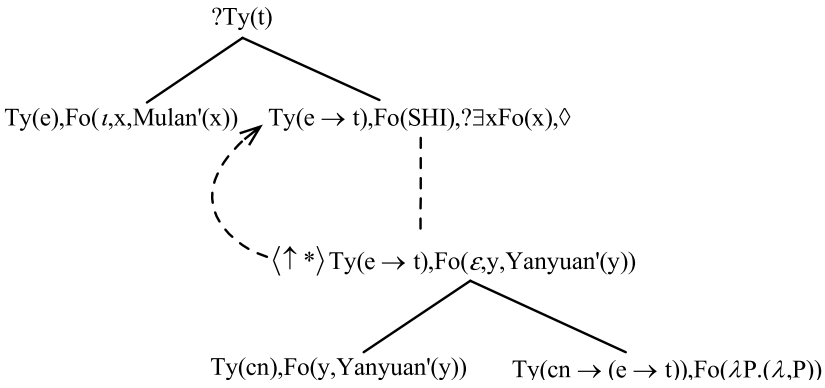

Figure 6.20 Parsing *Mulan shi yi-ge yanyuan*

projected). This permits the parse of any one-place predicate – a nominal predicate *yige yanyuan* 'an actress' in Figure 6.18. As has been briefly discussed in the preceding section, a noun phrase such as *yige yanyuan* 'an actress' can be simply assumed to be ambiguous in type between *e* and *e*→ *t* (note that *Mulan shi yanyuan* 'lit. Mulan is actress' is also perfectly natural). Accordingly, *yige*, which is corresponding to the English indefinite article, can be treated as being ambiguous in the sense that it is something that constructs an epsilon term in the context in which an expression of type *e* is required and one that makes a common noun into a one-place predicate in the context in which an expression of type (e →t) is required. In the case of Figure 6.18, the determiner *yige* can be analyzed as providing some binder for the distinguished variable in the common noun, creating a lambda operator in the context of the requirement for a one-place predicate; that is, the lambda operator is constructed in the processing of the nominal expression and has to be fixed in order to ensure that it will be bound by the subject.[7] The unfixed node projected by the indefinite nominal expression then merges with the fixed yet underspecified main predicate node, satisfying both the requirement of the unfixed node to find a fixed position within the tree and the requirement that SHI be replaced by some contentful concept. This parsing process is illustrated in the tree in Figure 6.20 – the completion of which will give rise to a formula Fo(*Yanyuan*' (ι, x, *Mulan*' (x))) as required.

Notice that the construal of *shi* as a predicate pro-form, as well as the output formula Fo(*Yanyuan*'(ι, x, Mulan'(x))), provides a straightforward explanation of why in spoken Chinese the copula can sometimes be omitted in predicative constructions (especially when the copular morpheme is followed by an adjectival phrase), without affecting the acceptability of the relevant sentences (see Chao 1968). If *shi* in sentence Figure 6.18 is removed, for example, the resulting string *Mulan yi-ge yanyuan* is still acceptable in daily speech. We can also find many other examples such as *Mulan shizu yi-ge shagua* 'Mulan utterly a fool' and *Mulan tangtangzhengzheng yi-ge nüren* 'Mulan an upright woman'. Like a pronoun, the copular form just serves as a placeholder which can be instantiated by some contentful concept. Given its expletive property, the lexical entry for *shi* in Figure 6.17 does not have a bottom restriction on the predicate node. The omission of *shi* would not render the relevant sentence unacceptable, simply because the indefinite nominal expression can provide the required value for the predicate node.

4.2 Emphatic construction

We now turn to the emphatic sentence Figure 6.2. As for emphatic constructions, we mainly consider three types here: one with a VP focus as in Figure 6.2, which is repeated here as Figure 6.21; one with a subject focus as in Figure 6.4b, which is repeated here as Figure 6.22 where the copular morpheme appears sentence-initially; and another with a temporal expression as focus as in Figure 6.4c, which is repeated as Figure 6.23.

The parse of sentences such as Figure 6.21 basically has the same story as that of Figure 6.18. The sentence is parsed in a normal way, with the first two words projecting a subject-predicate structure (with Introduction and

Mulan	*shi*	*xihuan*	*Faguo-cai*.
Mulan	SHI	like	French dish

'Mulan does like French food'.

Figure 6.21

shi	*Wangwu*	*zuotian*	*jian*	*le*	*Lisi*.
SHI	Wangwu	yesterday	see	PERF	Lisi

'It was Wangwu who met Lisi yesterday'.

Figure 6.22

Wangwu	*shi*	*zuotian*	*jian*	*le*	*Lisi*.
Wangwu	SHI	yesterday	see	PERF	Lisi

'It was yesterday that Wangwu met Lisi'.

Figure 6.23

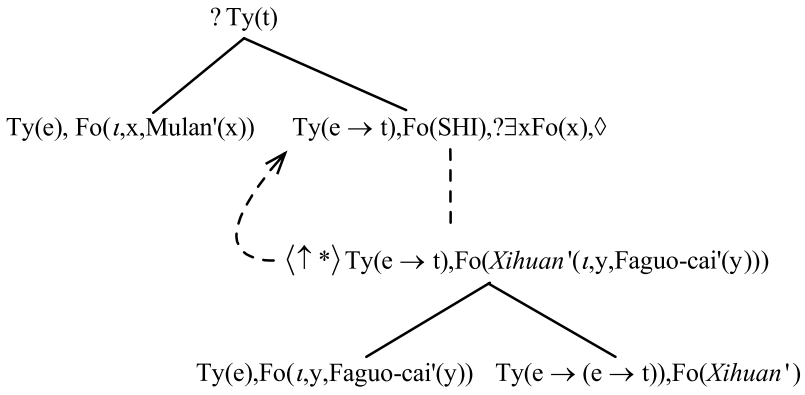

Figure 6.24 Parsing *Mulan shi xihuan Faguo-cai*

Prediction anticipating that structure prior to parsing the words themselves). Applying Late *Adjunction permits the parsing of the postcopular string, where the VP is identified as the intended focus of the sentence because of its phonological prominence. Figure 6.24 shows the parse state of merging the unfixed predicate node with the fixed predicate node projected by *shi*, which is truth-conditionally the same as the result of parsing a canonical sentence *Mulan xihuan Faguo cai* 'Mulan likes French food'.

As regards Figure 6.22, where the copular form appears sentence-initially, the parse of this sentence might be different in some way, yet the semantics of the copular morpheme should remain the same. From a real-time processing point of view, the occurrence of the morpheme *shi* in sentence-initial position may come as a surprise to the hearer. Thus it can be reasonably analyzed as projecting an unfixed node whose position can be fixed later; namely, it can merge with an open predicate node at some point in the parse. Figure 6.25 illustrates the effect of parsing *shi*.[8]

Subsequent to the parse of the copular morpheme, the pointer then moves back to the top node ?*Ty(t)*.With the application of Introduction and Prediction, the tree will be expanded to one with an argument daughter ?*Ty(e)* and a predicate daughter ?*Ty(e → t)*. The subject NP in Figure 6.22 *Shi Wangwu zuotian jian le Lisi* 'It was Wangwu that met Lisi yesterday' is parsed (and identified as the intended focus, owing to the phonological stress it carries) to decorate the subject node with *Fo(ι, x, Wangwu'(x))*, after which the pointer moves to the open predicate node. This allows the merge of the unfixed node decorated with Fo(SHI) with the open predicate node, as shown in Figure 6.26.

Subsequent to the parse of *Wangwu*, the lexical input is a sentential adjunct, *zuotian* 'yesterday'. The sentential adjunct can be taken to induce the upward building of a new Ty(t) node and then the downward building of a Ty(t → t) node, its own functor node. After *zuotian* 'yesterday' is parsed, the pointer returns to the predicate node decorated with Fo(SHI). Applying Late

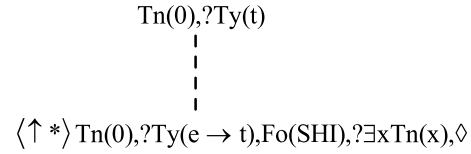

Figure 6.25 Parsing *shi*

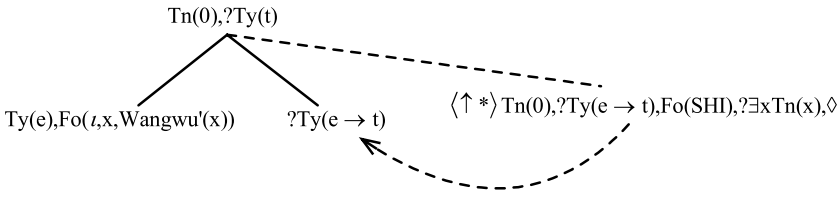

Figure 6.26 Parsing *Shi Wangwu*

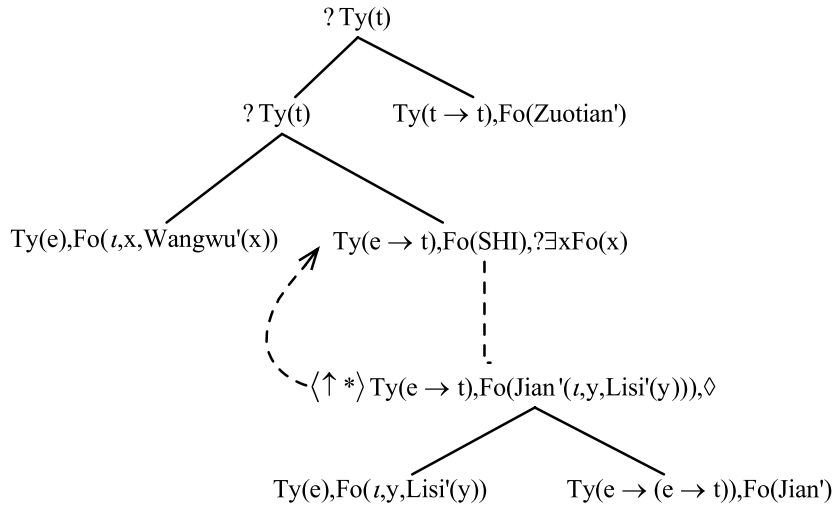

Figure 6.27 Parsing *Shi Wangwu zuotian jian le Lisi*

*Adjunction permits the parsing of the post-adjunct string – namely, the verb phrase *jian le Lisi* 'met Lisi' – which proceeds in a normal way: the transitive verb *jian* 'meet, see' is parsed, projecting a two-place predicate node which requires an internal argument node; the object NP *Lisi* is then parsed, satisfying the requirement on the internal argument node; finally, the unfixed predicate node merges with the fixed yet underspecified predicate node. These parsing effects are illustrated in Figure 6.27.

Completion of the tree will give rise to a well-formed propositional formula *Fo(Zuotian'(Jian')(ι, y, Lisi'(y))(ι, x, Wangwu'(x)))*, which is also truth-conditionally the same as the output of parsing a canonical sentence *Wangwu zuotian jian le Lisi* 'Wangwu met Lisi yesterday'. The parse of a sentence with an adjunct focus such as Figure 6.23 *Wangwu shi zuotian jian le Lisi* 'It was yesterday that Wangwu met Lisi' will be slightly simpler. First, The rules of Introduction and Prediction anticipate the subject-predicate structure, permitting the parse of the first two words *Wangwu shi*, which decorates the subject and predicate node with *Fo(ι, x, Wangwu'(x))* and Fo (SHI), respectively. Then the pointer moves up to the top node, allowing the sentential adjunct *zuotian* 'yesterday' to be parsed, which will induce the upward building of a new Ty(t) node and the downward building of a Ty(t → t) node, its own functor node. Subsequent to the parse of the adjunct, the pointer will move back to the predicate node decorated with Fo (SHI). Applying Late *Adjunction will allow the post-adjunct VP to be processed like the VP in Figure 6.22. Completion of the whole tree projected by Figure 6.23 will yield a propositional formula *Fo(Zuotian'(Jian') (ι, y, Lisi'(y))(ι, x, Wangwu'(x)))*, which is exactly the same as the output of parsing Figure 6.22.[9]

Notice how the process of characterizing the emphatic construction reflects its fundamental function mentioned in section 3 – that is, the emphatic structure serves to affirm some supposition. Being a predicate pro-form, the copular morpheme, once used before a string containing a predicate, would arouse hearers' curiosity about what action/event it represents because of the suspense effects that *shi* as a cataphoric element creates. The occurrence of the post-*shi* clause at a later stage instantiates the existence of such an action/event, hence satisfying the hearer's curiosity. The affirmative function is therefore dynamically reflected in the interpretive process of the emphatic construction: *shi* projects an underdetermined predicate structure which is then updated by the logical formula constructed through the parse of the postcopular clause. With the copular morpheme *shi* being interpreted cataphorically, the parsing process of emphatic sentences such as Figure 6.2 is essentially a process of pragmatic strengthening.

Finally, let us consider how the elliptical construction involving the copula *shi* can be characterized. Consider example Figure 6.3, which is repeated here as Figure 6.28.

As we know, an elliptical construction is a construction that lacks some element that is recoverable or inferable from the context. In the case of Figure 6.28, what is missing in the conjunct clause can be recovered from

Mulan	*xihuan*	*Faguo-cai.*	*Wangwu*	*ye*	*shi*.
Mulan	like	French dish	Wangwu	also	SHI

'Mulan likes French food. Wangwu does too'.

Figure 6.28

Mulan	*xihuan*	*Faguo-cai.*	*Wangwu*	*ye*	*xihuan*.
Mulan	like	French dish	Wangwu	also	like

'Mulan likes French food. Wangwu does too'.

Figure 6.29

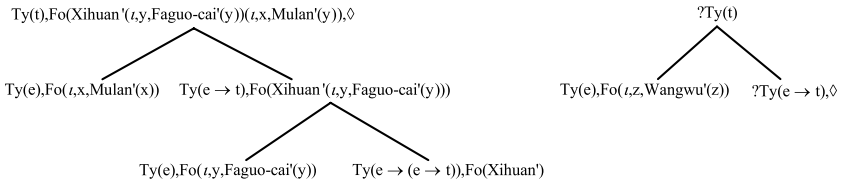

Figure 6.30 Parsing *Mulan xihuan Faguo-cai. Wangwu*

the first clause – that is, the verb phrase *xihuan Faguo-cai* 'like French food', though the 'omission' of this verb phrase may not be detected as easily as the omission of the object NP as in Figure 6.29.

In the DS framework, ellipsis is taken as a copy of content or of parsing steps – namely, reusing some term or construct which the context makes available (see, e.g., Cann et al. 2005, 2007). When it comes to the elliptical structure in Figure 6.28, what makes it interpretable is, as discussed in section 3, the anaphoric property of the copular morpheme which, as a predicate pro-form, enables hearers to establish a semantic relation between itself and the representation of content established from a preceding VP expression. In other words, it is the characteristic property of *shi* parallel to anaphoric expressions that helps hearers to identify a VP in the first clause as 'the antecedent' of the copular morpheme. Hence the construal of the elliptical form in Figure 6.28 is basically a pragmatic process of substituting a predicate formula value made available in context for the metavariable projected by the copular morpheme.

The parse of the elliptical construction in Figure 6.28 begins with the introduction of a subject and a predicate node and the parse of the subject NP *Wangwu* in the conjunct clause, as given in Figure 6.30, where the left tree shows the result of parsing the preceding utterance.

As indicated in the right tree in Figure 6.30, the pointer moves to the predicate node after the initial expression *Wangwu* is successfully parsed and duly decorated the subject node with a formula value. In the elliptical clause of Figure 6.28, the next lexical item to be processed is not a predicate as usually expected, but instead a predicate adjunct ye 'also, too' which can be assigned a semantic type $((e \rightarrow t) \rightarrow (e \rightarrow t))$. After the predicate modifier is processed, the pointer moves to the one-place predicate node, permitting the parse of the copular morpheme *shi*, which projects a metavariable as in the parse of other copular constructions such as Figures 6.17 and 6.18, as well as Figures 6.21 and 6.23. At this point, all the words in the clause have been processed, yet the

tree cannot be completed because the one-place predicate node, though type complete, has an outstanding requirement for a formula value. That is, the metavariable SHI projected by the copular form has to be replaced with some contentful concept. In the context of Figure 6.28, the only possible substituend for the pro-predicate is the termFo(*xihuan*'(ι, y, *Faguo-cai*'(y))) projected by the VP in the preceding clause. The pragmatic process of substitution is illustrated in Figure 6.31, where completion of the tree will yield the output *Fo(Ye'(Xihuan'(ι, y, Faguo-cai'(y))(ι, z, Wangwu'(z))))*, which is the result of interpreting the elliptical clause.

Notice how the analysis of the copula *shi* as a pro-predicate provides an adequate explanation of why in Chinese there should be constructions analogous to English elliptical constructions such as Figure 6.33 but not like Figure 6.32, as mentioned in footnote 5.

As can be seen in the earlier examples, when an object NP takes the elliptical form, the string is ungrammatical. With a sentential adjunct, it is perfectly acceptable like its English counterpart. The ungrammaticality of sentences

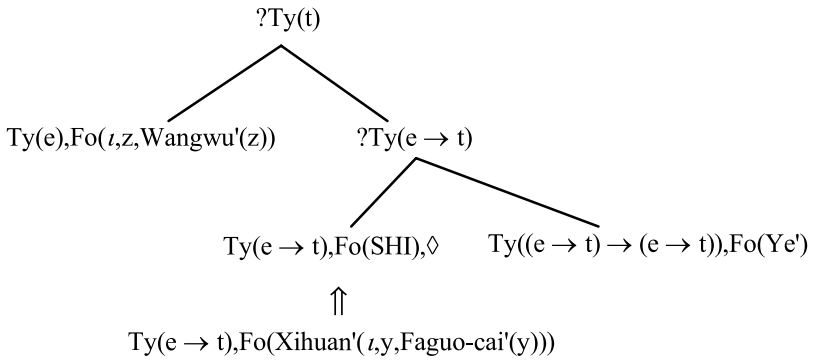

Figure 6.31 Parsing *Wangwu ye shi*

**Mulan*	*xihuan*	*Faguo-cai.*	*Yingguo-cai*	*ye*	*sh*i.
Mulan	like	French food.	English food	also	SHI

'Mulan likes French food. English food, too'.

Figure 6.32

Mulan	*zuotian*	*zuofan*	*le.*	*Shang*	*xingqi*	*ye*	*shi*.
Mulan	yesterday	cook	PERF	last	week	also	SHI

'Mulan cooked yesterday. Last week, too'.

Figure 6.33

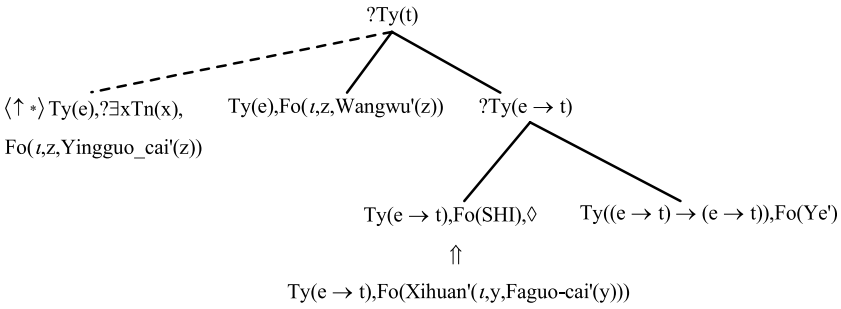

Figure 6.34 Parsing *Yingguo-cai ye shi.*

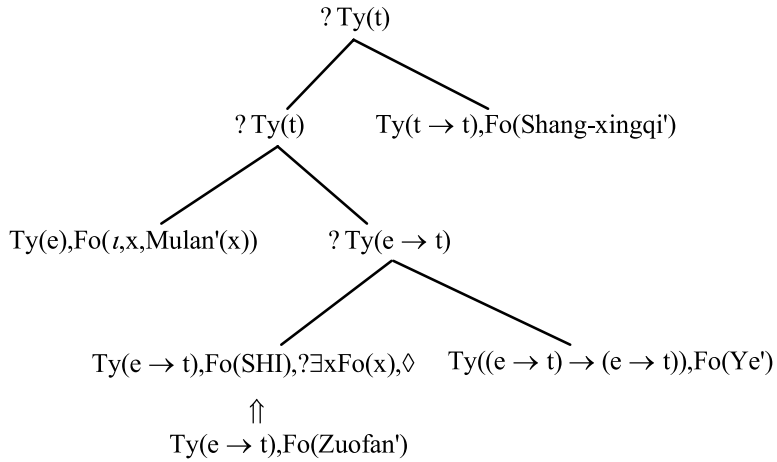

Figure 6.35 Parsing *shang xingqi ye shi*

such as Figure 6.32 can be easily accounted for by the analysis adopted here: being a pro-predicate, the copular morpheme, once parsed, would have its underspecified content instantiated by a predicate formula established from the parse of the VP *xihuan Faguo-cai* 'like French food' in the preceding clause, which means that it is not possible for the object NP *Yingguo-cai* 'English food' to find a position in the tree established by the parse of the elliptical form. Even if it can be initially analyzed as projecting an unfixed node (like a left-dislocated object),[10] it is still not possible for it to merge into an object position. As a consequence, the parse would collapse, as shown in Figure 6.34, where the subject node is decorated with a term Fo(ι, x, *Mulan*'(x)) made available from the parse of the preceding clause.[11]

However, the analysis of the copula *shi* as a predicate pro-form cannot preclude a sentential adverb such as *shang xingqi* 'last week' from occurring in the elliptical construction. The display in Figure 6.35 shows the process of parsing Figure 6.33, in which the sentential adjunct projects a term of Ty(t → t),

decorating the highest predicate node whose subject argument is propositional, which can be expanded to allow the parse of the remainder of the elliptical form.

5 Summary

In this chapter, I have presented an account of copular constructions in Chinese, with a particular focus on the copular morpheme *shi*, which is shown to share the characteristics of anaphoric expressions. Within the DS framework, the Chinese copula is treated uniformly as a semantic placeholder, precisely a predicate pro-form, which projects a metavariable whose semantic value is derived pragmatically from the context in which the copular construction is uttered. The context involves local as well as external linguistic content. It is thus shown that syntactic and pragmatic processes interact to determine the different readings of the copular constructions.

The dynamic analysis I have proposed here not only provides a formal characterization of a range of copular constructions without any stipulations but a straightforward explanation of their communicative functions, which functional linguists expect to do. The affirmative function of the emphatic construction, for instance, is directly accounted for through the analysis of the copular morpheme as an anaphoric expression (strictly speaking a cataphoric element), which creates suspense effects that call the attention of the hearer that some action/event may have taken place, and the expression that immediately follows *shi* satisfies the expectation of the hearer. Technically, this is characterized by treating the copula as projecting a metavariable whose underspecified content is updated by a term constructed from the parse of a postcopular string.

Notice that the proposed dynamic account of copular constructions in Chinese, the emphatic construction in particular, demonstrates how the dynamics of context and update made available within the DS framework can provide a more fine-grained analysis of the phenomenon involving focus interpretation than is available through simply labelling it as "focus" (as in the literature reviewed in this chapter). Within a grammar formalism which defines both representations of content and context dynamically and structurally, the focus effects in emphatic constructions are captured through updating some underspecified content (i.e., of *shi*) during the parse of a complete string. Compared with identification of the anaphoric morpheme's value from the independent context as in elliptical constructions such as Figure 6.3 and the interpretation of *shi* in emphatic sentences such as Figure 6.2 would require the hearer to make extra processing effort to identify all aspects of underspecification incrementally as and when possible. This uncanonical transition is sufficient to convey the sense of emphasis. The suspense effects in virtue of some action/event having taken place are solely in virtue of the mode of presentation of the information describing the action/event, the 'delayed' presentation of full information with subsequent update. This matches correctly the intuitive force of focus (as well as topic) as generally not relevant to truth conditions, but only to its 'packaging'.

Notes

1 Like its counterpart 'be' in English, *shi* can also occur in other types of copular constructions such as equative (e.g., *Mulan shi na-ge yanyuan* 'Mulan is the actress') or specificational constructions (e.g., *Na-ge yanyuan shi Mulan* 'That actress is Mulan'). Due to space considerations, I shall not discuss these constructions in this book, assuming that the analysis of the copula *shi* can equally apply to them. Also, it should be pointed out that emphatic constructions in Chinese can also be in the *shi . . . de* form, the so-called *shi . . . de* structure, where a particle *de* appears in sentence-final position. The sentence-final *de* is the same morpheme as the nominal marker *de* in *Mulan de mama* 'Mulan's mother', and its omission would not result in ungrammaticality. Due to the specific focus of this chapter, I shall not consider *de* here.

2 Actually, the morpheme *shi* does not always precede the focused element. It can never appear immediately before an object NP like *Lisi* in the example that follows (where the object is phonologically stressed and hence the intended focus).

(i) **Wangwu* *jian* *le* *shi* *Lisi*.
Wangwu see PERF SHI Lisi
'It was Lisi that Wangwu met'.

This puzzling fact can be easily accounted for by the essential property of *shi* being a pro-predicate form, as will be discussed in sections 3 and 4.

3 The affirmative function of the emphatic construction is first discussed in Li and Thompson (1981). They point out that the emphatic construction in Chinese "serves to characterize or explain a situation by affirming or denying some supposition, as opposed to simply reporting an event" (Li and Thompson 1981, p.589). Li and Thompson give examples such as the following one for a justification of their claim that the emphatic construction also serves to deny some supposition.

(i) *women* *(shi)* *bu* *hui* *qifu* *nimen* *de*.
1PL SHI not likely bully 2PL DE
'The situation is that we aren't going to bully you'.

Actually, the emphatic sentence still functions as confirmation. Specifically, the speakers use it to assure the hearers that there is no likelihood of bullying them. Therefore, the construction at issue invariably has the affirmative function. It is also worth mentioning here that *shi* sometimes can serve as an affirmative marker, as shown in the example that follows.

(ii) A: *Mulan* *xihuan* *faguo-cai*.
Mulan like French-dish
'Mulan likes French food'.
B: *shi.*
yes

4 I left out the star symbol * that Huang et al. (2009) originally placed before Figure 6.11b and also Figure 6.12d because it is confusing and misleading, given that it usually indicates ungrammaticality (note that these sentences are completely grammatical, though the occurrence of *shi* in Figure 6.11b yields a contrastive reading).

5 In Classical Chinese, *suo* is an auxiliary, which is usually used before attributive adjectives or verbs, and *ye* is a sentence-final particle used to end a sentence.

6 Depending on context, an anaphoric expression may be assigned different types, while it invariably projects a metavariable to be replaced by some proper representation. For instance, the pronoun *it* in English projects a term of type *e* in a context in which it is interpreted referentially as in *I like it*, *your new book*, but a formula of type *t* in a context in which it is construed expletively as in *it is likely that your new book will become a bestseller* (see Cann et al. 2005, pp.194–198).

7 Readers are referred to an alternative and more sophisticated analysis of nominal predicates discussed in Cann et al. (2005, pp.370–371) and in more detail in Cann (2006), in which the post-copular noun phrase is taken to project an epsilon term that decorates a node LINKed to the subject.

8 A question can be raised here as to whether the copular morpheme in sentences such as Figure 6.22 can be treated as projecting a node of Ty(t). While this possibility cannot be excluded, the Chinese copula is in many cases like its English counterpart 'be', with the latter being reasonably analyzed in Cann et al. (2005) and Cann (2006) as an anaphoric predicate. Treating the Chinese copula uniformly as being a pro-predicate projecting a node of Ty(e →t) would provide a consistent analysis, as shown in section 5.

9 The same kind of analysis applies to emphatic sentences such as Figure 6.4d, which is repeated as (i), which has the word order of Subject + Adjunct 1 + *shi* + Adjunct 2 + VP (note that the first adjunct *zuotian* 'yesterday' can also appear sentence-initially).

(i)	*Wangwu*	*Zuotian*	*shi*	*zai*	*jiuba*	*jian*	*le*	*Lisi*.
	Wangwu	yesterday	SHI	in	pub	see	PERF	Lisi

'It was in the pub that Wangwu met Lisi yesterday'.

The parse of (i) will involve Wangwu being allowed to decorate the subject node with Fo(ι, x, Wangwu'(x)), the sentential adjunct *zuotian* 'yesterday' inducing the upward building of a new ?Ty(t) node and then the downward building of a Ty(t → t) node, its own functor node (the sister node of the intermediate propositional node dominating the subject node) and the copular morpheme *shi* decorating the main predicate node with Fo(SHI). Applying Late *Adjunction will allow the post-copular string to be parsed – namely, Adjunct 2 + VP: the locative adjunct is taken to project a node of Ty ((e→ t) → (e → t)), its own node and a sister Ty(e → t) node which will be duly decorated with the term projected by the VP *jian le Lisi* 'met Lisi'.

10 An object NP can take the elliptical form of the following type:

(i)	*Mulan*	*xihuan*	*Faguo-cai.*	*Yingguo-cai*	*ye*	*xihuan*.
	Mulan	like	French food.	English food	also	like

'Mulan likes French food. English food, too'.

In the example where the subject is identified as a pro-drop, *Yingguo-cai* 'English food' can be treated as a left-dislocated object and analyzed as initially projecting an unfixed node, which would merge into an object node created by the parse of the transitive verb *xihuan* 'like'.

11 Here and in later tree displays, I omit the process of substituting the metavariable U projected by the null subject for a term Fo(ι, x, Mulan'(x)).

7 The cleft construction

1 Introduction

In chapter 6, I have presented an analysis of copular constructions, treating the copula *shi* as providing a predicate pro-form which is enriched through the parse of the postcopular string. In this chapter, I look at another type of construction also involving the copular morpheme *shi* and the function word *de* – namely, the cleft construction in Chinese – and I further explore the structural properties of the Chinese clause. I shall show that although both constructions are copular structures and both can be considered focus structures, unlike the emphatic construction in Figure 7.2, the cleft construction at issue is a syntactic focusing structure displaying right-periphery effects.

To illuminate the use of the cleft construction in Chinese, we can use as an example the canonical sentence already employed to exemplify the emphatic construction and show how distinct syntactic constituents can be made the focus of the sentence. To show that the derivation of the two types of constructions may produce different effects, I repeat the *shi* . . . *de* construction in Figure 7.2a and Figure 7.3a, together with the cleft construction in Figure 7.2b and Figure 7.3b.[1]

Compared with their counterparts in the emphatic construction, the bold-faced expressions as the loci of main prominence are more easily identified in the cleft construction. Syntactically, they appear to be extracted from the pre-copular clause and dislocated to the right periphery of the sentence, whereas apparently their counterparts in the emphatic construction remain in situ, as already discussed in chapter 6.[2] It should be pointed out that traditional grammarians (e.g., Wang 1959; Zhu 1980; Lü 1982), who consider *shi* to be a 'judgmental verb', refer to the construction in question as a 'judgmental sentence', whereas contemporary researchers such as Hedberg (1999) treat it as a pseudo-cleft construction, since they analyze the emphatic construction as corresponding to the cleft structure in English.

Semantically, sentences such as Figure 7.2b and Figure 7.3b are clearly partitioned in terms of the dichotomy presupposition versus focus: the postcopular constituent is construed as focus, as opposed to the pre-copular string construed as presupposition. Precisely, the pre-*shi* string is interpreted as the presupposed

Wangwu jian guo Lisi.
Wangwu see EXP Lisi
'Wangwu has met Lisi'.

Figure 7.1

a. *shi* ***Wangwu*** *jian guo Lisi de.*
SHI Wangwu see EXP Lisi DE
'It is Wangwu that has met Lisi'.
b. *jian guo Lisi de shi* ***Wangwu****.*
see EXP Lisi DE SHI Wangwu
'Who has met Lisi is Wangwu'.

Figure 7.2

a. *Wangwu shi jian guo* ***Lisi*** *de.*
Wangwu SHI see EXP Lisi DE
'It is Lisi that Wangwu has met'.
b. *Wangwu jian guo de shi* ***Lisi****.*
Wangwu see EXP DE SHI Lisi
'Who Wangwu has met is Lisi'.

Figure 7.3

a. There is an x, such that x has met Lisi and x is Wangwu.
b. There is an x, such that Wangwu has met x and x is Lisi.

Figure 7.4

information which is conveyed by a headless relative clause completed by the particle *de*, whereas the post-*shi* noun phrase is understood as the nonpresupposed information. The cleft structure of Figure 7.2b and Figure 7.3b, for instance, can be represented as in Figure 7.4a and Figure 7.4b, respectively, where the presupposed part introduces a variable whose value is provided by the nonpresupposed part.

At the lexical level, the two morphemes *shi* and *de* in the cleft construction seem to receive an interpretation different from their counterparts in the emphatic construction. In the cleft construction, the function word *de* plays a crucial role in determining the nominal status of the pre-*shi* string, as can be attested by the fact that the omission of this word would result in ungrammaticality, as discussed in the preceding chapter.

The fact that *de* is obligatory in the cleft construction suggests that it functions in a different fashion than it does in the emphatic construction: in the former, it is a particle effecting nominalization, while in the latter it is a sentence-final particle expressing evidentiality.

**jian*	*guo*	*Lisi*	*shi*	*Wangwu*.
See	EXP	Lisi	SHI	Wangwu

Figure 7.5

**Wangwu*	*jian*	*guo*	*shi*	*Lisi*.
Wangwu	see	EXP	SHI	Lisi

Figure 7.6

a.	*jian*	*guo*	*Lisi*	*de*	*shi*	***Wangwu***.
	see	EXP	Lisi	DE	SHI	Wangwu
	'Who has met Lisi is Wangwu'.					
a'.	**jian*	*guo*	*Lisi*	*de*	***Wangwu***.	
	see	EXP	Lisi	DE	Wangwu	
b.	*shi*	***Wangwu***	*jian*	*guo*	*Lisi*	*de.*
	SHI	Wangwu	see	EXP	Lisi	DE
	'It is Wangwu that has met Lisi'.					
b'.	***Wangwu***	*jian*	*guo*	*Lisi*	*de.*	
	Wangwu	see	EXP	Lisi	DE	
	'It is Wangwu that has met Lisi'.					

Figure 7.7

a.	*Wangwu*	*jian*	*guo*	*de*	*shi*	***Lisi***.
	Wangwu	see	EXP	DE	SHI	Lisi
	'It is Lisi that Wangwu has met'.					
a'.	**Wangwu*	*jian*	*guo*	*de*	***Lisi***.	
	Wangwu	see	EXP	DE	Lisi	
b.	*Wangwu*	*shi*	*jian*	*guo*	***Lisi***	*de.*
	Wangwu	SHI	see	EXP	Lisi	DE
	'It is Lisi that Wangwu has met'.					
b'.	*Wangwu*	*jian*	*guo*	***Lisi***	*de.*	
	Wangwu	see	EXP	Lisi	DE	
	'It is Lisi that Wangwu has met'.					

Figure 7.8

As regards the *shi* in the construction at issue, functionally it is not exactly the same as the one in the emphatic construction. Specifically, *shi* as a predicate pro-form in the *shi . . . de* construction is optional, as illustrated in the preceding chapter, whereas *shi* in the cleft construction is obligatory.[3]

It is worth noting that sometimes the omission of *shi* does not affect the grammaticality of the relevant sentence – namely, the outcome is still a perfectly natural sentence. Consider the following examples (Figures 7.9 and 7.10) taken from Zhu (1980).

a. *ta* *shuo* *de* *shi* *Shanghai* *hua*.
3SG speak DE SHI Shanghai dialect
'What he speaks is Shanghai dialect'.
b. *ta* *shuo* *de* *Shanghai* *hua*.
3SG speak DE Shanghai dialect
'He speaks Shanghai dialect'.

Figure 7.9

a. *wo* *wanshang* *he* *de* *shi* *niunai*.
1SG evening drink DE SHI milk
'What I drink in the evening is milk'.
b. *wo* *wanshang* *he* *de* *niunai*.
1SG evening drink DE milk
'I drink milk in the evening'.

Figure 7.10

Sentences of this sort, as discussed by Zhu, are both syntactically and semantically ambiguous. Syntactically, they could be regarded either as an NP comprising a relative clause construction marked by *de*, as just shown in footnote 3, or as displayed by the translation, an emphatic or *shi* . . . *de* construction, where *de* cannot be construed as a relativizer and the copula *shi* is omitted since the semantic focus could be identified with the help of the phonological cues. Semantically, the focus could be the subject, the VP or the object if the emphatic stress falls on one of these constituents, as already illustrated in the preceding chapter.

The obligatoriness of *shi* in the cleft construction indicates that it is an indispensable syntactic constituent of the sentence and that the cleft construction is different in nature from the emphatic construction. Unlike its counterpart in the *shi* . . . *de* construction whose realization is through the interaction between syntax and pragmatics, the realization of focus in the construction under discussion is entirely through syntactic means – namely, by dislocating one of the arguments to the postcopular position. Therefore, the construction in question is a purely syntactic focusing construction.

One may pose a question from the factual description of the cleft construction, can the copular morpheme be followed by the verb or VP of the canonical sentence, given that it can in the emphatic construction? The answer is affirmative, but the outcome is distinctive. The construction in the form of VP + *shi* + VP, as observed and discussed by Chao (1968) and Hashimoto (1969) among others, is not a focus construction but a concessive one (see also Yang and Wu 2017). Consider Figure 7.11, which is taken from Hashimoto (1969, p.107) and Figure 7.12, which is derived from Figure 7.1.[4]

ta	*mai*	*shu*	*shi*	*mai*	*shu*,	*keshi*. . .
3SG	buy	book	sure	buy	book	but

'He buys books, to be sure, but.. '.

Figure 7.11

Wangwu	*jian*	*guo*	*Lisi*	*shi*	*jian*	*guo*,	*keshi* . . .
Wangwu	see	EXP	Lisi	SHI	see	EXP	but

'Wangwu has met Lisi, to be sure, but . . . .'

Figure 7.12

Thus we can arrive at a generalization about the characteristic properties of the cleft construction. Unlike the emphatic construction, it is purely a syntactic focusing construction which is effected by reordering the syntactic constituents: any argument of the predicate can appear in the postcopular position and become the focus of the sentence. Unlike its counterpart in the emphatic structure, which is of an in situ nature, the focused constituent, as will be discussed in the next section, is an identificational one in the sense of Kiss (1998): the pre-copular string, a headless relative clause, provides a description of the referent whose identity is provided by the postcopular expression.

2 Previous analyses

In the relevant literature, the cleft construction in question is often discussed along with the emphatic construction. There are two principal reasons for this: one is that both involve the use of the copular verb *shi* and the function word *de* and the other is that both concern the assignment of focus to certain constituents. Although the existence of the emphatic construction and the cleft construction as two types has been acknowledged in the literature, yet no agreement has been reached in the actual language description. Generally speaking, there are two lines of analyses with one claiming that the two patterns, albeit distinguishable in syntactic ordering, are equivalent in semantics, and the other claiming that there is difference, albeit subtle, between the two structures.

Some scholars (e.g., Teng 1979; Lü et al. 1980) consider the cleft construction and the emphatic construction to have the same semantics. Teng (1979), for instance, takes sentences such as Figure 7.13a to be synonymous with Figure 7.13b.[5]

It is true, as pointed out by Lü et al. (1980) in their analysis of *shi*, that the pre-*shi* part is interchangeable with the post-*shi* part, as demonstrated in Figure 7.13. But contrary to the claim of Lü et al. (1980), it is not true that

a.	*Wu*	*Xiansheng*	*jiao*	*de*	*shi*	*yuyanxue*.
	Wu	Mr	teach	DE	SHI	linguistics
	'What Mr.Wu teaches is linguistics'.					
b.	*yuyanxue*	*shi*	*Wu*	*Xiansheng*	*jiao*	*de*.
	linguistics	SHI	Wu	Mr	teach	DE
	'As for linguistics, it is Mr.Wu who teaches it'.					

Figure 7.13

yuyanxue	*Wu*	*Xiansheng*	*jiao*	*(de)*.
linguistics	Wu	Mr	teach	DE
'As for linguistics, Mr. Wu teaches it'.				

Figure 7.14

yuyanxue	*shi*	***Wu***	***Xiansheng***	***jiao***	*de*,	*bu*	*shi*	***women***
linguistics	SHI	Wu	Mr	teach	DE	not	SHI	1PL
zixue	*de*.							
self-study	DE							
'As for linguistics, it is the case that Mr. Wu teaches it, not that we teach ourselves'.								

Figure 7.15

the interchange would leave the semantics unchanged. First, although both the (a) and (b) sentences are copular constructions and can be considered a focus construction, they are distinguishable in the distribution of focus. In Figure 7.13a, the focused constituent is the postcopular NP *yuyanxue* 'linguistics', which appears to be extracted and dislocated at the right periphery of the sentence and assigned the focus status by the copular verb. In contrast, the same expression *yuyanxue* 'linguistics' in Figure 7.13b appears at the left periphery of the sentence and functions as the topic of the utterance, as can be attested by the fact that deletion of *shi* (and *de*) would yield a typical topic construction as in Figure 7.14.

As for the focus of the sentence, it could be either the immediate post-*shi* element, here the subject NP *Wu Xiansheng* 'Mr. Wu' as shown by the translation in Figure 7.13b, which is in general the case, or the post-*shi* string *Wu Xiansheng jiao* 'Mr. Wu teaches', which is a broad focus as discussed in chapter 6.

Second, although both the two types of construction concern the assignment of focus to a certain constituent, the presupposition-focus partitioning in the cleft construction is easily identifiable, whereas the line between presupposition and focus in the emphatic construction is fairly fuzzy. Consider the highlighted cleft construction in Figure 7.16, which shows that the pre-copular part is not only logically presupposed, but may be contextually salient.

xuduo	*yiren*	*chengtian*	*ma*	*meiti*	*ganshe*	*si*		*shenghuo.*
many	artist	all day	curse	media	interfere	private		life
keshi	*cangying*	*bu*	*ding*	*wufengde*	*dan*,	*ni*	*yaoshi*	*guang*
but	fly	not	sting	seamless	egg	2SG	if	stroll
shudian	*shui*	*baodao*	***nimen***	***guang***	***de***	***shi***	***yedian***.	
bookstore	who	report	2PL	stroll	DE	SHI	nightclub	

'Many artists cursed the media for interfering their private life. But flies never sting seamless eggs. Who would produce a report on you if you visit a bookstore? Regrettably where you visit is the nightclub'.
(*China Screen* 2004, p.21)

Figure 7.16

zheshi,	*ta*	*huran*		*ting*	*yi-sheng*		*jingxinde*	*hanjiao:"*
this moment	3SG	suddenly		hear	one-CL		terrifying	shout
Wang Zhuo,	*ni*	*bei*	*bu*	*le!"*	*ta*	*chijingdi*	*zuo*	*qilai*,
Wang Zhuo	2SG	BEI	arrest	SFP	3SG	surprisedly	sit	up
bu,	***shi***	***liang-wei***	***jingcha***	***ba***	***ta***	***jiu***	***qilai***	***de***.
no	SHI	two-CL	policeman	BA	3SG	pull	up	DE

'At this moment, he suddenly heard a terrifying shout: "Zhuo Wang, you are under arrest!" He was surprised and then sat himself up. No, it is the case that two policemen dragged him'.

Figure 7.17

As can be seen in the cleft construction in Figure 7.16, what precedes *shi* conveys the presupposed information and what follows *shi* the new information, constituting the focus of the sentence. As for the emphatic construction, it is not always partitioned in terms of new and presupposed information: sometimes the whole sentence may represent new information and sometimes the presupposed information, particularly when a whole clause is in focus. Consider the following two examples (Figures 7.17 and 7.18) which are taken from Yuan (2003a).

The whole statement in the *shi* . . . *de* sentence in Figure 7.17 is used as a correction and conveys new information, whereas its counterpart in the *shi* . . . *de* sentence in Figure 7.18 presents known information which is already given in the discourse.[6] And there is no partitioning of focus and presupposition in either of the two sentences because, as C. Li and Thompson (1981) correctly point out, the *shi* . . . *de* sentence mainly serves as confirmation.[7]

Furthermore, although both constructions can be considered focus constructions, focus is realized in different ways, as already discussed. The emphatic construction carries an in situ focus, which is not associated with syntactic reordering. In contrast, the cleft construction at issue involves focus extraction: if one of the arguments of the predicate is intended to be in focus, it has to be displaced at the right periphery of the clause, namely the postcopular position. The focused constituent in this construction, in the sense of Kiss

zheshi	*Hu Mali*	*zou*	*guolai.*	*qiaoqiaodi*	*ba*	*yidie*	*bijiben*
this moment	Hu Mali	walk	over	silently	BA	a bunch	notebook
jiao	*gei*	*Zheng*	*Bo*,	*ta*	*shuo:*	*"qian*	*jitian*,
hand in	to	Zheng	Bo	3SG	say	ago	several day
meijing	*ni*	*tongyi*,	*wo*	*sizi*	*ba*	*ni*	*de*
without	2SG	consent	1SG	privately	BA	2SG	's
benzi	*na*	*guolai*,	*ba*	*zhe*	*jitian*	*de*	*biji*
notebook	take	over	BA	these	several day	's	note
ti	*ni*	*chaoshang*	*le.*	*duibuqi".*	*Zheng Bo*	*jidong*	*jile*,
for	2SG	copy	PFV	sorry	Zheng Bo	excite	extremely
Hu Mali	***ti***	***ta***	***chao***	***de***	***biji***!		
Hu Mali	for	3SG	copy	DE	note		

'Then Mali Hu came over. Silently she gave Bo Zheng a bunch of notebooks and said: "A few days ago, without you consent, I took away your notebooks and copied into them the notes of these past days. Sorry". Zheng Bo was extremely excited. It is the case that Mali Hu copied the notes for him!'

Figure 7.18

An identificational focus represents a subset of the set of contextually or situationally given elements for which the predicate phrase can potentially hold; it is identified as the exhaustive subset of this set for which the predicate phrase actually holds.

Figure 7.19 The function of identificational focus

a. It was a hat and a coat that Mary picked for herself.
b. It was a hat that Mary picked for herself.

Figure 7.20

a. Mary picked a hat and a coat for herself.
b. Mary picked a hat for herself.

Figure 7.21

(1998), is a type of identificational focus, which is subject to a uniqueness or an exhaustiveness condition. É. Kiss defines identificational focus as follows (Figures 7.19–7.21).

É. Kiss uses the following examples to illustrate the difference between cleft focus that is identificational and exhaustive, and ordinary focus that is informational and nonexhaustive.

She states that Figure 7.20b is not a logical consequence of Figure 7.20a; on the contrary, it contradicts Figure 7.20a. Figure 7.21b, on the other hand, is a logical consequence of Figure 7.21a. Thus in the cleft construction *Wu Xiansheng jiao de shi yuyanxue* "What Mr. Wu teaches is linguistics", *yuyanxue* 'linguistics' is the identificational focus and the set of contextually or

situationally given elements for which the predicate phrase *jiao* 'teach' can potentially hold is, for example, {economics, linguistics, politics, etc.}. {linguistics} is identified as the exhaustive subset of this set for which the phrase *Wu Xiansheng jiao* 'Mr.Wu teaches' holds. Of course, the identification of the right-peripheral constituent as focus is facilitated with the help of the headless relative clause: the pre-*shi* string presupposes the existence of an entity and the occurrence of the post-*shi* expression instantiates the existence of the entity. In one word, the distinction between two parts of the sentence as presupposition and focus is transparent.

As far as the emphatic construction is concerned, it does not function as a syntactic focusing construction as the cleft construction does. As already discussed in the preceding chapter, the whole construction mainly functions as an evidential structure, although it contains a focused element. Compared with the clear distinction between the pre-copular part as presupposition and the postcopular part as focus in the cleft construction, the informational status of the focused element in the *shi* . . . *de* construction is not so easily identifiable. Sometimes it appears to be an informational focus, as in Figure 7.17, and sometimes an identificational focus, as in Figure 7.2, which is repeated here as Figure 7.22 where the subject focus has clearly a contrastive nature: it is *Wangwu*, not someone else who has met *Lisi*.

Let us now turn to another line of analysis. Of the traditional linguists, Zhu (1980) provides perhaps the most detailed analysis of the emphatic construction and the cleft construction at issue. Interestingly, Zhu views the two structures as semantically distinct, though he considers them of the same type – "judgmental sentences" in his terminology. Whether in the emphatic construction or the cleft construction at issue, the morpheme *de* in Zhu's analysis is the marker of nominalization whose grammatical function is to convert a VP into an NP in the form of VP + *de*. Accordingly, *zuotian wanshang lai de* in both of the following sentences (Figure 7.23a and Figure 7.23b) can be construed as *zuotian wanshang lai de ren* 'the person who came last night'.

In Zhu's view, the logical relationship between *Xiao Wang* and *zuotian wanshang lai de* in sentence Figure 7.23a corresponds to that between member and class; Figure 7.23a, therefore, can be interpreted as *Xiao Wang* is a member of the class 'the people who came last night', as illustrated by the translation; whereas the logical relationship between *Xiao Wang* and *zuotian wanshang lai de* in sentence Figure 7.23b corresponds to identification. Figure 7.23b, therefore, can be construed as 'the person who came last night is identified with Xiao Wang', as shown by the translation.

shi	***Wangwu***	*jian*	*guo*	*Lisi*	*de.*
SHI	Wangwu	see	EXP	Lisi	DE

'It is Wangwu that has met Lisi'.

Figure 7.22

a. *Xiao Wang shi zuotian wanshang lai de.*
little Wang SHI yesterday evening come DE
'Wang is one of the people who came last night'.
b. *zuotian wanshang lai de shi Xiao Wang.*
yesterday evening come DE SHI little Wang
'The person who came last night is Wang'.
(Zhu 1980)

Figure 7.23

Xiao Wang zuotian wanshang lai de.
little Wang yesterday evening come DE
'It was the case that Wang came last night'.

Figure 7.24

**zuotian wanshang lai de Xiao Wang.*
yesterday evening come DE little Wang

Figure 7.25

Zhu is right in pointing out that sentences such as the aforementioned pair do not have the same semantics, yet his analysis does not appear to be on the right track. Discourse-pragmatically, as discussed in chapter 6, Figure 7.23a could also be interpreted as an emphatic structure with an emphasis on the adverbial NP, the time of Xiao Wang's visit, and hence it can be semantically equivalent to the English cleft sentence, 'It is last night that Xiao Wang came'. Also, it is generally agreed among Chinese linguists (e.g., Chao 1968; N. Li et al. 1998; Yuan 2003a) that the morpheme *de* in this sort of sentence is a particle the occurrence of which at the sentence-final position endows the relevant sentence with a sense of evidentiality: it assures the hearer that something does happen. One piece of evidence is that omission of *shi* does not result in ungrammaticality, as shown in Figure 7.24, suggesting that *de* is not a nominalizer, and the post-*shi* string is not a noun phrase because otherwise it would be likely to be ungrammatical.

In contrast, omission of *shi* in Figure 7.23b would result in ungrammaticality as shown in Figure 7.25, suggesting that it plays an essential role in determining the formation and interpretation of the sentence. At this point, Zhu correctly claims that *shi* in sentences such as Figure 7.23b denotes identification.

Cheng (1983) shares the same view with Zhu in his analysis of sentences in Figure 7.26. He claims that there is a subtle difference in semantics between them: the predicate in the (a) sentence denotes subsumption under a class or categorization, while that in the (b) sentence denotes identification.

Like Zhu's example Figure 7.23a, Figure 7.26a displays some ambiguity as discussed in chapter 6. It can be interpreted either as an inverted pseudocleft as

a. *zidian* *shi* *ta* *yao* *de*.
dictionary SHI 3SG want DE
'A dictionary is what he wants'.
b. *ta* *yao* *de* *shi* *zidian*.
3SG want DE SHI dictionary
'What he wants is a dictionary'.

Figure 7.26

shown by Cheng's translation, or an emphatic sentence with a subject focus, in which case it has nothing to do with categorization.

In summary, the cleft construction at issue is different from the emphatic construction in terms of focus realization, focus distribution and information value. It is a syntactic focusing construction where the focus is realized through syntactic reordering and is dislocated at the right periphery of the sentence. In addition, the focus is always interpreted as identificational, as opposed to the dubious status of its counterpart in the emphatic construction. In the next section, I shall show how the identificational effects of the cleft construction can be captured under a dynamic account.

3 A dynamic analysis

As noted, the cleft construction is composed of two parts, the pre-copular string and the postcopular expression. Unlike the morpheme *de* in the emphatic construction, which is an optional particle, the one in the cleft construction is an obligatory nominalizer. Syntactically, the pre-copular string and the postcopular expression are on the same footing. Semantically, both the pre-copular part and the post-copular noun part are referential. Intuitively, rather than picking out some definite entity, the pre-*shi* headless relative clause functions as a description whose referent is assumed to be unknown to the hearer and whose identity is provided by the post-*shi* expression.[8] Therefore, to characterize the structural and semantic properties of the cleft construction, we are supposed to characterize the identificational effects.

To provide a dynamic account of the cleft construction, we encounter the problem of how to characterize the headless relative clause in Chinese. The characterization of the Chinese headless relative clause appears problematic, compared with its English counterpart, because the English is introduced by a pronoun, which in DS is analyzed as projecting a metavariable as illustrated in chapter 2, whereas the Chinese is completed with a meaningless particle *de* whose actions seem far from clear at first sight. Before we tackle the Chinese cleft construction, let us first consider how to analyze its English counterpart, for instance, the translation of Figure 7.3b, which is repeated here as Figure 7.27.

Wangwu jian guo de shi Lisi.
Wangwu see EXP DE SHI Lisi
'Who Wangwu has met is Lisi'.

Figure 7.27

As introduced in chapter 2, relative clauses are characterized by means of the rule of LINK transition, which allows for the construction of a pair of structures, with the first one inducing the second one and at the same time imposing a constraint for sharing a common term. The parse of a relative clause is thus a process of building a *Ty(e)* node decorated by a term *Fo(α)* from which a propositional tree is projected and required to contain a copy of *Fo(α)*. As for the English sentence *who Wangwu has met is Lisi*, the analysis begins with the pronoun *who*, whose lexical entry can be given as follows (Figure 7.28):

IF ?Ty(e)
THEN IF $\langle\downarrow_*\rangle$Fo($\alpha$)
THEN ABORT
ELSE put(Ty(e), Fo(U),?$\exists$x.Fo(x));
make($\langle$L$\rangle$), go($\langle$L$\rangle$), put(?Ty(t));
make($\langle\downarrow_*\rangle$), go($\langle\downarrow_*\rangle$), put(Ty(e), Fo(U), ?$\exists$x.Fo(x)); go($\langle\uparrow_*\rangle$)

Figure 7.28 The lexical entry for *who*

The set of actions shows that like a pronoun, *who* projects a metavariable with a bottom restriction, but in addition induces the building of a propositional structure with a copy of the metavariable. The parse of the pseudocleft sentence proceeds in the normal way after the linked structures are constructed. The effect of processing the pre-copular clause is illustrated in the tree of Figure 7.29, where the unfixed node merges with an open internal argument node.

The LINKed tree then compiles to yield a logical formula *Meet'(U)(Wangwu')*, since the current context does not provide an obvious substituend for the metavariable. The search for the value of the metavariable *U* carries on as the parse of the pseudocleft sentence proceeds. The pointer then moves to the predicate node, licensing the parse of the copular verb. In chapter 6, I showed that the copula *shi* in Chinese is a predicate pro-form which projects underspecified content whose value is provided from the context in which it appears. Similarly, we can treat *be* as an underspecified predicate which is dependent on the context for interpretation. Since what follows the copula in the pseudocleft construction is an NP, we can treat it as one-place predicate of type $e \rightarrow t$, whose lexical actions can be stated as follows in Figure 7.30.

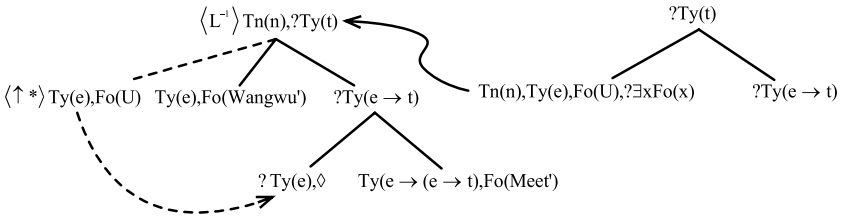

Figure 7.29 Parsing *who Wangwu has met*

IF ?Ty(e → t)
THEN put(Ty(e → t), Fo(BE), ?∃x.Fo(x))
ELSE ABORT

Figure 7.30 The lexical entry for *be*

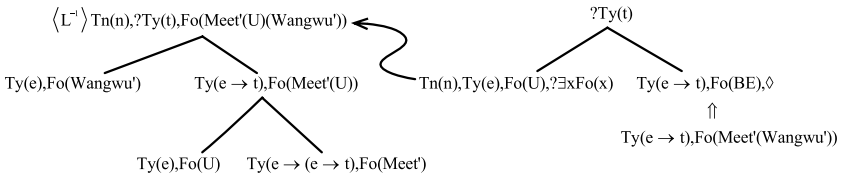

Figure 7.31 Parsing *Who Wangwu has met is*

The predicate node is thus decorated with the metavariable *BE*. As discussed in the preceding chapter, the copula as a pro-predicate takes its value from the context in which it occurs. To identify the value for the predicate metavariable, I exploit the opportunities opened up by the DS perspective of for admitting inferential pragmatic processes into linguistic explanation. Here I adopt a general Relevance-theoretic perspective (see Sperber and Wilson 1995) on the pragmatic process of substitution: the hearer will take as substituend the most accessible formula that is likely to produce significant inferential effects (cf. Cann et al. 2005; Cann 2006). Under the current circumstances, what is appealing is the one-place predicate *λx.Meet'(x)(Wangwu')*, which has not been used to identify any substituend. Therefore, it should be chosen as substituend as shown in Figure 7.31.

After substitution, the pointer moves up to the top node in order to complete the propositional type requirement. At this point all type requirements on its daughter nodes are fulfilled but there remains an outstanding formula requirement on the subject node, which prevents the tree from being completed. So the pointer must move down the tree from the top node to the subject node in order to fulfill the requirement on this node. The rule of Late *Adjunction, which has been introduced in chapter 6, applies to permit the parse of the NP

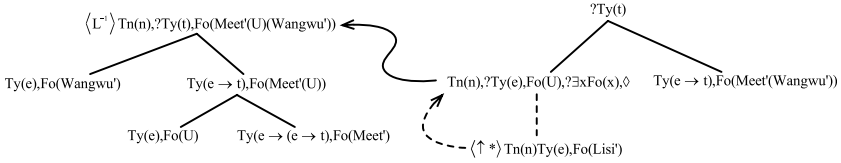

Figure 7.32 Parsing *Who Wangwu has met is Lisi*

$$\frac{\{\ldots\{Tn(a),\ldots Fo(\phi),\ Ty(t),\Diamond\}\},\{\langle L^{-1}\rangle MOD(Tn(a)),\ \ldots Fo(\psi),\ Ty(t)\}}{\{\ldots\{Tn(a),\ldots Fo(\phi \wedge \psi),\ Ty(t),\Diamond\}\},\{\langle L^{-1}\rangle MOD(Tn(a)),\ \ldots Fo(\psi),Ty(t)\}}$$

$$MOD \in \{\langle \uparrow_0 \rangle, \langle \uparrow_1 \rangle\}^*$$

Figure 7.33 LINK evaluation

Lisi, which is taken to project an unfixed node. The value for the metavariable *U* is hence established through the Merge of the unfixed node with the subject node, as shown in Figure 7.32.

After the substitution of the metavariable *U* with the formula value *Fo(Lisi')*, the pointer moves from the subject node to the top node of the tree, which can pile up and yield a propositional formula *Fo(Meet'(x)(Lisi')(Wangwu'))*. To interpret the output structure of parsing *Who Wangwu has met is Lisi*, we can apply the rule of LINK Evaluation as stated in Figure 7.33, which shows that when the pointer sits at a completed type *t* node, and if there is another completed type *t* node which is linked to the pointed node, the combination of the two nodes' formula values is the output value of the whole structure.

The result of interpreting the English sentence is therefore *Fo(Meet' (Lisi') (Wangwu') ∧ Meet' (Lisi')(Wangwu'))* – two conjoined Ty(t) expressions.

Let us now return to the parse of the cleft construction in Chinese. Unlike the English sentence which begins with a pronoun, the Chinese ends up with the relativizer *de*, displaying the head-final properties opposed to the head-initial properties of English relative clauses. Presumably, the tree growth of parsing the pre-copular headless relative clause *Wangwu jian guo de* 'Who Wangwu has met' is upward, with the relativizer *de* projecting a sequence of actions which induces the LINK transition from the top node onto a head node. Undoubtedly, the characterization of the headless relative clause in Chinese hinges on the morpheme *de*. We now go into the question of how to define the lexical entry of this relative marker.

As mentioned in chapter 6, the modifying *de* is diachronically derived from a demonstrative and now devoid of its original definiteness value. Following the spirit of Simpson (2002)'s analysis that *de* is a bleached determiner and can be considered expletive-like, and the intuition that upon hearing *de* in the similar construction native speakers would expect a noun phrase to occur

IF Ty(t)
THEN IF ⟨↓*⟩(Fo(U),?∃x.Fo(x));
THEN make(⟨L^{-1}⟩),go(⟨L^{-1}⟩), put(Ty(e),Fo(U),?∃x.Fo(x));
ELSE ABORT
ELSE ABORT

Figure 7.34 The lexical entry for *de*

a.	**Wangwu*	*jian*	*guo*	*Zhangsan*	*de*	*shi*	*Lisi*.
	Wangwu	see	EXP	Zhangsan	DE	SHI	Lisi
b.	**Zhangsan*	*jian*	*guo*	*Lisi*	*de*	*shi*	*Wangwu*.
	Zhangsan	see	EXP	Lisi	DE	SHI	Wangwu

Figure 7.35

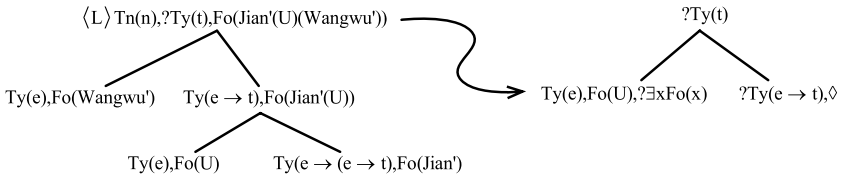

Figure 7.36 Parsing *Wangwu jian guo de*

in the post-*de* position, we can define the lexical entry of *de* as follows in Figure 7.34.[9]

The trigger for *de* is a propositional type, because the headless relative clause is already parsed prior to this relativizer. The action of *de* projecting a node of type *e* depends on the pre-*de* string, as indicated by the second clause. Specifically, *de*'s inducing the LINK transition onto the head node requires there to be a proposition containing an uninstantiated metavariable. Such a condition being satisfied, *de* would project a metavariable which is exactly of the same value as the metavariable existing in the initial structure with a value *Fo(U)*. In other words, *de* projects a metavariable as annotation to the head node, which is inversely linked to the top node of the first tree projected by the relative clause. This analysis straightforwardly explains why the following sentences are not well formed (Figure 7.35).

At the point all the elements of the headless string *Wangwu jian guo de* 'who Wangwu has met' have been processed, there is no obvious substituend for the metavariable. So the pointer moves to the top node, and then through the general rules of Introduction and Prediction, the predicate node is constructed, which licenses the parse of the copula verb *shi*, as shown in Figure 7.36, where the pointer sits at the functor node, requiring it to be developed.[10]

In chapter 6, the copula *shi* is analyzed as underspecified in both type and content, and is enriched through the parse of the post-*shi* string. In the cleft construction, we treat it as a one-place predicate of type $e \rightarrow t$, rather than type

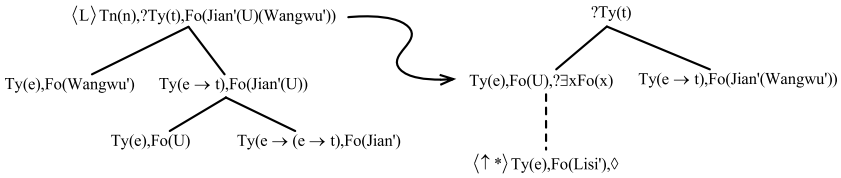

Figure 7.37 Parsing *Wangwu jian guo de shi Lisi*

ambiguous, since it is invariably followed by a noun phrase. The parse of *shi* is similar to that of *be*; that is, it projects a predicate metavariable SHI whose potential substituend is the one-place predicate *λx.Jian'(x)(Wangwu')* derived in the pre-copular string. The rest of the parse of the sentence is similar to that of the English one. The incompleteness of the subject node forces the pointer to move back and through Late *Adjunction the post-*shi* expression *Lisi* is parsed, which projects an unfixed node as shown in Figure 7.37.

The value of the metavariable *U* is then instantiated as *Fo(Lisi')* through application of Merge. The output value of parsing *Wangwu jian guo de shi Lisi* has the identical result as the English pseudocleft, i.e. *Fo(Meet'(Lisi')(Wangwu') ∧ Meet'(Lisi')(Wangwu'))*, two conjoined Ty(t) expressions.

Notice how the identificational reading and the focus effect of the construction at issue is reflected in the dynamic account presented earlier. The descriptive property of the headless relative clause in the pre-copular position is characterized by treating it as entailing a metavariable with associated presupposition decorating the subject node. The instantiation of the metavariable is characterized by identifying its substituend at a later stage – that is, through the parse of the definite noun phrase in the postcopular position, hence the identificational effect. As for the focus effect of the construction, it is characterized by analyzing the postcopular expression as first projecting an unfixed node through Late *Adjunction and then being located at a fixed position through Merge.

4 Summary

In this chapter, I have provided an account of the cleft construction that, in line with the account of copular constructions in chapter 6, still treats *shi* as a pro-predicate, which is semantically underspecified and pragmatically enriched from the local context. Like the one adopted in the preceding chapter, the dynamic analysis of the copula is carried out through pragmatic inference. By construing the pre-copular string as a description of a referent whose value is provided by the postcopular constituent, the dynamic analysis proposed here explains why the construction at issue denotes identification. By treating the postcopular noun phrase as projecting an unfixed node which is the update for the 'subject' node, the proposed analysis also explains why the construction at issue gives rise to a focus interpretation. The successful characterization has

shown that the cleft construction has right-periphery effects, though in a less obvious fashion.

Notes

1 Although in the emphatic construction temporal or locative expressions can become the marked focus of the sentence, they rarely appear in the post-copular position of the cleft construction at issue. Consider the following pairs:

(i) a. *Wangwu shi zuotian jian (le/guo) Lisi de.*
Wangwu SHI yesterday see PERF/EXP Lisi DE
'It was yesterday that Wangwu met Lisi'.
b. **Wangwu jian Lisi de shi zuotian.*
Wangwu see Lisi DE SHI yesterday
'When Wangwu met Lisi was yesterday'.

(ii) a. *Wangwu shi zai jiuba jian (le/guo) Lisi de.*
Wangwu SHI in pub see PERF/EXP Lisi DE
'It was in the pub that Wangwu met Lisi'.
b. **Wangwu jian Lisi de shi zai jiuba.*
Wangwu see Lisi DE SHI in pub
'Where Wangwu met Lisi was in the pub'.

In addition, pseudocleft sentences in English such as *what John is is brilliant* have no counterparts in Chinese. Therefore, I shall limit the discussion to those constructions where an argument of the predicate is extracted and dislocated to the post-copular position. I shall continue to gloss the copula *shi* and the particle *de* as SHI and DE as in the preceding chapter.

2 Following Prince (1978), who in the spirit of Higgins defines *wh*-clefts as sentences of the form *What S – Ci is/was Ci, where S – Ci = Sentence minus Constituent*, I exclude all those whose subject clause has a lexical head and those which look like the so-called inverted pseudo-clefts in English.

3 When one of the verb's arguments becomes the focused constituent, the outcome of deleting *shi* could possibly be construed as a relative clause, as already pointed out in chapter 6.

(i) *jian guo Lisi de Wangwu*
see EXP Lisi REL Wangwu
'The Wangwu who has met Lisi'

(ii) *Wangwu jian guo de Lisi*
Wangwu see EXP DE Lisi
'The Lisi who Wangwu has met'

4 This sort of concessive construction, as pointed out by Hashimoto (1969), can have variant forms if the VP contains an object. For sentences in Figure 7.11 and Figure 7.12, Chinese native speakers can also say:

(i) a. *ta mai shi mai shu, keshi. . .*
3SG buy SHI buy book, but
b. *ta mai shu shi mai, keshi. . .*
3SG buy book SHI buy but

c. **ta* *mai* *shu* *shi* *shu*, *keshi*. . .
3SG buy book SHI book but

(ii) a. *Wangwu* *jian* *guo* *Lisi* *shi* *jian* *guo* *Lisi*, *keshi*. . .
Wangwu see EXP Lisi SHI see EXP Lisi but

b. *Wangwu* *jian* *shi* *jian* *guo* *Lisi*, *keshi*. . .
Wangwu see SHI see EXP Lisi but

c. **Wangwu* *jian* *guo* *Lisi* *shi* *Lisi*, *keshi*. . .
Wangwu see EXP Lisi SHI Lisi but

5 As has been discussed in the preceding chapter, it is sometimes problematic to identify and translate a *shi* . . . *de* construction. Because of this, sentences such as Figure 7.13b are also translated as *linguistics is what Mr. Wu teaches* in the literature, a so-called inverted pseudocleft construction (e.g., Hedberg 1999). The native speakers I queried insist that the current translation should be closer to the meaning of the Chinese because, it is a *shi* . . . *de* construction where the post-*shi* constituent is invariably interpreted as the focus of the sentence.

6 As Zubizarreta (1998) points out, there is no unitary definition of focus so far in the literature and the different researchers use the same terms such as focus/presupposition to mean different things in many cases. The characterization of focus/presupposition in terms of new/old information is not tenable because, as shown earlier, old information may also be focused. Here it is not my intention to go into this fiercely contested area.

7 Hedberg (1999) claims that the presupposition of English clefts needs to be split in Chinese between topic material that precedes *shi* and presupposed material that follows the focus between *shi* and *de*. This claim may never apply to the case where a whole clause is in focus.

8 See Cann (2006) for an analysis of specificational copular clauses in English.

9 Kempson et al. (2001, p.139) suggest that to reflect the spirit of Simpson's analysis of *de* as a determiner, this complementizer can be defined as projecting a sequence of actions: first to project a metavariable as annotation to one such node of type *e* and second to induce the LINK transition onto a head node, imposing a requirement for that same metavariable on that head node. This kind of analysis can only apply to relative clauses such as Figure 7.3b, the one being discussed here, but not those such as Figure 7.2b, where the subject NP is missing.

(i) *jian* *guo* *Lisi* *de* *shi* *Wangwu*.
see EXP Lisi DE SHI Wangwu
'Who has met Lisi is Wangwu'.

Therefore, it may be inappropriate to allow *de* to be responsible for projecting an argument daughter node of the verb, because it has something in common with the relative pronoun in English in that it is only responsible for the connection between the head node and the relative clause.

10 For simplicity, the resolution process of the verb's underspecification is ignored in the tree display here.

8 Semantic underspecification

Cases of personal pronouns

1 Introduction

In the preceding chapters I have focused on structural underspecification in some grammatical constructions. In this chapter, I address issues concerning semantic underspecification, precisely the different uses of a third-person pronoun in Chinese, as exemplified by Mandarin *ta* in Figure 8.1 through Figure 8.3.

In Figure 8.1, the pronoun *ta*, which is generally considered singular in traditional grammar in contrast to its plural counterpart *tamen* 'they', is used canonically and typically referential in the sense that a singular pronoun is anaphorically related to a singular NP in the preceding utterance. In Figure 8.2, the pronoun is unusually anaphorically related to a plural NP in topic position; in the context of sentences such as those in Figure 8.2, *ta*, though still referential, is interpretively different from the same pronominal form in Figure 8.1 in that it has a collective reading; that is, it refers to *neixie gua* 'those melons' in Figure 8.2a or *zhe-bang xiaotou* 'this gang of thieves' in Figure 8.2b as a whole.[1] More specifically, the two sentences in Figure 8.2 should be understood in the sense of "We should eat those melons all at once" and "The police would rather kill this gang of thieves all at once", respectively. In Figure 8.3, the pronoun does not have an antecedent, nor does it have a referent,[2] because of which it has been called a 'dummy', 'empty', 'expletive' or 'non-referential' pronoun in traditional, as well as generative accounts (see Chao 1968; Lü 1985; Iljic 1987; Lin 1994; Zhang 2002; Wu 2004; Lin and Zhang 2006; Wu and Matthews 2010; Yuan 2012; Wu and Cao 2016). Notice that the pronoun *ta* in Figure 8.3 meets Postal and Pullum's (1988, p.636) criteria for expletive status: (i) morphologically identical to a pro-form, (ii) non-referential, being neither anaphoric or cataphoric and (iii) devoid of any but a vacuous thematic role.

Hence the referentiality of the pronoun *ta* seems to vary when it occurs in different structural contexts. As far as the expletive use of *ta* is concerned, we need to spell out the structural context in which the pronoun's expletive reading occurs. First, *ta* occurs in postverbal position. Specifically, it must occur between the main verb and an indefinite NP. In general, the verbs involved are regular transitive ones, and the nonspecific indefinite NPs have thematic

a. *wo you yi-zhi gou. ta shi wode hao pengyou.*
1SG have one-CL dog 3SG is my good friend
'I have a dog. It is my good friend'.
b. *nei-tiao yu hen da. mama mai le (ta).*
that-CL fish very big Mum buy ASP 3SG
'The fish was very big. Mum bought it'.

Figure 8.1

a. *neixie gua, women yao chi le ta.*
Those melon 1PL should eat ASP it
'Those melons, we should eat them'.
b. *zhe-bang xiaotou, jingcha henbude sha le ta.*[1] (Xu 1999, p.5)
this-gang thieves police would-rather kill ASP 3SG
'This gang of thieves, the police would rather kill them'.

Figure 8.2

a. *women chi ta shi-wan mian.*
1PL eat 3SG ten-bowl noodle
'Let's eat ten bowls of noodles!'
b. *women he ta wu-ping jiu.*
1SG drink 3SG five-bottle wine
'Let's drink five bottles of wine!'

Figure 8.3

a. *women chi ta* [*shi-wan mian/*mian/*zhe shi-wan mian*].
1PL eat 3SG ten-bowl noodle/noodle/this ten-bowl noodle
'Let's eat ten bowls of noodles'
b. *women he ta* [*wu-ping jiu/*jiu/*na wu-ping jiu*].
1PL drink 3SG five-bottle wine/wine/that five-bottle wine
'Let's drink five bottles of wine'

Figure 8.4

properties.[3] Basically, all (mono) transitive verbs can appear in the expletive construction in Figure 8.3. Second, like the English expletive 'it' in "I take it that Iris is writing a novel", which is associated with a following clausal string,[4] *ta* appears to be associated with the following indefinite NP (see also Lin 1994). Specifically, the associate of *ta* as an expletive cannot be a bare NP or a definite NP, but only a nonspecific indefinite NP, as illustrated in Figure 8.4.

Lü (1985) conjectures that the reason why the pronoun *ta* in the expletive construction must be followed by a nonspecific indefinite is perhaps that the pronominal form would otherwise be construed as referential. This conjecture

a.	*women*	*taoyan*	*ta (,)*	*zhe-ge*	*ren.*	
	1PL	dislike	3SG	this-CL	man	
	'We	dislike	him,	this	guy'.	
b.	*women*	*jiu*	*renshi*	*ta(,)*	*yi-ge*	*ren.*
	1PL	just	know	3SG	one-CL	person
	'We just know one person, that is him'.					

Figure 8.5

**wo*	*jiu*	*mai*	*ta*	*na-ben*	*shu.*
1SG	just	buy	3SG	that-CL	book
'I just buy it, that book'.					

Figure 8.6

a.	*women*	*chi*	*le*	*ta*	*shi-wan*	*mian.*
	1PL	eat	PERF	3SG	ten-bowl	noodle
	'We ate ten bowls of noodles of his/hers'.					
b.	*women*	*he*	*guo*	*ta*	*wu-ping*	*jiu.*
	1PL	drink	EXP	3SG	five-bottle	wine
	'We have drunk five bottles of wine of his/hers'.					

Figure 8.7

seems quite reasonable because referential pronouns, which are generally treated as definite descriptions, are usually anaphorically related to specific or definite NPs. If, for instance, the NP following *ta* is definite or specific, the pronominal form cannot be construed as expletive, but must be construed as referential, with the definite or specific NP construed as in apposition to the pronoun, as Figure 8.5 shows.

The nonspecificity of the NP following *ta* in Figure 8.3 rules out the possibility that the indefinite NP in Figure 8.3 is in apposition to the pronoun, for two major reasons: (i) usually a plural NP cannot be in apposition to a singular pronoun (note that *ta* is generally a singular pronoun, as mentioned earlier) and (ii) in general, a non-animate NP in Chinese cannot be in apposition to a pronoun, as shown in Figure 8.6.[5]

There is another point worth noting about the structural context which gives rise to the expletive reading of *ta*: the pronoun must occur with an irrealis predicate. If the verbs in the Mandarin sentences Figure 8.3 have realis modality; that is, if the verbs take an aspect marker as in Figure 8.7, *ta* can only be construed as referential – namely, referring to a particular person that has been mentioned in the previous discourse (note that in speech but not in writing, the third-person pronoun *ta* does not make a distinction between masculine and feminine).

This can be accounted for by the fact that in general, realis modality makes noun phrases including pronouns specific or referential (see, e.g., Jackendoff 1972; Givón 1989; Bybee and Fleischman 1995). As Jackendoff (1972, p.286) points out, "If the sentence claims such-and-such a state of affairs or event to have been realized in the real world, it follows that the participants in this state of affairs or event can be identified". In the Mandarin case, realis modality would make the pronominal form *ta* have a definite reading (i.e., it would be construed as referential, and hence a definite nominal), and the indefinite NP following *ta* a specific reading. By contrast, the indefinite NP following *ta* in irrealis contexts tends to have a nonspecific reading, and the pronominal form an expletive reading in the examples of Figure 8.3, because it does not have an antecedent in the sentence containing it (see footnote 2), nor can it be in apposition to the indefinite NP.

In this chapter, I attempt to provide both structural and functional characterizations of the different uses of the pronoun *ta* in Mandarin,[6] assuming that there is only a single representation of the same pronominal form, while sustaining a unitary account of anaphora as a pragmatic process. The chapter is organized as follows. Section 2 presents a critical review of some relevant analyses. Section 3 provides a unitary analysis within the DS framework. Section 4 concludes the chapter.

2 Previous analysis of expletive *ta*

In the literature, there does not seem to be any unitary account of the different uses of the pronoun at issue. Since the construal of *ta* as referential (typically or not) in sentences such as Figure 8.1 and Figure 8.2 is relatively straightforward, I focus mainly on existing analyses proposed to account for sentences such as Figure 8.3 – namely, the expletive construction, whose analysis has aroused great interest among linguists working on Chinese.

Following Chao's (1968) classic work on Chinese grammar in which *ta* in sentences such as Figure 8.3 is called a 'dummy indirect object', researchers have generally taken the pronoun to be non-referential. However, Iljic (1987) proposes that the Chinese pronoun may have some semantic import. He states that 'empty *ta*' has a connotation of 'no matter what' or 'regardless of', since its occurrence gives rise to a strength-of-feeling effect, as indicated by the English translations of Figure 8.3. This sort of account does not seem to be on the right track. First, it is the whole construction, rather than the empty pronoun alone, that gives rise to a strength-of-feeling effect. Second, the construction at issue as a whole does not really have the sense Iljic describes, but actually a sense of 'until one feels completely satisfied' or 'to one's complete satisfaction'. This sort of sense can be seen more clearly in the idiomatic type of expletive construction in Figure 8.8 (adapted from Wu 2004).[7]

In addition, we have two pieces of supportive evidence for the kind of strong sense just described: one is that the main verb, but not the dummy element in the construction, should always be emphatically stressed; the other is that

a.	*he*	*ta*	*ge*	*gou*
	drink	3SG	CL	enough
	'drink to one's satisfaction'			
b.	*wen*	*ta*	*ge*	*shui–luo–shi–chu*
	ask	3SG	CL	water–fall–rock–out
	'do a thorough interrogation (until everything is clear)'			

Figure 8.8

even without the dummy pronoun, the same kind of strong sense can still be expressed if the main verb is emphatically stressed, which indicates that 'empty *ta*' does not really have any intrinsic connotation (see also Zhang 2002). The reason why the construction gives rise to a strength-of-feeling effect should be better accounted for from a constructionist perspective (see Goldberg 1995, 2006). That is, sentences containing dummy *ta* are actually a particular type of construction, in the sense of a conventionalized pairing of form and function: structurally it is a pseudo-double object construction; functionally it has some special expressive effects; namely, it is more lively than a sentence without the expletive element, in the words of Chao (1968).[8]

A generative analysis proposed in Lin (1994) claims that the dummy pronoun in sentences such as Figure 8.3 should be construed as the specifier of AgrOP instead of an indirect object. According to Lin, *ta* is an NP and hence must be assigned a structural case (following Chomsky 1981). If the pronoun occupies the [Spec, AgrOP] position, then it can be assigned a structural case by the verb that undergoes head-to-head raising to Asp.

Since the pleonastic *ta* must receive a structural case from the verb, it must be adjacent to the verb. As for the object NP, it is construed as being assigned an inherent case rather than structural case, which accounts for why the object NP does not need to be adjacent to the verb. Semantically, Lin proposes that *ta* has an inherent meaning of existential closure, and therefore it must quantify over variables introduced by its associate. This requires its associate to be an indefinite NP, because only indefinite NPs introduce novel variables that can be bound by a quantifier (see Heim 1982; Diesing 1992). Lin's analysis runs into some difficulties. For instance, if the pronoun *ta* is lexically empty as widely assumed in the literature, it should not have such features as 'existential closure' and 'quantifier'. Also, as pointed out by Lin and Zhang (2006), if object NPs in Chinese could be assigned an inherent case, we then would not expect movement in passive constructions. But this is not the case, because object NPs do appear to move in Chinese passives. For example, a canonical *bei*-passive such as *women bei ta dabai le* (lit. we BEI him beat ASP) 'we were beaten by him', can be analyezd as involving movement of the object NP *women* in *ta dabai le women* (lit. he beat ASP us) to the subject position of the passive.

Recently, Yuan (2012) has proposed a VP pro-form analysis, suggesting that the pronoun in question could be an anaphoric element occurring between a verb and its object, and its antecedent is the whole VP, as illustrated by the structure of Figure 8.9a.

a.	*ming-nian*	*wo*	*yao*	*mai*	*ta*	*yi-liang*	*Santana.*	
	next-year	1SG	will	buy	3SG	one-CL	Volkswagen	
	'Next year, I will buy a Volkswagen!'							
b.	*ming-nian*	*wo*	*yao*	[VP	*mai*	*ta*	*yi-liang*	*Santana*]i
	next-year	1SG	will		buy	3SG	one-CL	Volkswagen

Figure 8.9

a.	**ming-nian*	*wo*	*yao*	*mai*	*ta*	*Santana.*	
	next-year	1SG	will	buy	3SG	Volkswagen	
b.	**ming-nian*	*wo*	*yao*	*mai*	*ta*	*na-liang*	*Santana*.
	next-year	1SG	will	buy	3SG	that-CL	Volkswagen

Figure 8.10

Technically, Yuan's proposal would be an i-within-i configuration and hence circular: the pronoun *ta* is inside its own antecedent – a VP as shown in Figure 8.9b. Intuitively, the pronoun at issue has nothing to do with the VP in the sentence, syntactically or interpretively. As discussed in section 1, *ta* is closely associated with a following NP, a syntactic relation roughly analogous to that between the English expletive *it* and an extraposed clausal object. More specifically, *ta*'s associate is the indefinite NP immediately following it, as evidenced by the fact that the nominal expression immediately following the pronoun cannot be a bare NP or a definite NP, but must be an indefinite NP, as illustrated in Figure 8.4. This can be further illustrated in Figure 8.10 in which the two sentences are constructed out of Yuan's own example in Figure 8.9a.

More recently, Lin and Zhang (2006), while admitting *ta*'s non-referential nature, have analyzed it as a nonspecific determiner analogous to *any* in English and heading a DP projection. To account for why *ta* can only occur in postverbal position and why the matrix verb preceding *ta* cannot take an aspect marker (note that we have explained these two reasons in section 1), Lin and Zhang propose further that the pronoun is a clitic and must be encliticized into a verb root. Lin and Zhang's proposal does not seem plausible, either. First, unlike 'any', the pronoun *ta* cannot select a bare NP, as already shown earlier. Second, the clitic analysis seems to raise a lot of complications. In non-clitic languages such as Chinese, it is highly doubtful that a pronominal form is encliticized to a verb root in the lexicon. There is no evidence, phonological or morphological, that the pronominal form in question is bound to the verb. Although linguists have proposed various definitions of clitic as a technical term, it is widely held that a clitic is usually prosodically deficient and hence phonologically bound to its host and can form an accentual unit in combination with its host (see, e.g., Zwicky 1977; Klavans 1995). Unlike ''em' in "I see 'em" in English, the Chinese expletive *ta* is not prosodically deficient nor phonologically bound to the preceding verb, but instead is fully and articulately pronounced in all cases such as Figure 8.3 and Figure 8.8. Morphologically,

ta is a word that has independent existence and is written separately from the preceding verb, which is perhaps why in the literature no linguists, including Lin and Zhang, have represented it as a bound or contracted form.

Thus none of the analyses reviewed so far appears satisfactory. Moreover, from an interpretive perspective, all the analyses we have discussed fail to provide an adequate account of why the expletive construction in Figure 8.3 gives rise to an emphatic meaning, or creates the strength-of-feeling effect as discussed earlier (we will address this issue in section 3). To sum up, a unitary account of the different uses of the pronoun in question favours a dynamic perspective that takes context seriously on the grounds that it is the linguistic context that informs us that the pronoun *ta* is used differently, referential or expletive. More precisely, it is from an interpretive perspective that we are able to differentiate various uses of the same pronominal form.

3 A dynamic analysis

In this section, I attempt to provide a unitary analysis of the different uses of the pronoun at issue from a processing perspective. I shall address two questions in particular, as follows:

(a) Can the same pronominal form be given a uniform representation, irrespective of the fact that the results of pronoun resolution may be different?
(b) Can a formal characterization of the different uses of pronouns provide a basis for explaining why the occurrence of the pronoun in Figure 8.3 as expletive creates a sort of emphatic effect?

The answer to the first question should be affirmative. As discussed in section 1, the lexical content of *ta* underspecifies its interpretation in context. We can capitalize on this fact and treat *ta* uniformly as a placeholder without descriptive content; that is, there is only a single representation of the same pronominal form, whose underspecified content is enriched from context. As will be shown shortly, the difference between the expletive and referential use of *ta* is directly reflected in the process of tree growth, which relies heavily on the linear order that determines to a large extent the pronoun resolution.

3.1 A dynamic analysis of the typical and non-typical referential construal of ta

Let us begin by looking at sentences such as Figure 8.1b, which is repeated here as Figure 8.11. Figure 8.12 shows the parse state where the pointer is at the internal argument node of the predicate after the verb *mai* 'buy' is processed.[9]

Subsequent to the parse of the verb, the lexical input is the pronoun *ta* whose interpretation is straightforward. In the context of Figure 8.11, there is an anaphoric relation between the pronoun *ta* in the second conjunct and its antecedent *nei-tiao yu* 'that fish' in the first conjunct. In the real-time processing of

nei-tiao	*yu*	*hen*	*da.*	*mama*	*mai*	*le*	*ta.*
that-CL	fish	very	big	Mum	buy	PERF	3SG

'The fish was big. Mum bought it'.

Figure 8.11

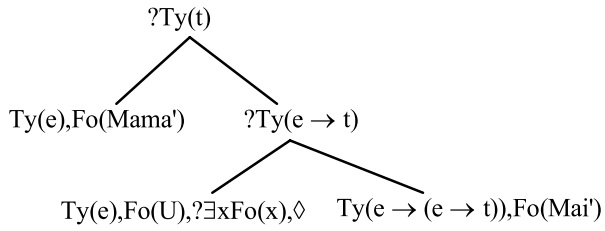

Figure 8.12 Parsing *Mama mai le*

IF ?Ty(e)
THEN put (Fo(U), Ty(e), ?∃x.Fo(x), [↓]⊥)
ELSE ABORT

Figure 8.13

the utterance, the hearer keeps track of the antecedent once it is parsed and readily identifies its co-reference relation with the pronoun when the latter is processed. To reflect the process of pronoun resolution specific to *ta* in Figure 8.11, we analyze it as projecting a metavariable U which has to be replaced by some fixed value to yield a final output, the eventual semantic tree representation of the utterance. The lexical information provided by the pronoun *ta* can be characterized as noted in Figure 8.13.

The lexical specification of *ta* in Figure 8.13 expresses the need for the pronoun to have a value established in context. As shown in Figure 8.13, a lexical entry is presented as a conditional statement. The condition IF is a trigger that induces the parse of the word and usually takes the form of a type requirement. In the case of Figure 8.13, the IF conditional statement is met since the pronoun *ta* is a Ty(e) expression indeed. The THEN statement specifies the action(s) to be taken next. We first annotate the pointed node with a specified formula and type values – i.e., Fo(U), Ty(e), and then with an associated requirement ?∃x.Fo(x) – to find a contentful value for the formula label; [↓]⊥is the bottom restriction that the annotated node in question is the terminal node of a tree and cannot be further developed, which is a general property of most lexical items (e.g., clitic pronouns in languages like Spanish have lost the bottom restriction). The ELSE statement induces other actions if the IF condition is not met, which is in general an instruction to abort the current parse. The

effect of parsing the pronoun *ta* is, as displayed in Figure 8.14, that the internal argument node of the propositional structure is decorated with a metavariable U which is then replaced by a copy of the term Fo(*Nei-tiao yu*') projected by the subject NP of the first conjunct – namely, its antecedent.[10]

Completion of the semantic tree will give rise to a well-formed propositional formula *Fo(Mai'(Nei-tiao Yu')(Mama'))*. Notice that the term *Fo*(*Nei-tiao Yu*') replacing the metavariable projected by the pronoun is inferentially derived, because only it, which is already established in the given context, qualifies as the substituend. Also notice that this pragmatic process of replacement shows why we usually say that the pronoun *ta* in Figure 8.1 is referential. Interpretively, the pronoun straightforwardly picks out the same individual as the expression *nei-tiao yu* 'that fish', meaning that it is just co-referential with its antecedent.

Next, let us consider the parse of the pronoun in sentences such as Figure 8.2. The sentences in Figure 8.2 share at least one property with those in Figure 8.1; that is, there is an anaphoric relation between the pronoun and a contentive expression. As discussed in section 1, what is special about the use of *ta* in Figure 8.2 is that this pronoun, usually co-referential with a singular NP, is anaphorically related to a plural NP in topic position. From the interpretive perspective, it is also the structural context which forces the pronoun to be associated with a plural NP: the occurrence of a left-peripheral expression as the topic requires the matrix clause – namely, the comment about the topic to encapsulate it informationally, which is usually indicated by the use of an anaphoric expression. In other words, the topic phrase and the comment clause share a term through a lexicalized anaphor.

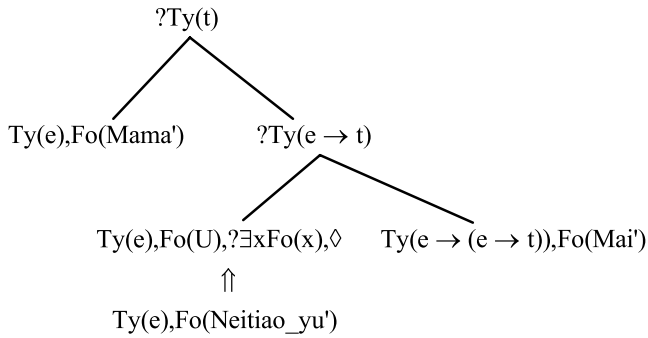

Figure 8.14 Parsing *Mama mai le ta*.

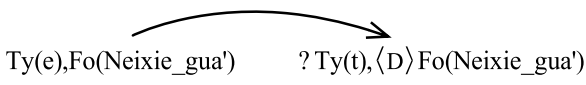

Figure 8.15 Parsing *Neixie gua*

As has been shown in chapter 4, the topic-comment structure is characterized as a LINK relation projected from a node of Ty(e) onto a node of Ty(t), with the latter required to contain a copy of the formula decorating the Ty(e) node. The parse of the topic expression *neixie gua* 'those melons' in Figure 8.2a, which is repeated here as Figure 8.16, is illustrated in Figure 8.15.

As can be seen in Figure 8.15, the left-peripheral expression projects a tree with the top node annotated with a formula value of type *e* and that node has the top node of a second tree LINKed to it, with a requirement (the <D> operator meaning somewhere 'down') that there be a copy of the term just completed somewhere in the development of this new structure, reflecting the anaphoric relation between the topic expression and the comment clause. Subsequent to the parse of the topic expression, the comment clause is processed like a canonical sentence: the subject NP of the matrix clause is parsed and identified as the speakers, and the transitive verb is parsed, projecting a predicate node and an internal argument node which triggers the parse of the pronoun. At the point when *ta* is processed, it initially projects a metavariable U whose value is to be instantiated by some term constructed in the paired structures being built. The constraint imposed on the top node of the linked structure would require the value of the metavariable to be identical to the interpretation assigned to the topic expression. Thus only by substituting the metavariable U with the term Fo(*Neixie gua'*) can the requirement at the top node be fulfilled. The effect of substitution is illustrated in Figure 8.17.

The substitution in this example is exactly the same process as in the previous example: both processes of replacement involve pragmatic inferences.

neixie	*gua*,	*women*	*yao*	*chi*	*le*	*ta.*
those	melon	1SG	should	eat	ASP	3SG

'Those melons, we must eat them'.

Figure 8.16

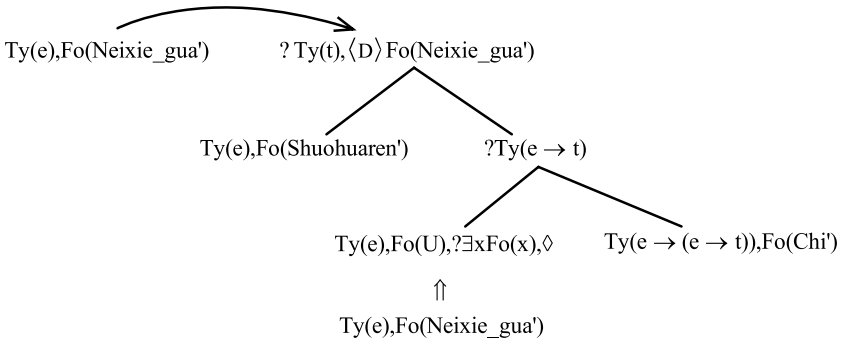

Figure 8.17 Parsing *Naxie gua, women yao chi le ta*

women	*taoyan*	*ta (,)*	*zhe-ge*	*ren*.
1PL	dislike	3SG	this-CL	man

'We dislike him, this guy'.

Figure 8.18

However, the relatedness of the same pronominal form with a nominal expression in sentences in Figure 8.1 and Figure 8.2 may be established in different ways. In Figure 8.1, the referential construal of the pronoun is natural in the sense that when processing the pronoun which is typically used as singular, hearers just 'readily' pick out an individual for its value. By contrast, when processing the same pronominal form in Figure 8.2, hearers are 'forced' to construe it as identical to the reference of a plural NP (due to the topic-comment structure). In a sense, the pronoun in Figure 8.2, which is not typically used as it is in Figure 8.1, is coerced to be co-referential with the topic expression and hence receives a collective reading as discussed in section 1.

Notice that the concept of LINK relation can naturally apply to the sentences in Figure 8.5, which are usually treated as an afterthought construction in which a pronoun is in apposition to some NP on the right periphery of the clause, the latter sometimes described as a background topic (which is usually indicated by an intonation break after the pronoun). Consider Figure 8.5a, which is repeated here as Figure 8.18.

This construction in Figure 8.18 may be considered to be the analogue of the hanging topic construction in Figure 8.16 discussed earlier. In the hanging topic structure in Figure 8.14, we postulated the construction of a LINK relation between a Ty(e) node projected by the left-peripheral expression and a propositional Ty(t) node projected by the matrix clause. The backgrounding case in Figure 8.18 is interpreted in DS analogously yet inversely with a transition from the top node of the propositional tree to some following structure requiring type *e*: the term decorating this LINKed tree is required to be identical to some subterm of the just constructed propositional tree. This accounts for the co-referentiality in Figure 8.18: the right-peripheral expression must be a term which the anaphoric expression is interpreted as co-referential with, which explains why the pronoun cannot be truly cataphoric and the following expression cannot be a nonspecific NP. The effect of parsing Figure 8.18 is shown in Figure 8.19.

3.2 A dynamic analysis of the expletive construal of ta

We now consider how to characterize the expletive construal of the same pronominal form. Consider Figure 8.3a, which is repeated here as Figure 8.20.

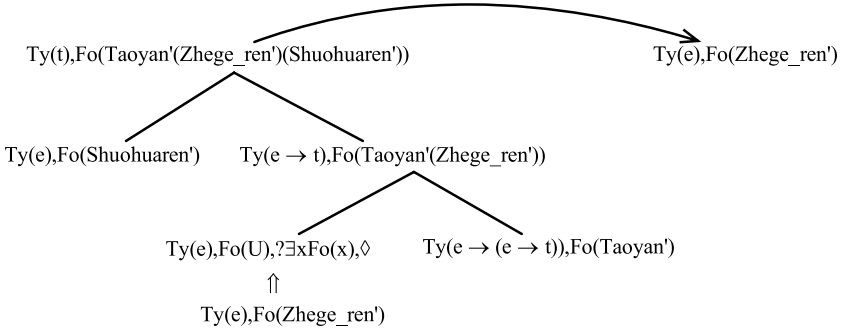

Figure 8.19 Parsing *Women taoyan ta (,) zhe-ge ren*

women	*chi*	*ta*	*shi-wan*	*mian.*
1PL	eat	3SG	ten-bowl	noodle

'Let's eat ten bowls of noodles!'

Figure 8.20

As already discussed in detail in section 1, there are two interesting points worth noting about the expletive reading of *ta* in sentences such as Figure 8.20: (i) the expletive construal of the pronoun relies on the following expression that is a nonspecific indefinite, as well as the irrealis modality of the predicate, and (ii) the fact that the expletive construal of *ta* involves a nonspecific indefinite NP as its associate is in sharp contrast to the fact that the referential construal of the same pronoun involves a specific or definite NP as its associate. Presumably, the link between an expletive pronoun and its associate is not like the straightforward co-reference relation between a referential pronoun and its antecedent. One question concerning the expletive construal of *ta* is, how do speakers determine the use of the pronoun as a vacuous element, which is different from the use of the same morpheme as a referential element? In the case of Figure 8.20, which is uttered independent of any context, hearers may initially assume that *ta* is not referential when it is parsed, because the pronoun does not have a possible antecedent with respect to the available context (recall that expletive sentences can be uttered without any discourse context). The non-referential reading of *ta* is bolstered by the absence of aspect marking and the irrealis mood in the sentence in Figure 8.20.[11] Up to the point when the pronoun is processed, it can only be interpreted with respect to a following expression that is not part of the available context. This determines that the following expression will have to be discourse-new. The best candidate for such an expression is an indefinite which would be interpreted as nonspecific, given the irrealis mood of the sentence containing it. Depending on such an indefinite expression for its value, the pronominal form *ta* in object position is thus construed as expletive.

Given that the pronoun occurs in strictly subcategorized object position, it still acts as a place-holding device, taking its value not from the uttered string, but from a following expression. The function of the expletive use of the pronoun, then, is to keep the parsing process alive: like pronouns construed as referential, it projects a metavariable as an interim value to the type requirement with the internal argument node projected by the verb, but unlike pronouns construed as referential, no substitution can take place and an open formula requirement remains on the node annotated with the metavariable, because the metavariable cannot be instantiated until the parse of some following expression. A lexical entry for *ta* in Figure 8.21 can thus be given in Figure 8.21.

Notice that there is an important difference between the lexical entries for the pronoun in Figure 8.13 and Figure 8.21; that is, the former, but not the latter, has a bottom restriction [↓]⊥, the effect of which is to prevent further development of the current node. This restriction captures one of the crucial differences between contentive and functional expressions. When pronouns are used as referential elements such as the Chinese *ta* in Figure 8.12, they are like content words in being associated with the bottom restriction in that the value assigned to them can only decorate a terminal node. Lacking the referential interpretation, the pronoun *ta* in Figure 8.20 loses the bottom restriction, and as a consequence, it allows substitution not just by some formula but also by some structural representation provided by the parse of a following expression, as will be shown later. The effect of parsing the pronoun in Figure 8.20 is shown in Figure 8.22.

The tree in Figure 8.22 cannot be completed since the internal argument node, though type complete, still carries an unsatisfied formula requirement ?∃x.Fo(x). The metavariable on the internal argument node can only rely on a following expression for a value.[12] Given that the pronoun is in object position, the following discourse-new expression looks like a right-peripheral

IF ?Ty(e)
THEN put (Fo(U), Ty(e), ?∃x.Fo(x))
ELSE ABORT

Figure 8.21

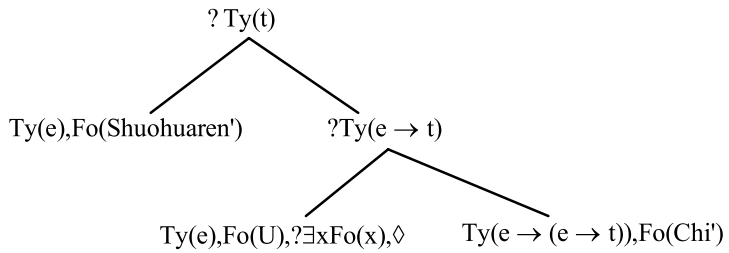

Figure 8.22 Parsing *Women chi ta*

expression. A computational rule called Late *Adjunction can then apply to provide an open type requirement allowing the parse of new material to take place (see Cann et al. 2005, chapter 5 for application of the rule to the analysis of expletive 'it' in English). It allows the projection of an unfixed node with a requirement for the same type as the node from which it is projected. Since no further direct development of the fixed node is possible, this rule thus defines directly the structural context to which Merge applies – i.e., the unfixed node and the fixed node from which it is projected. The effect of applying Late *Adjunction to Figure 8.20 is shown in Figure 8.23, where the symbol on the unfixed node (whose exact position will be fixed at some later stage) means that the node has the same type with the dominating node where a in Tn(a) is a diacritic here labeling some particular node (see Kempson et al. 2001 for details).

Notice in passing that under the analysis proposed here, there is nothing to prevent the associate being separated from the expletive *ta*. The metavariable on the internal argument node waits to be instantiated by a formula value, yet such a value is not available in the structure currently being built, which means that substitution cannot take place, and compilation of the tree cannot proceed as in the parse of a normal SVO sentence. Hence the formula value for the metavariable must be provided by an expression immediately following the introduction of *ta*, and the expression must be of type *e*.

The rule of Late *Adjunction thus permits the parse of the following quantified phrase, *shi-wan mian* 'ten bowls of noodles'. In DS, quantified phrases are taken to project a term of type *e* like other types of noun phrases, but are associated with internal structure as given schematically in Figure 8.24.

The structure projected by a quantified expression contains a quantifier node that carries the information about the kind of quantification to be projected, a node to be decorated with the restrictor predicate and another node for a variable, also of type *e*. The effect of parsing the indefinite expression *shi-wan mian* is shown in Figure 8.25, where the dominating Ty(e) node carries a

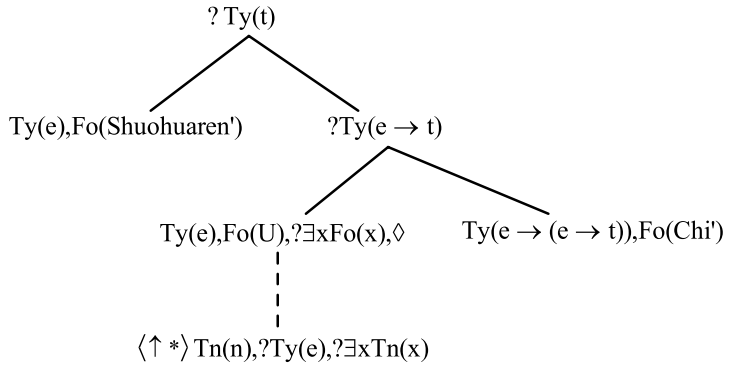

Figure 8.23 Applying the rule of Late *Adjunction

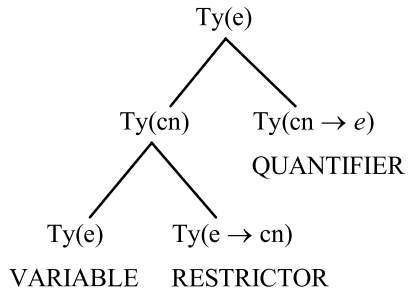

Figure 8.24 The internal structure of quantified expressions

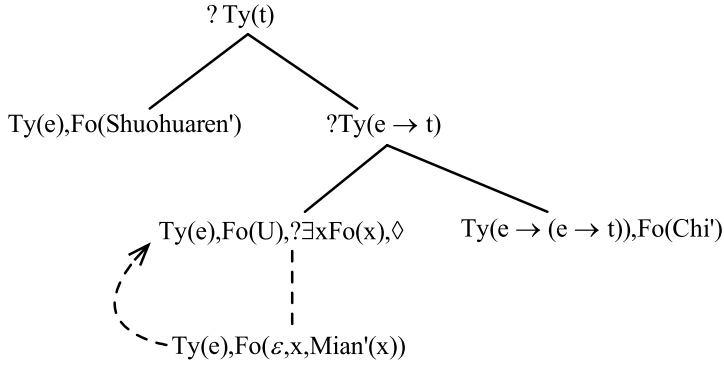

Figure 8.25 Parsing *Women chi ta shi-wan mian*

classification feature Indef(+), the quantifier projects a node annotated with an epsilon term, shown as a lambda term binding a variable P, and the common noun *mian* 'noodle' projects a complex structure containing an internal Ty(e) node decorated with a fresh variable and a restrictor node of Ty(e → cn) decorated with a complex lambda term which expresses the concept associated with the noun and which binds the fresh variable.[13]

Completion of the unfixed node immediately satisfies the requirement on the dominating node for a formula value, and the two nodes can then merge, which yields a complete object node and then a final propositional value *Fo(Chi'(ε, x, Mian'(x)) (Shuohuaren'))*. The formula *Fo(ε, x, Mian'(x))* is an epsilon term which stands for some arbitrary 'witness' of the set denoted by the restrictor, here *mian*'. Notice that the result of parsing Figure 8.20, an expletive construction, is exactly the same as that of parsing its expletive-less counterpart, *women chi shi-wan mian* 'we eat ten bowls of noodles', capturing the fact that the expletive construction at issue and its expletive-less counterpart are truth-conditionally the same.

3.3 Scope interpretation and expletive ta

One may wonder if two quantified expressions can co-occur in the Chinese expletive construction, and if the proposed DS analysis can account for scope effects in Chinese. As far as quantification is concerned, what is interesting about Chinese is that this language is in general very sensitive to linear order in determining scope effects (see, e.g., Lee 1986), that is, an earlier expression is usually interpreted as taking wide scope over a later one. The sentence in Figure 8.26, for instance, can only have the interpretation: 'For each person there are ten bowls of noodles that the person wants to eat', so the scope relation is *mei-ge ren* < *shi-wan mian*: ten bowls of noodles per person, but not the same ten bowls of noodles. The Chinese sentence is different from its English counterpart in the translation, which can have two possible interpretations with either of the two quantified expressions having wide or narrow scope.

In the analysis of Figure 8.20, which involves only one quantified expression, we have ignored the issue of quantifier scope. We now need to set out the mechanism that collects scope-relevant information during the tree growth process and the subsequent scope-evaluation process. In DS, scope information is expressed in the form x < y, a shorthand for "a term with variable x has scope over a term with variable y". These statements are collected at the node requiring a formula of Ty(t) as they are made available by lexical items and their actions during the parsing process. Once a propositional formula of Ty(t) is yielded at the top node of some tree, this node will have a pair of (i) a formula of Ty(t) and (ii) a scope statement of the form SC (Si < x < . . .). Then (i) and (ii) together will be subject to scope-evaluation algorithm which spells out what that pairing amounts to. Hence the starting point? Ty(t) can be modified to contain a term in the attendant scope statement – namely Si, which is the constructed index of evaluation. Each scope statement can be successively added to the end of the sequence, and they can fix the scope relative to what precedes.

With regard to Figure 8.18, the first quantified expression *mei-ge ren* 'every-CL person', a universal quantifier, can be represented as a term of Ty(e), Fo(τ, x, *Ren*'(x)), using a tau (t) term which is the universal counterpart of an epsilon term. Apart from the expected actions building a node for a common noun and a classification feature Indef(–), there is an action which adds to the higher Ty(e) node a requirement? SC(x) for a scope statement involving the variable that decorates the internal Ty(e) node. Since it is satisfied only when a scope statement is established on the propositional node, the information provided by

mei-ge	*ren*	*chi*	*ta*	*shi-wan*	*mian.*
every-CL	person	eat	3SG	ten-bowl	noodle

'Let everyone eat ten bowls of noodles!'

Figure 8.26

the quantifier and by the common noun, once put together, the scope statement gets added to the top Ty(t) node to satisfy the scope requirement. The effect of parsing the first quantified expression *mei-ge ren* 'every-CL person' can be illustrated in Figure 8.27.

With the information (i.e. Indef(–) and ?SC(x)) accumulated at the higher Ty(e) node through parsing the universal quantifier and the common noun, the pointer moves to the dominating Ty(t) node. Since the universal quantifier can only have a wide-scope reading, its scope relation can be fixed relative to the index of evaluation Si. Accordingly, Si < x is added to the scope predicate at the top node, immediately upon processing the expression. The lexical input subsequent to the parse of the transitive verb *chi* 'eat' and the pronoun *ta* is the indefinite *shi-wan mian* 'ten bowls of noodles', the parse of which is already shown in Figure 8.25. Just like the universal quantifier parsed earlier, the indefinite should also have a scope requirement ?SC(y). The effect of parsing the following indefinite expression can be shown in Figure 8.28.

As mentioned earlier, quantifier scope in Chinese is very sensitive to linear order, so that a quantified expression processed first usually has scope over a quantified expression processed later. Thus the indefinite can only have the

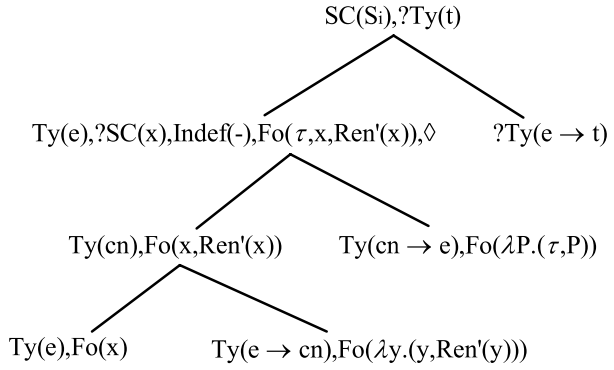

Figure 8.27 Parsing *Mei-ge ren*

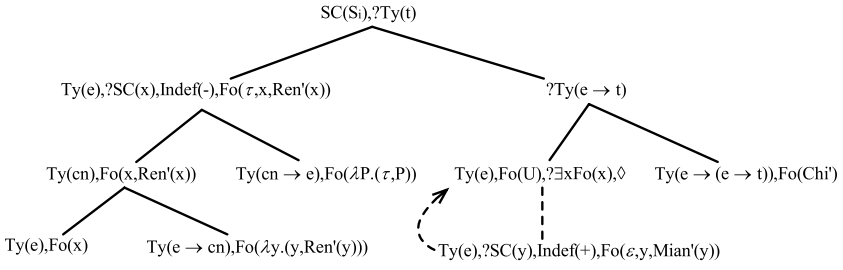

Figure 8.28 Parsing *Mei-ge ren chi ta shi-wan mian*

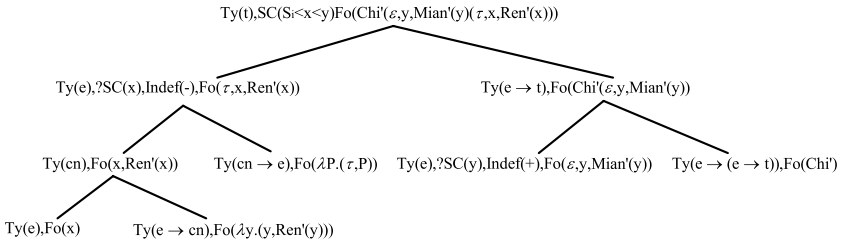

Figure 8.29 Completing the tree

narrow-scope reading. Upon processing this indefinite expression, its scope relation can also be fixed immediately relative to the scope predicate Si < x at the top node which is established after the universal quantifier *mei-ge ren* 'every-CL person' is parsed. Figure 8.29 illustrates the parse state in which the metavariable U merges with the unfixed node projected by the following indefinite and completion of the tree yields a propositional formula with an attendant scope statement ($S_i < x < y$), in which the epsilon term takes narrower scope than the tau term.

The proposed analysis, which is based on the left-right dynamics of parsing, naturally captures the linearity-sensitive scope effects in Chinese: the collection of scope-dependency statements gradually accumulates as terms projected by quantified expressions are progressively introduced into the propositional structure through regular tree growth process. Notice how the proposed analysis accounts for the nonspecific reading of the indefinite noun phrase following the pronoun. The simple fact that the later occurring indefinite expression *shi-wan mian* can only take narrow scope with respect to any earlier occurring expression determines that it can only have a nonspecific interpretation.

The analysis also accounts for the principled difference between sentence Figure 8.20, an expletive construction, and sentence Figure 8.17, an afterthought construction. Though both constructions involve right-periphery data, the noun phrase following *ta* in Figure 8.20 is introduced as an unfixed node through the rule of Late *Adjunction as shown in Figure 8.23, providing an update for the metavariable projected by the pronoun. By contrast, the noun phrase in Figure 8.18 following *ta*, which is construed as an afterthought topic, is introduced as a LINKed node, reinforcing the interpretation of the pronoun.

3.4 Some implications

Our analysis suggests some significant theoretical implications. The expletive use of the Chinese pronoun provides supportive evidence for Postal and Pullum's (1988) claim that expletives can occur in strictly subcategorized object positions. A widespread assumption as part of the Projection Principle (Chomsky 1981) is that subcategorized positions are always theta-marked. Correspondingly, a central claim about expletive NPs is that they should be restricted

to subject position, which is projected syntactically and not thematically. The Chinese fact that the pronoun *ta* can occur as expletive in object position challenges this standard assumption, yet it can be given a straightforward explanation in the DS system. As shown in the analysis of Figure 8.20, more than one expression can serve to decorate one and the same node: the internal argument node of the predicate *chi* 'eat' is initially decorated with the metavariable projected by the pronominal form, which is then updated by a term projected by a following nominal expression.

One bonus of the analysis of *ta* as a placeholder whose value is instantiated by a following indefinite phrase is that it not only can capture the syntactic and interpretive properties shared by different types of pronouns (i.e., they are all placeholders associated with some expression in the sentence) but also can provide a basis for answering question Figure 8.2 raised at the beginning of section 4 – that is, how can a formal characterization of the different uses of the pronoun, its expletive use in particular, provide a functional explanation of why its occurrence adds some emphatic effect to the containing construction?

Here it is plausible to speculate that compared with the referential use of *ta*, the construal of *ta* as expletive would require extra processing effort, for the simple reason that it lacks an antecedent with respect to the available context, and there is no expression associated with it up to the point when it is processed. It is not until after the occurrence of a following indefinite NP that hearers can identify a possible associate. To determine the following NP as a qualified associate, the hearer would have to examine the structural context that leads to the expletive reading of the pronominal form; i.e., the following expression must be discourse-new and must be a nonspecific indefinite, which would involve a great deal of processing effort. Seen this way, the processing of the expletive element is just part of what is a quite general cognitive process of relevance-driven processing (Sperber and Wilson 1995). As shown in the analysis of Figure 8.21, the expletive construal of the pronoun involves the progressive update of the parsing process. With various sorts of information incrementally adding to the structure being built, all terms need to be interpreted within the relevant steps of tree development prior to the update of the pronominal form by an indefinite expression. By contrast, the parse of the referential use of the pronoun is a simple step: the metavariable projected by it is replaced straightforwardly by a term already established in the context.

4 Summary

From a dynamic, parsing-based perspective, the different uses of the pronoun *ta* can all be treated as placeholders projecting an interim value which is contextually provided. The advantage of a dynamic analysis lies in the way it characterizes the process of how the pronoun as a formally null element is interpretively identified or associated with the content of some nominal expression. The difference in interpretation between referential and expletive pronouns

has been captured in the way that the former are copies of their antecedents, whereas the latter do not have a particular referent, but take their value from a postverbal indefinite expression. Both processes are pragmatic in nature, in that the content of different types of pronouns, though underspecified by their form, is enriched from context.

It is significant to note that the dynamic analysis presented here achieves a unified characterization of *ta* which does not rely on lexical ambiguity, but derives different uses from the interaction of structural underspecification and contextual information. The incrementality intrinsic to the formalism is essential to the account given. This is uniquely diagnostic of DS as a grammar. Without reliance on the time-linearity which incrementality of update reflects, there would be no such formal integration of expletive and context-dependent anaphora.

Notes

1 The example in Figure 8.2b may not be fully acceptable to some Chinese speakers, for it is pragmatically implausible that a gang of thieves, who have not been captured yet, can be killed all at once.

2 Strictly speaking, the pronoun in sentences in Figure 8.3 is ambiguous: it can have both a possessive as well as an expletive construal. As shown in the short dialogue that follows, *ta* can best be construed as a possessive pronoun coindexed with *Lisi*.

(i) A:	*Lisi you*	*zhong*	*le*	*liuhecai*,	*women*	*qu*	*he*	*ta*	*shi-ping*	*jiu*.
	Lisi again	win	PERF	lot-tery	1SG	go	drink	3SG	ten-bottle	wine
	‘Lisi won the lottery again. Let’s go and drink ten bottles of wine of his!’									
B:	*bu*	*hao*	*ba.*	*women*	*yijing*	*he*	*guo*	*ta*	*shi-ping*	*jiu*	*le*
	not	nice	SFP	1SG	already	drink	EXP	3SG	ten-bottlewine		SFP
	‘Let’s not. We have already drunk ten bottles of wine of his’.										

‘Without a discourse context, we take the pronoun in sentences like (Figure 8.3) to be expletive, as in the literature.

3 It should be pointed out that sometimes the expletive construction in Chinese may contain a verb that would be considered intransitive in English. Consider the following example:

(i)	*pao*	*ta*	*shi*	*li*
	run	3SG	ten	mile
	‘run	ten	miles’	

Chao(1968) states that the verb in sentences such as the aforementioned takes a cognate object – i.e., *shi li* – which suggests that transitivity in Chinese may be a complex issue.

4 Here I follow Jackendoff (1990) in assuming that the clausal object is the associate of the expletive, in the sense that the two expressions are interpretively related. See also chapter 5 of Cann et al. (2005) in which the expletive ‘it’ is analyzed in the same spirit within the DS framework.

5 Apart from the non-animate NP as shown in Figure 8.3, the pronoun *ta* can of course be followed by an animate NP and construed as expletive:

(i)	*jintian*	*jingcha*	*xiang*	*zhua*	*ta*	*(*tamen)*	*jige*	*xiaotou.*
	today	police	want	catch	3SG	3PL	several	thief
	'The police want to catch several thieves today!'							
(ii)	*laoban*	*zhunbei*	*pin*	*ta*	*(*tamen)*	*shi-ge*	*biyesheng.*	
	boss	prepare	employ	3SG	3PL	ten-CL	graduate	
	'Our boss is going to employ ten graduates!'							

6 It is worth mentioning that expletive pronouns similar to those in Mandarin as described earlier also occur in some Chinese dialects such as Cantonese (see Man 1998) and Chaozhou (see Matthews et al. 2005).

7 In Figure 8.8a, the pronoun *ta* appears to be followed by an adjective and in Figure 8.8b by an idiomatic expression. Yet both the adjectives and the verbal idioms are nominalized by a most frequently used numeral classifier *ge* 'individual', without which all the aformentioned expressions would be ungrammatical – e.g., **he ta gou* 'drink it enough' in Figure 8.8a. Wu (2004) analyses *ge* as a nonspecific determiner that converts non-nominal categories (e.g., adjectives) into nominal ones. In this chapter, we focus on the type of expletive construction shown in Figure 8.3 since it is most productive.

8 One possibility is that the expletive construction in sentences in Figure 8.3 is originally a type of double object construction, that is, the pronominal *ta* in these sentences was a referential pronoun which has later been grammaticalized as an expletive one. A similar account for the grammaticalization of an expletive pronominal is suggested in Matthews et al. (2005) for the Chaozhou dialect.

9 As indicated in Figure 8.1b, the use of the pronoun is optional. Being a pro-drop language, Chinese generally permits the optionality of pronouns in object as well as subject position. And the occurrence of a pronoun (such as *ta* in Figure 8.1b) does not create any contrastive effect. To allow for object-drop, we could alternatively analyze predicates as underspecified with respect to argument structure, and pragmatically enriched in a given context as in chapter 3. For ease of discussion, the tree displays are made simpler here.

10 Here I ignore the internal structure of the noun phrase and also the one in Figure 8.14 as it is not especially germane to the discussion. We will provide a detailed analysis of nominal expressions in later tree displays.

11 A tense suffix in Japanese indicates the structural boundary of a clause it marks, so it is taken in DS to be processed last in a clausal sequence, as it functions as closure over tree construction (see Cann et al. 2005). Chinese, however, is a nontensed and a non-case-marking language, in which aspect marking is not obligatory and in principle there is no formal way to distinguish finite from non-finite clauses (see, e.g., Hu et al. 2001), as it often involves pragmatic inferences. In this book I make no attempt to formally address the tense-aspect-mood construal in Chinese, but leave it for future research.

12 The association of the expletive use of *ta* with a following indefinite expression is reminiscent of cataphora effects – i.e., an earlier expression (usually a definite or an anaphoric expression) co-refers with a later expression in the discourse. A question can be raised as to whether such expletive use occurs in Chinese relative clauses with a ditransitive verb and whether it can have cataphora effects. The answer should be negative. Consider the following two relative clauses in which the pronoun *ta* is used cataphorically and *de* is a relative marker.

(i) *women gei le ta yi-ben shu de nei-ge nan sheng*
1PL give PERF 3SG one-CL book DE that-CL male student
'The male student whom we gave a book'

(ii)) *women jiao guo ta Yingwen de nei-ge nü sheng*
1PL teach EXP 3SG English DE that-CL female student
'The female student whom we once taught English'

The pronoun *ta* can only be construed as co-referential with the head noun phrase *nei-ge nansheng* 'the male student' in (i), and *nei-ge nü sheng* 'that female student' in (ii). Indeed, any pronoun occurring in Chinese relative clauses must be construed as referential, usually (as in (i)–(ii)) co-referential with the head NP which must be a referential term as it is modified by a relative clause. The co-referentiality relation between *ta* in the relative clause and the head noun phrase determines that the pronoun cannot be construed as expletive but must be referential. Due to space considerations, I shall not probe relative clauses further in this chapter.

13 It should be pointed out that the formalization here denotes "at least one" and does not account for the cardinality of the expression – i.e., ten bowls, but this as well as the issue of classifiers are outside the scope of the present chapter.

9 Conclusion

In this study I have looked at a variety of Chinese grammatical phenomena within the DS framework. Precisely I have focused on the verbal domain, the pre- and postverbal domains. With regard to the verbal domain, I have dealt with the phenomenon of verbal underspecification, one of the salient characteristics of the Chinese language. Verbal underspecification is manifested in the way verbs are lexically underspecified as to the number and the type of complements (i.e., arguments and argument-like adjuncts) they can take. It is, on the one hand, a reflex of the interaction between the lexicon, syntax and pragmatics, and on the other, a reflex of the general semantic underspecification of lexical items. Within the DS framework that allows the interaction between lexical, structural and pragmatic information during the syntactic process, I have shown that (i) the representation of predicate-argument structure can be established dynamically at the level of propositional form which is constructed incrementally and (ii) just like semantically selected expressions, semantically unselected yet syntactically expressed expressions contribute to the enriched semantic composition (Jackendoff 1997, 2002; Zhang 2005) that no abstract syntactic mechanisms need to be invoked for.

With regard to the pre- and postverbal domains, I have explored some major grammatical constructions such as topic, passive and copular and cleft, which have all been characterized as the constructs of the interplay between syntax, semantics and pragmatics. The fruitful exploration is attributable to the novel approach of DS that takes the incremental, left-to-right processing of linguistic forms to be a fundamental part of characterizing the relationship between syntactic structure and semantic interpretation. I have thus demonstrated that a dynamic approach can best reflect one of the salient properties of Chinese – i.e., word order constrains its interpretation and defines its grammatical functions, as mentioned in chapter 1. In what follows, I shall summarize the major findings of this study and discuss its significance and implications for linguistic research, Chinese linguistics in particular and linguistic theorizing in general.

1 Contributions to Chinese linguistics

In chapter 1, I have briefly discussed that, as a non-inflectional language, Chinese is largely dependent on word order in defining its grammatical

functions. Because of reliance on word order rather than inflectional morphology, we expect a different sort of interaction between syntax, semantics and pragmatics in the interpretation of this language than languages like English. Focusing on some well-discussed grammatical structures in Chinese, this study brings out all aspects of information, such as syntactic, semantic and pragmatic, behind the object of inquiry and demonstrates that a full understanding of linguistic structure should be grounded in a dynamic perspective.

Although I have developed a parsing-based analysis of some key grammatical constructions in Chinese, implicit in it are some findings about the general properties of this language. Looked at from a theory-neutral, descriptive viewpoint, the major findings of this study can be summarized as follows: (i) flexible organization of linguistic elements is a salient characteristic of such a non-inflectional language and is apparently motivated for fulfilling various grammatical (and discourse) functions; (ii) the extent to which syntax, semantics and pragmatics interact in the production and interpretation of grammatical constructions is considerable, which may account for the 'hidden complexity' in the structure of Chinese language (cf. Bisang 2009, 2014, 2015); and (iii) Chinese is indeed a topic-prominent language where topic is not only manifest in pure topic structure, as have been generally assumed, but also noticeable in other grammatical structures.

First, as shown by the parsing-based account of topic, passive, copular and cleft constructions, they all involve dislocating a constituent at the clausal periphery and hence all display left- or right- periphery effects, albeit to a varying degree. In topic constructions dealt with in chapter 4, the left-peripheral constituent, either morphologically marked by a particle or phonologically marked by a pause tone, is overtly presented; in passive constructions dealt with in chapter 5, the left-peripheral expression, characteristically followed by the voice particle *bei*, is invariably interpreted as the fronted patient argument of the predicate; in many of the copular constructions dealt with in chapter 6, the pre-copular element is also identified as a given term providing a context from which the postcopular assertive clause develops. In cleft constructions dealt with in chapter 7, the right-peripheral expression is identified as the focus which is dislocated in the postcopular position, as opposed to the postcopular in situ focus in chapter 6.

This study reveals that dislocation is one of the salient characteristics of the Chinese language, which defines the grammatical function of the relevant structure. The left dislocation of any constituent in a canonical sentence results in a topic structure which is able to fulfill a certain discourse function, as evidenced by the saliency or availability of the left-peripheral expression in the discourse context; the left dislocation of the patient argument in a canonical sentence results in a passive structure which with the help of the voice particle *bei* is able to highlight the affectedness of the fronted constituent. The right dislocation of an argument expression of a canonical sentence to the postcopular position yields a cleft structure which is able to express a uniqueness or an exhaustiveness function.

Second, the study shows that in the Chinese grammatical structures investigated, syntactic, semantic and pragmatic information are encoded in very subtle ways, suggesting that a comprehensive analysis of such grammatical structures cannot be sought in only syntactic, semantic or pragmatic terms, but in a dynamic perspective that combines all three. The relation between the topic and the comment in the topic structure, for instance, is encoded not only syntactically, as in the English-style topic structure but also semantically or pragmatically as in the Chinese-style topic structure; the pre-*bei* expression in the passive structure is not only fronted to the most prominent syntactic position for the purpose of highlighting the semantic aspect of affectedness but also assigned some special pragmatic salience; in both the copular and cleft structures, the semantics of the copular morpheme *shi*, which is underspecified in content (as well as in type sometimes), is enriched through a process of pragmatic inference over predicates provided by local context. The interaction between various sorts of information presupposes that one can only take a dynamic approach to such linguistic structures.

Third, this study brings up the issue concerning the general property of Chinese clause structure. From an interpretive perspective, it provides some justification for Chao (1968)'s characterization of Chinese sentence structure as topic comment rather than subject-predicate, as mentioned in chapter 4. Although it is generally agreed among linguists that Chinese is a topic-prominent language, the discussion of topic in the literature is mainly focused around the topic construction (Li and Thompson 1976, 1981; Tsao 1977; Xu and Langendoen 1985; Y. Huang 1994). The present study demonstrates that topic is not only prominent in the pure topic construction, but also noticeable in other constructions such as passive and copular constructions.[1]

Fourth, and last, this study may provide some insights into a typological issue which has interested both functional and formal linguists – that is, whether languages can be distinguished in terms of 'syntactic' type versus 'pragmatic' type. Some functionalists (e.g., Givón 1979) distinguish languages with respect to the mode of communication: languages with the pragmatic mode usually have a topic-comment structure, whereas languages with the syntactic mode usually have a subject-predicate structure. Some formalists (e.g., J. Huang 1984) also distinguish languages in the similar fashion: syntactic type of languages such as English are sentence oriented, whereas pragmatic type of languages such as Chinese are discourse oriented. The prominence of topic in various grammatical structures and the saliency of topic in the discourse context seem to provide some supporting evidence for such a move. There is, of course, much room for future research on this issue, both empirical and theoretical.

2 Reflections on linguistic theorizing

Of course, the main findings reported in this study are the outcome of the successful characterization of a variety of Chinese grammatical structures, which are in turn attributed to the DS methodology employed throughout this book.

In chapter 2, it is argued that a truly explanatory account of the compositional and context-dependent properties of natural language cannot rely on the conventional methodology which results in the separation of syntax and semantics, on the assumption that the former, which involves the postulation of static and abstract representations of syntactic structure, can feed the latter, which involves a process of building interpretation with information established in context. It is further argued that a proper methodology should take the dynamics of natural language into account and introduce a system of representation that can be used in a dynamic way to capture the interpretive process in which both syntactic and semantic explanations can be articulated.

Through demonstrations of the complexity of the syntax-semantics correspondence, which is often shown in the format that a given sequence has more than one truth-denotational context, this study is a justification for advocating a dynamic approach to linguistic structure, on the grounds that it can provide a comprehensive analysis which makes both the syntactic and semantic explanations of language explicable through the dynamics of language processing. Having adopted a parsing-oriented perspective, as introduced in chapter 2, DS incorporates into its system two notions – namely, underspecification, which is taken as not only syntactic but also semantic, and contextual enrichment, which defines context as not only sentence by sentence but also word by word. The fruitful exploration of Chinese grammatical structures supports the use of these two notions as a theoretical tool in analyzing natural language, because they make the interplay between structure and context more explicit.

The notion of underpsecification, syntactic and semantic, is widely employed in the analyses of the grammatical constructions explored in this study. The structural use of underspecification is best shown in the characterization of both the left-peripheral and right-peripheral expressions. Chapter 4 analyzes the left-dislocated constituent either as a term decorating an unfixed node or a term projecting a linked structure; chapter 5 construes the pre-*bei* expression as projecting an unfixed node yet with a specific target position; chapter 6 treats the pre-copular element in some copular constructions as a given term introducing a linked structure. The concept of unfixed nodes and linked structures apply equally to the cleft construction, a right dislocation structure, with minor variation in the rule formation. In chapter 7, the postcopular constituent is analyzed as projecting an unfixed node updating a contextually given structure.

The semantic use of underspecification is best shown in the analyses of anaphora throughout chapters 2–8 and the copula in chapters 6 and 7. The anaphoric expression, whether in the null form or in the form of a pronoun, is analyzed, as shown in chapter 8, as projecting a metavariable whose content depends on context for instantiation; Similar to the anaphoric expression, the copula is construed as providing a predicate metavariable whose content also relies on context for interpretation. The semantically underspecified content requires to be pragmatically enriched, reflecting the context-dependent property of language. The contextual enrichment of the anaphoric expression is through a process of pragmatic substitution, a direct explanation of its co-referentiality,

while the contextual enrichment of the copula is through a process of pragmatic inference, a straightforward account of its underdeterminacy.

Notice how DS incorporation of the notion of underspecification into its machinery allows the collapsing of the dichotomy between what should be explained in syntax and what should be explained in semantics. Once a dynamic perspective is adopted, syntactic information can be viewed in terms of procedures for building semantic information. Given that the process of building semantic information involves the incremental presentation of linguistic material, DS is committed to a procedure of constructing structured representations of content. Structural properties of natural language are therefore explained in terms of how they contribute to the structural representations of content. Seen in this perspective, natural language expressions provide input procedures for the incremental process of constructing an eventual representation of interpretation, so syntactic explanations are couched in the dynamics of transition between the input and output structures (cf. Kempson et al. 2001; Cann et al. 2005).

The successful characterization of some problematic constructions in Chinese justifies such a dynamic, procedural approach. As shown throughout chapters 3–7, the account of the structural properties of the grammatical constructions explored does not involve any independent concept of syntactic and semantic representation but only the progressive construction of logical forms to which each word in a sentence provides partial information. The dislocational properties of the left-peripheral expressions addressed in chapter 4, for instance, have been illustrated through a transition either from a top node to an unfixed node, as in the analysis of those with focal properties, or from an initial node to a top node, as in the analysis of those with topic properties. Syntax is defined in terms of procedural construction of structures representing content as established in context. With the use of the concept of underspecification, linguistic structures are not described in terms of some static configuration, but in terms of transitions across partial structures to a complete structure. It is in this sense that syntax is made dynamic.

The dynamic approach adopted in this study opens up opportunities for future research. The use of the concept of contextual enrichment in the DS system breaks ground in addressing the theoretical question discussed in chapter 2 – i.e., how the semantic interpretation of linguistic expressions is determined in context. Explicitly making pragmatic inference a central part of linguistic formalism, which has led to successful analyses of the morpheme *shi* in a variety of copular constructions, enables DS to provide a natural characterization of the interplay between syntax, meaning and context. Therefore, the analysis developed in this study is likely to cover more linguistic phenomena in Chinese and is extendable to other languages as well. Continuing research on the interfaces of syntax with semantics and pragmatics will certainly have great prospects.

Finally, the work done here justifies the DS stance about linguistic knowledge. With special reference to a fascinating language such as Chinese, this

study shows that a full understanding of the nature of language and the knowledge of language cannot be achieved without a better understanding of the use of that language. The complex, subtle interaction between various kinds of linguistic knowledge in the production and interpretation of various grammatical structures is a perfect reflection of what natural languages enable human beings to do. Without knowing how to use this linguistic information, one certainly cannot claim that he or she knows that language. Hence there is justification for encoding the dynamics of natural language in linguistic formalism.

Note

1 More and more researchers have realized that topic is noticeable in other Chinese grammatical constructions as well. For instance, Hedberg (1999) provides some discussion of the topical properties of the pre-*shi* constituent in the emphatic construction. Y. Huang (1994/2007, 2000) also provides some discussion of the topical properties of the pre-*bei* expression in passive constructions.

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