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MODELING TEMPORAL PROGRESSION IN MANDARIN: ASPECT MARKERS AND TEMPORAL RELATIONS

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MODELING TEMPORAL PROGRESSION IN MANDARIN: ASPECT MARKERS AND TEMPORAL RELATIONS

by

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Dissertation

Presented to the Faculty of the Graduate School of

the University of Texas at Austin

in Partial Fulfillment

of the Requirements

for the Degree of

Doctor of Philosophy

The University of Texas at Austin

May 2003

This dissertation is dedicated to my beloved parents, who have supported me all the way without hesitation, and to my sister and brother, who have been the best siblings one can have in the world.

謹以此論文獻給一直支持我的爸爸、媽媽、妹妹、弟弟。

Acknowledgements

During the five years I spent at UT, there are a lot of persons to whom I owe my deepest gratefulness. First, I would like to express my sincerest gratitude to my supervisor, Dr. Nicholas Asher. His in-depth understanding of dynamic semantics sparked my interest in this brand new mechanism. His insight in the theoretical significance of linguistic phenomena never ceases to amaze me. Without his careful guidance, time-consuming going over of different versions of my draft, and countless lengthy discussions, I would never have finished this dissertation. I will never forget how inspiring he can be to me. I would like to extend my gratitude to Dr. Carolta Smith. She is a wonderful linguist, very knowledgeable and insightful in linguistic analysis. I will always remember every time when she tells me that my generalization may not be adequate and she always turns out to be right. I would also like to thank Dr. Lisa Green. She is one of the kindest and most gracious professors I have met at UT. She is always encouraging and available whenever I need advice. I will miss her after I leave UT. And, I am also grateful to Dr. Schwarz and Dr. Gillies for their detailed and useful comments on my dissertation. These are my dissertation committee members, without whom I would never have completed this dissertation.

Studying and living in the States are always expensive even though the tuition of UT Austin is relatively low. I want to express my wholehearted thankfulness to Dr. Wenhua Teng, my teaching supervisor and a senior lecturer at the Department of Asian Studies. She offered me a teaching assistantship when I ran out of my own fund and was very desperate. Without the assistantship, I would probably have quit my

study at UT long time ago and would never have had this opportunity to finish my dissertation. To her, I am truly grateful.

To those professors at National Chengchi University, my alma mater, I also owe my greatest gratitude. Dr. Hsun-huei Chang, my master's thesis advisor, encouraged me to pursue a Ph.D. degree when I talked to her about my worry about studying aboard. Dr. One-Soon Her, my master's thesis co-advisor, not only showed me the beauty of LFG but also demonstrate how humor was perfectly compatible with serious academic research. Dr. Huei-ling Lai, the most recent Taiwanese Ph.D. from UT Linguistics, gave me tons of tips as to how to survive at Austin, provided invaluable advice when I faced difficulties and encouraged me whenever I needed encouragement. Dr. Yuen-mei Yin, the director of the Graduate Program in Linguistics when I was studying there, always encouraged me and offered help even when I did not ask. The linguistic professors at NCCU brought me into the field of linguistics. They are always patient, kind and available to students. They demonstrated to me what a professor is like.

For Dr. Wei-fang Tso, my first phonology teacher, I can never thank her enough. Though she left NCCU years ago, she has always been very nice to me. I am applying for teaching positions right now. Dr. Tso emails me any information she can find. It is her enthusiasm and care for students, as well as her abundant knowledge of phonology, that made my learning experience in her class so pleasant, joyful, and productive.

Dr. Zhaoming Gao, my *xuezhang* from NCCU, always provides useful, helpful,

important and priceless suggestions in every aspect of my academic career whenever I need some. Though he has been an assistant professor for a few years, he always treats me as his peer and colleague. I am deeply indebted to him because he inspired me and helped me decide what I could do for my dissertation. Without his inspiration and help, this dissertation would never, ever, have started.

I also want to thank a few friends of mine here at UT. They are: Hsi-yao Su, Henrietta Shu-fen Yang, Hung-ming Chen, and Liton (Kiki) Wang. Hsi-yao and Shu-fen are also in linguistics. Without them, my life at UT Linguistics would have been very, very boring and lonely. Hung-Ming was my colleague at CKIP, Institute of Information Science, Academia Sinica. Undoubtedly, he is the kindest and friendliest person at Austin. He has kindly helped me countless times ever since I first came to Austin five years ago. I cannot imagine what my life at Austin would have been like without this enthusiastic friend. Kiki is a doctoral student in philosophy. His specialized training in philosophy has made his thought clear and his eloquence almost “intimidating”! But, his knowledge and understanding of logics and formalisms do impress me a great deal and it is always productive to discuss semantics with him.

Last, but not least, I would like to thank my family. My parents telephoned me every week when I was at Austin. They helped me through numerous difficult times. My sister and brother always offered me help whenever I needed some. My brother in law always kindly offered me rides from the airport back to home. Without my family, life would be terrible and meaningless.

MODELING TEMPORAL PROGRESSION IN MANDARIN: ASPECT MARKERS AND TEMPORAL RELATIONS

Publication No. _____

Jiun-Shiung Wu, Ph.D.

The University of Texas at Austin, 2003

Supervisor: Nicholas M. Asher

This dissertation examines how the aspectual properties of aspect markers in Mandarin affect the temporal relations between clauses. The significant point (SigP) analysis is proposed to account for the aspectual properties of aspect markers. The SigP for an event/eventuality is defeasibly inferred from the situation types of that event/eventuality. The SigP for accomplishment and achievement is their natural final endpoint. Accomplishment differs from achievement in that the former has a noticeable process between its initial endpoint and its natural final endpoint, while the initial endpoint and the natural final endpoint of the latter coincide. The SigP for activity is undefined because it does not have a natural final endpoint. The SigP for the kind of state with an initial endpoint is its initial endpoint while the SigP for the

kind of state without an initial endpoint is undefined.

The progressive marker *zai* is argued to present an event ongoing at an instant. It can present any point other than the SigP in an event, which means that *zai* does not present a natural final endpoint. Therefore, the event time of a *zai* clause cannot be advanced, which means that a clause following a *zai* clause cannot be connected to the *zai* clause by *Narration*. *zai* is argued to specify $Background_{T}$, a temporal background, by default.

The durative marker *zhe* is argued to present a homogeneous event/eventuality lasting over an interval. It cannot present a duration containing a SigP with nothing following. Since *zhe* presents either activity or state, neither of which has a natural final endpoint, the event time of a *zhe* clause cannot be advanced unless a verb denoting completion or termination is syntactically embedded under the event marked by *zhe*. That is, a clause following a *zhe* clause can be connected to the *zhe* clause by *Narration* only when the termination or completion of another event is being witnessed. *zhe* is also argued to indicate $Background_{T}$ by default.

The perfective marker *le* is argued to identify the SigP of an event/eventuality and to locate it before a reference time (RT). Because it presents as a single whole the part of an event/eventuality from its initial endpoint to its SigP, the internal process of an event/eventuality presented by *le* is inaccessible unless it is made accessible by *Elaboration*. *le* defeasibly specifies *Narration*.

The experiential marker *guo* is argued to predicate on an event type, which was realized at indefinite past and which is repeatable. Because *guo* realized an

event/eventuality at indefinite past, the semantics of *guo* cannot include a temporal variable and an event variable, which means that the event time of a *guo* clause is unknown. Therefore, the event time of a *guo* clause cannot be advanced unless there is a temporal location phrase to specify the possible range for the event time of the clause. That is, a temporal location phrase is required for a clause following a *guo* clause to be connected to the *guo* clause by *Narration*. *guo* indicates $Background_I$, an informational background, by default.

Examples of other rhetorical relations require explicit lexical information or indicators such as *yinwei* 'because', *danshi* 'but', etc. Explicit lexical information and these indicators can override the default rhetorical relation specified by an aspect marker as long as there is no aspectual clash.

Since a clause with an aspect marker can be connected to its adjacent clause by almost any rhetorical relation and since every rhetorical relation specifies its own temporal relation, it is argued that aspect markers do not directly determine the temporal order between clauses. Instead, aspect markers indirectly affect the temporal order via rhetorical relations.

Segmented Discourse Representation Theory (SDRT) is utilized to model temporal relations, which are determined by the meaning postulates for rhetorical relations in the Satisfaction Schema, which is used to interpret discourse.

The dissertation has two important theoretical implications. First, it provides strong support for the view of dynamic semantics on meanings. Secondly, it clarifies and verifies the intuitive impression that Mandarin is a discourse-oriented language.

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LIST OF ABBREVIATIONS

CL: Classifier

DE: Modifier/modifiee marker

DISP: Disposal marker

DUR: Durative marker

EXP: Experiential marker

Lit: Literally

PASS: Passive marker

PC: Phase complement

PFV: Perfective marker

Prc: Particle

PRG: Progressive marker

Q: Interrogative particle

REL: Relative clause marker

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CHAPTER ONE

Introduction

1.1 Scope of Study

The sentences in a passage are related to each other in terms of temporal relations in four ways, i.e. progressive, regressive, inclusive and neutral. Suppose both *A* and *B* are sentences and they appear in the order of *A*+*B* in a passage. A progressive relation is that *A* temporally occurs before *B*. A regressive relation is one where *B* temporally takes place before *A*. An inclusion relation is that *A* occurs when *B* occurs, vice versa, or *A* and *B* occur at the time, which is also called temporal overlapping. A neutral relation is that there is no explicit (or implicit) temporal relation between two discourse-related sentences. The following English examples illustrate these four relations.

1. a. John was hit by a car yesterday.
   b. He cannot go to school today.
2. a. John cannot go to school today.
   b. He was hit by a car.
3. a. John took a walk on the street for one hour last evening.
   b. He saw no other person on the street.
4. a. Nobody in this world is absolutely honest.
   b. John lost his faith in people when he realized that long ago.

In (1), under a preferred interpretation, (1a) explains (1b), and hence (1a) occurs before (1b). This is a progressive relation because the temporal order matches

the contextual order. The sentences in (2) are the ones in (1) in reverse order. Here, (2b) explains (2a), and hence (2b) occurs before (2a). In this case, the temporal order does not match the contextual order. This is a regressive relation because the temporal order is the reversed contextual order. In (3), having seen no other person is true during the time when he took a walk, that is, (3b) is temporally included in (3a). This is an inclusive relation. (4a) is a generic sentence, which is true all the time and is not anchored to any specific time. Since it is not anchored to any specific time, it does not provide a reference time (hereafter, RT), which one of the sentences in each of the previous three sets of examples provides for the other sentence in the same example. But, semantically, (4a) and (4b) are related because the anaphor *that* in (4b) refers to (4a). (4) is an example of a neutral relation because (4a) and (4b) are semantically related but there is no explicit temporal relation between them.

The temporal relations in the examples above can be partially[1] determined by the different tenses of the sentences since English is a tense language. For example, (1a) is past tense, and (1b) is present tense. For (1), tense alone can determine that (1a) occurs before (1b), and no other information is required. The same is true for (2).

The sentences in Mandarin texts have the same temporal relations as the examples in (1). The following examples illustrate the four temporal relations between Mandarin sentences. However, Mandarin is generally assumed to be a tenseless language (Kao 1940, Spencer 1970, Rohsenow 1978, Wang 1943, Smith

[1] It is partial determination because rhetorical relations also play an important role in determining the temporal relations between clauses, as argued in Asher (1993), Asher and Lascarides (2003), etc.

1997, among others), and hence the temporal relations cannot possibly be determined by tenses.[2]

5. a. zhangsan zai che huo zhong shou le zhong shang
   Zhangsan at car accident in receive PFV serious injury
   'Zhangsan was injured seriously in a car accident.'
   b. bei song dao yiyuan jijiu
   PASS take to hospital emergency-rescue
   'He was taken to the ER of the hospital.'

6. a. zhangsan bei song dao yiyuan jijiu
   Zhangsan PASS take to hospital emergency-rescue
   'Zhangsan was taken to the ER of the hospital.'
   b. yinwei ta zai che huo zhong shou le zhong shang
   because he at car accident in receive PFV serious injury
   'because he was injured seriously in a car accident.'

7. a. zhangsan zai nulide zuo gongke
   Zhangsan PRG diligently do homework
   'Zhangsan was doing homework diligently.'

[2] Some linguists suggest that Mandarin has tense, implicit or explicit, e.g., Lin W. (1979) and Lin J. (2002a, 2002b, 2003). These works all treat the perfective marker *le* as a (relative) past tense marker. Lin J. (2000a) further suggests that *le* must move to the head of T(ense)P to support his analysis. This position is discussed in Chapter Five.

b. ta de didi que zai kan dianshi

he DE younger brother but PRG watch TV

'But, his brother was watching TV.'

8. a. zhe ge shehui shang ren ren dou zisi

this CL society on person person all selfish

'In this society, everyone is selfish.'

b. suoyi zhangsan zao jiu dui zhe ge shehui shiqu le

so Zhangsan early JIU[3] to this CL society lose PFV

xinxin

confidence

'Zhangsan lost his confidence in this society long time ago.'

In (5), (5a) explains (5b). Hence, (5a) occurs before (5b). This is a progressive relation because the temporal order matches the contextual order. In (6), (6b) explains (6a), and hence (6b) occurs before (6a)[4]. This is a regressive relation because the temporal order is the reversed contextual order. In (7), both (7a) and (7b) takes place at the same time, i.e., they temporally include each other. This is an example of an inclusive relation (more specific, temporal overlapping). In (8), (8a) is also a generic sentence, and hence is not fixed at a specific time. It does not provide an RT. Therefore, though (8b) is the result of (8a), they do not manifest obvious temporal

[3] Here, JIU indicates an early action from the speaker's point of view. For detailed study of JIU and CAI, which indicate a delayed action, interested readers are referred to Lai (1995).

[4] There is a syntactic difference between (5) and (6). That is, (5a) has a zero anaphor subject, while (6b) does not and cannot have a zero anaphor. The function of zero anaphora is discussed in later chapters.

relation between them. This is an example of a neutral relation.

Though Mandarin is considered tenseless, it has a rich aspectual system, including the perfective marker *le*, the experiential marker *guo*, the progressive marker *zai* and the durative marker *zhe*. In (5a), the perfective marker *le* indicates that an action is completed since nothing indicates otherwise. Since (5a) is completed, (5b) can occur after it. In (7), both (7a) and (7b) have the progressive marker *zai*, and they temporally include each other. At the first glance, these two examples seem to be suggesting that the perfective marker *le* advances the narrative time while the progressive marker *zai* provides a temporal frame when another event can take place.

However, (6) and (8) suggest that *le*[5] does not necessarily advance the narrative time. (6b) has the perfective marker *le*, but it does not advance the narrative time. Instead, it occurs before (6a) because it explains (6a). (8b) also has *le*. It does not advance the narrative time either since it remains neutral with respect to the temporal relation with (8a).

The progressive marker *zai* does not necessarily provide a temporal frame for other events, either. The example (9) below demonstrates this point. Though (9c) has the progressive marker *zai*, it does not serve as a temporal frame for (9b). Instead, (9c) explains (9b). Presumably, (9c) should occur before (9b).

[5] Mandarin has at least two different *le*'s. One is the perfective *le*, which appears immediately after a verb, and the other is the sentential *le*, which appears after a VP (Chao 1968, Lin 1979, Li and Thompson 1981, etc.). Generally, the perfective *le* is regarded as an aspect marker while the sentential *le* is treated as a sentence particle, though Rohsenow (1978), and Shi (1990) suggest that they are, in fact, two variations of the same word under different circumstances. Based on the fact that Rohsenow's and Shi's works cannot really provide a unified account of the two *le*'s, both of which are reviewed in Chapter Five, this dissertation maintains that there are two different *le*'s. Only the perfective *le* is discussed here.

9. a. mei ge ren shengchulai dou chabuduo
every CL person born all not much difference
'When everyone is born, they are not that different.'

b. dan zhangda yihou meiyou ren shi wanchuan xiangtongde
but grow up after no person be completely same
'After they grow up, nobody is completely identical to others,'

c. yinwei mei ge ren dou zai zhao ziji de
because every CL person all PRG based on self DE
jiazhiguan zuo xuanze
value sense make choice
'because everyone is making choices based on what (s)he thinks is valuable and what is not.'

In addition to suggesting that the aspect markers in Mandarin do not directly determine the temporal relations between sentences, (6), (8) and (9) also seem to suggest that rhetorical relations can usually, but not always, determine the temporal relation between sentences. (6b) explains (6a), and hence (6b) occurs before (6a). This reasoning also applies to (9b) and (9c). However, for (8), though (8b) is the result of (8a), (8b) cannot occur before (8a) because (8a) is a generic sentence and is not anchored to any specific time.

It seems that the semantic properties of the four aspect markers also play an important role, in addition to the factors discussed so far, in determining what rhetorical relation can connect a sentence with an aspect marker to its adjacent

sentences. This is illustrated by example (10) below.

The perfective *le* presents an event as a complete whole, and its internal process is not accessible. Hence, the time for the internal process of an event presented by the perfective *le* cannot provide its event time as a temporal frame. This is why (10b) is not a good continuation to (10a), which has the perfective *le*. On the other hand, the progressive marker *zai* presents an on-going event, whose internal process is accessible. This is why (10b) is a good continuation to (10a').

10. a. !dan ta xie le xin[6]
when he write PFV letter
'When he wrote a letter,'

a'. dang ta zai kan shu de shihou
when he PRG read book DE time
'When he was reading a book,'

b. wo zai kan dianshi
I PRG watch TV
'I was watching TV.'

Few works, if any, have been devoted to how the temporal relations between Mandarin sentences are determined. Smith and Erbaugh (2000) propose that the event time is defeasibly determined by the situation types of predicates in Mandarin since tense cannot help in this respect. Given this study, it seems reasonable to think about

[6] In this dissertation, ! is used to indicate contextual ill-formedness. That is, a clause marked with ! is ill-formed in a certain context, but it is syntactically and semantically well-formed.

the relation between temporal progression and aspect, and to examine how aspect can help in determining the temporal relations between sentences in Mandarin. In order to examine the relation between aspect markers and temporal progression in detail and to avoid unnecessary complications, this dissertation focuses on sentences with aspect markers in Mandarin texts, even though Smith and Erbaugh (ibid) also note that Mandarin texts do not necessarily have to contain any aspect marker.

To sum up, this dissertation aims:

- to critically review the literature on the four aspect markers in Mandarin and to provide new analysis
- to examine whether the aspect markers in Mandarin directly determine the temporal relations between sentences or indirectly influence them through rhetorical relations
- to discuss how the semantic properties of the four aspect markers affect the rhetorical relations
- and to model the temporal progression in Mandarin based on the above observations

1.2 Source, Statistics and Presentation of Data

1.2.1 Source and Statistics of Data

The texts used in this dissertation to examine temporal relations are taken from the Academia Sinica Balanced Corpus Version 3.0 (for short, the Sinica Corpus). This version contains articles of different genres and of different sources, and has roughly five million words in it. It contains articles of five different linguistic forms: written,

written to be read, written to be spoken, spoken, and spoken to be written. This dissertation focuses on the data of written form. Table I is the statistics of the distribution of different genres in the Sinica Corpus.

Table I. The Distribution of Genres on the Sinica Corpus 3.0 (Unit: ten thousand)

Genres	Report	Commentary	Fiction	Personal Essay
Number of Characters[7]	443.94	78.97	79.85	66.93
Number of Words	292.64	52.06	52.64	44.12
Percentage	56.25	10.01	10.12	8.48

Table I (Continued)

Genres	Announcement	Advertisement	Letter	Biography/diary
Number of Characters	5.79	4.68	10.17	3.94
Number of Words	3.82	3.08	6.71	2.60
Percentage	0.73	0.59	1.29	0.50

[7] In Mandarin, characters are different from words. A word in Mandarin is a unit in the spoken language characterized by syntactic and semantic independence and integrity (Li and Thompson 1981: 13-15). A Chinese character is a single graphic writing, which is monosyllabic. A Chinese word can consist of one or more Chinese characters. The number of words in the Sinica Corpus Version 3.0 is not precisely five million; instead, there are a little more than five million words in this version of the Sinica Corpus.

Table I (Continued)

Genres	Poem	Ana	Manual
Number of Characters	2.31	0.23	15.98
Number of Words	1.52	0.15	10.54
Percentage	0.29	0.03	2.03

Table I (Continued)

Genres (non-written)	Movie/TV Script	Conversation	Speech	Meeting Transcription
Number of Characters	0.43	10.57	64.61	0.84
Number of Words	0.29	6.97	42.60	0.56
Percentage	0.05	1.34	8.19	0.11

A Prolog program was written to do the frequency count of different aspect markers in different genres in the data of written form in the Sinica Corpus. It is found that four out of the eleven genres of written form have the most aspect markers. The four genres are Commentary, Report, Fiction and Personal Essay. This dissertation focuses on the data of these four genres. Table II is the result of the frequency count of aspect markers in different genres.

Table II: The Frequency of Aspect Markers in Different Genres

	Commentary	Report	Fiction	Personal Essay	Advertisement
le	3082	11996	7224	4119	111
guo	368	1512	654	444	12
zai	206	856	333	310	3
zhe	640	3641	3608	1957	40
Total	4296	18005	11819	6830	166

Table II (Continued)

	Letter	Announcement	Biography/ Diary	Poetry	Anna	Manual
le	369	40	120	141	6	411
guo	80	2	24	16	1	47
zai	29	2	7	23	2	15
zhe	83	7	41	90	0	91
Total	561	51	192	270	9	564

1.2.2 Presentation of Data

In the Sinica Corpus, the data are numbered by lines. Any segment that is separated from others by punctuation is listed as a single line and the segment in each line is not necessarily a complete clause. (11) is an example.

11. a. zai huang sha mangmang de huijiang da mo zhishang[8]
at yellow sand flat and wide DE Huijiang big desert on
'On the Huijian desert where yellow sand spreads flat and wide,'

[8] This short passage is taken from the file *bbai*, number 5 to number 7, in the Sinica Corpus.

b. chen sha fei qi liang zhang lai gao
dust sand fly up two three meters some high
'dust and sand fly up for around six meters high,'

c. liang ren qi ma yi qian yi hou ji chi er lai
two person ride horse one front one after fast run and come
'Two persons rode horses. One was in the front, and the other in the back. They came close, riding fast.'

In the original text, these three segments are separated by commas, and at the end of (11c) is a period. (11a) is not a clause. Instead, it is a long PP with a relative clause modifying the NP. But, since it is separated from (11b) with a comma, in the Sinica Corpus, it is listed as a separate line and is numbered individually. (11c) contains several clauses, but since in the original text they are not separated by any punctuation, they are listed as a single line in the Sinica Corpus.

In this dissertation, the data are not presented as they are in the Sinica Corpus. Here, each clause with a verb, all its arguments and adjuncts, is presented together under a number. Therefore, in this dissertation, several lines in the Sinica Corpus may be collapsed into one and are presented under a number, or a line may be split into several ones, which are presented under different numbers. That is, a short passage listed in the Sinica Corpus like (11) is presented as (12) in this dissertation.

12. a. zai huang sha mangmang de huijiang da mo zhishang
at yellow sand flat and wide DE Huijiang big desert on
chen sha fei qi liang zhang lai gao
dust sand fly up two three meters some high
'On the desert where yellow sand spreads flat and wide, dust and sand fly up for around six meters hight.'

b. liang ren qi ma
two person ride horse
'Two persons rode horses.'

c. yi qian
one front
'One was in the front,'

d. yi hou
one after
'and the other was in the back.'

e. ji chi er lai
fast ride and come
'They approached, riding fast.'

In (12), the PP is represented under (12a) together with the clause it modifies, and the four clauses collapsed as one under (11c) are separated from each other and presented under (12b) to (12e) respectively. The convention used here that a complete clause is listed under a number just follows from the convention how an example is

presented in the syntactic or semantic studies where the domain of discussion is one single sentence.

Anther issue pertinent to the presentation of data is that only clauses with any aspect marker and their adjacent clauses, which may or may not be temporally related to the clauses with aspect markers, are discussed and presented. This is so because this dissertation focuses on how aspect markers in Mandarin influence temporal relations. In addition, when an example is presented, a complete passage is presented so that the clauses will not have to be interpreted out of context.

It is also worth mentioning that the examples used to discuss the semantic properties of the aspect markers are not necessarily taken from the Sinica Corpus. They can be grammatical/ungrammatical sentences made up for the purpose of discussion.

1.3 Introduction to the Theoretical Framework Adopted

Segmented Discourse Representation Theory (hereafter, SDRT) (Asher 1993, Asher and Lascarides 2003) is used in this dissertation to model the temporal progression in Mandarin texts. This section is a brief introduction to SDRT.

SDRT is developed to model and to interpret discourse. It contains two different, but related, logics. The first is the logic of information content, which is the semantics used to interpret discourse. The second is the logic of information packaging, which consists of the glue logic, discourse update and discourse revision. The glue logic is the reasoning performed to glue the logical forms of clauses to form a logic form of discourse. Discourse update defines how the SDRS for the discourse

context plus the SDRS for the new information are integrated into a new SDRS. Discourse revision[9] defines how the SDRS for the discourse in a dialogue plus the SDRS for the new information are revised to form a new SDRS.

SDRT utilizes underspecified logical forms (for short, ULF) to represent semantic ambiguity, e.g. anaphora, scopal interactions, rhetorical relations, etc. The basic insight of underspecified semantics is to use a labeling scheme to build on the syntax/semantics interface a partial description of the logical form. It is partial because it specifies the constraints on the form of the logical form itself, which is a formula in a base language that does not have labels. Those constraints do not necessarily determine a unique logical form in the base language. ULF can be directly mapped from a formula in the unlabeled base language. The arity of each constructor in the base language is increased by one and that additional argument place is used for the label. For a sentence like (13a), its LF in the base language is like (13b). Its ULF is like (13c) and can be glossed as in (13d).

13. a. Many problems preoccupy every politician[10].

b. many'(x, problem'(x), ∀(y, politician'(y), preoccupy'(x, y))) or

∀(y, politician'(y), many'(x, problem'(x), preoccupy'(x, y)))

c. $\exists l_4, l_5$ ($R_{many}(l_6, l_7, l_4, l_1) \wedge R_x(l_6) \wedge R_{problem}(l_8, l_7) \wedge R_x(l_8) \wedge$

$R_\forall(l_9, l_{10}, l_5, l_2) \wedge R_y(l_9) \wedge R_{politician}(l_{11}, l_{10}) \wedge R_y(l_{11}) \wedge$

[9] Discourse revision is not used in this dissertation because this dissertation focuses on written texts only. Therefore, discourse revision will not be discussed further. Interested readers are referred to Asher and Lascarides (2003).

[10] All of the examples and their logical forms used in this section to demonstrate SDRT are taken from Asher and Lascarides (2003).

$R_{preoccupy}(l_{12}, l_{13}, l_3) \wedge R_x(l_{12}) \wedge R_y(l_3) \wedge$ outscope(l_1, l_3)

$\wedge$ outscope(l_2, l_3)

d. $\exists l_4, l_5$ (l_1: many'(l_6, l_7, l_4) $\wedge$ l_6: x $\wedge$ l_7: problem'(l_8) $\wedge$ l_8: x $\wedge$

l_2:$\forall$(l_9, l_{10}, l_5) $\wedge$ l_9: y $\wedge$ l_{10}: politician'(l_{11}) $\wedge$ l_{11}: y $\wedge$

l_3: preoccupy'(l_{12}, l_{13}) $\wedge$ l_{12}: x $\wedge$ l_3: y $\wedge$ outscope(l_1, l_3)

$\wedge$ outscope(l_2, l_3)

(13a) is ambiguous in that the scope between *many problems* and *every politician* is not determined. The ULF (13c) bears much resemblance to the formulae of the base language (13b) except that the ULF contains labels. For example, *many* in the base language is three-place. In the ULF, it becomes four-place with an extra argument for the label representing *many* itself. Variables in the base language, such as *x, y*, become one-place in the ULF. This extra argument is for the label that represents the variable itself. The labels for underspecified information have to be existentially quantified. In (13c), the existentially quantified labels, l_4 and l_5, are labels for underspecified information, i.e. the scopal interaction between *many problems* and *every politician* in this example.

(13a) does not have an anaphor. The ULF for an anaphor is like: $\exists$Y ($R_{=}(l_x, l_y, l)$ $\wedge$ $R_x(l_x)$ $\wedge$ $Y(l_y)$, glossed as l: x = ? or x = ?, which basically means that the antecedent for the anaphor represented as *x* is unknown so far.

The discussion above is about the ULFs for clauses. The ULFs for discourse is the ULFs for clauses with one extra argument for the label representing the clause

itself, which is marked as π_i. Rhetorical relations take the labels for clauses as their arguments. Therefore, the ULF for an underspecified rhetorical relation is like $\exists R$ $R(\pi_1, \pi_2, \pi)$, where R is the underspecified rhetorical relation and π_1, π_2, and π are labels for SDRSs for clauses.

An ULF, such as (13c), is a partial description because it poses constraints on the form of the LF itself, i.e. the fully-specified LF for (13a) should have every condition that (13c) has. But, (13c) does not specify the scopal relation between *many problems* and *every politician*, which requires extra information to resolve.

The language of the logic of information content can be translated from the ULF language. The arity of an n-ary constructor in the base language is increased by two to form an ULF for discourse, which is a formula in the logic of information content. The interpretation of discourse is done in the logic of the information content by the Satisfaction Schema for rhetorical relations.

The formulae of the glue language can be translated from ULFs for discourse in a homophonic way except that the quantifiers in the ULFs ranging over variables are dropped. For example, An ULF $\exists R$ $R(\pi_1, \pi_2, \pi)$ can be translated into a formula of the glue language as $?(\pi_1, \pi_2, \pi)$. To support nonmonotonic inference, such as default inference for rhetorical relations, the glue language contains in its vocabulary a modal connective >, where A > B means if A then normally B. The existential quantifiers are removed in the translation of an ULF for discourse into a formula of the glue language in order to maintain computability. The glue language also contains axioms

to defeasibly infer rhetorical relations.

To illustrate how SDRT works, an example is presented below. A step-by-step discourse update is demonstrated to incorporate new information into old information to form a new SDRS. And, how the final SDRS is interpreted and how the temporal relations between the clauses in the discourse are determined by the Satisfaction Schema are also illustrated.

14. a. Max experienced a lovely evening last night.

    b. He had a fantastic meal.

    c. He ate salmon.

    d. He devoured lots of cheese.

    e. He won a dancing competition.

First, (14a) is translated into a formula of the glue logic, as in (14a').

14. a'. π_1: experience'(Max', y, e) $\wedge$ lovely'(night'(y)) $\wedge$ e $\subseteq$ last night'
$\wedge$ e $\prec$ ST

Then, when (14b) comes into the discourse, it has to be attached to a clause already existing in the discourse. Here, since (14a) is the only choice, (14b) is attached to (14a). And, the attachment is done by an underspecified rhetorical relation. This is represented as (14b').

14. a'. π_1: experience'(Max', y, e) $\wedge$ lovely'(night'(y)) $\wedge$ e $\subseteq$ last night'
$\wedge$ e $\prec$ ST

b'. π_2: had'(x, y, e') $\wedge$meal'(y) $\wedge$ x = Max' / x = ? $\wedge$ e' $\prec$ ST

π_0: Elaboration(π_1, π_2) / ?$_0$(π_1, π_2)

The underspecified rhetorical relation ?$_0$ can be resolved to *Elaboration* by the subtype relation between *experiencing a lovely evening* and *having a fantastic meal* represented as an axiom in the glue logic. Since (14b') is attached to (14a') and the only possible antecedent candidate for the pronoun in (14b') is *Max*, the underspecified antecedent for the pronoun is resolved to *Max*.

If there are more than one clause in the discourse and a new clause comes in, the new clause will have several possible attachment sites. The attachment sites of a new clause are determined by the principle (Asher and Lascarides 2003: 148) below:

15. Available Attachment Points

Suppose that β is to be attached to a constituent in the SDRS <*A*, *F*, *LAST*>. Then the available attachment points are:

(i) The label α = *LAST*;

(ii) Any label γ such that:

(a) *i-scopes*(γ, α) (i.e., R(δ, α) or R(α,δ) is a conjunct in *F*(γ) for some R and some δ); or

(b) R(γ, α) is a conjunct in *F*(λ) for some label λ, where R is subordinating discourse relation (like *Elaboration*, *Explanation* or $\Downarrow$). This is glossed as $\alpha < \gamma$.

(iii) Transitive closure:

Any label γ that dominates α through a sequence of labels $\gamma_1, \gamma_2, ..., \gamma_n$ such that $\alpha < \gamma_1, \gamma_1 < \gamma_2, ..., \gamma_n < \gamma$.

In words, (15) basically says that the available nodes are the previous clause α and any label γ that dominates α via a series of outscopings and/or subordinating rhetorical relations.

When (14c), marked as π_3, comes into the discourse, it has three possible attachment sites: π_1, π_2 and π_0. It is not good to attach π_3 to π_0 because the pronoun in π_3 cannot find an accessible antecedent and because it is impossible to compute what rhetorical relation connects them together. If π_3 is attached to π_1, though the pronoun can find an accessible antecedent and a rhetorical relation can be computed, the relationship between π_3 and π_2 is not accounted for. If π_3 is attached to π_2, the subtype relation determines that they are connected by *Elaboration*, the pronoun in π_3 can find an accessible antecedent, and π_3 indirectly elaborates π_1. Therefore, π_3 should be attached to π_2 by *Elaboration*. This is shown below.

14. a'. π_1: experience'(Max, y, e) $\wedge$ lovely'(night'(y)) $\wedge$ e $\subseteq$ last night' $\wedge$ e $\prec$ ST

b'. π_2: have'(x, y, e') $\wedge$ meal'(y) $\wedge$ x = Max' / x = ? $\wedge$ e' $\prec$ ST

π_0: Elaboration(π_1, π_2) / $?_0$(π_1, π_2)

c': π_3: eat'(x, y, e'') $\wedge$ salmon'(y) $\wedge$ x = Max' / x = ? $\wedge$ e' $\prec$ ST

π_{23}: Elaboration(π_2, π_3) / ?$_{23}$(π_2, π_3)

Discourse update does not determine which available attachment site the label for the new clause should be attached to. This is determined by Maximize Discourse Coherence (MDC). Informally, MDC (Asher and Lascarides 2003: 233) states that:

16. If discourse update produces two SDRSs *K* and *K'*, *K* describes a preferred or more coherent interpretation of the discourse (so far) if the followings conditions hold:
    (a) *K* has more and better quality rhetorical relations than *K'*
    (b) *K* has fewer inconsistencies and pragmatic clashes
    (c) *K* has a simpler structure unless a simpler structure would generate an inconsistency or a clash
    (d) *K* has fewer unresolved underspecifications

Attaching π_3 to π_0 violates (16d) since the underspecified pronoun is unresolved. Attaching π_3 to π_1 violates (16a) because the relationship between π_2 and π_3 is not accounted for and this attachment cannot produce an SDRS which have more rhetorical relations than the one produced by the attachment of π_3 to π_2. Attaching π_3 to π_2 can produce an SDRS which maximizes the connections between the propositions and minimizes the number of unresolved underspecifications.

When (14d), labeled as π_4, comes into the discourse, it has four possible attachment sites: π_3, π_2, π_1 and π_0. If π_4 is not connected to π_3, then the important

information about a possible rhetorical relation is lost. That is, if π_4 is connected to π_3, Narration(π_3, π_4) can be inferred from occasion(π_3, π_4) since it is the order of courses in a meal. Attaching π_4 to other labels violates (16a) because the important (pragmatic and temporal) relationship between π_3 and π_4 cannot be accounted for and the SDRS produced cannot have more and better quality rhetorical relations. This is represented as below.

14. a'. π_1: experience'(Max, y, e) $\wedge$ lovely'(night'(y)) $\wedge$ e $\subseteq$ last night' $\wedge$ e $\prec$ ST

b'. π_2: have'(x, y, e') $\wedge$ meal'(y) $\wedge$ x = Max' / x = ? $\wedge$ e' $\prec$ ST

π_0: Elaboration(π_1, π_2) / $?_0$(π_1, π_2)

c': π_3: eat'(x, y, e'') $\wedge$ salmon'(y) $\wedge$ x = Max' / x = ? $\wedge$ e' $\prec$ ST

π_{23}: Elaboration(π_2, π_3) / $?_{23}$(π_2, π_3)

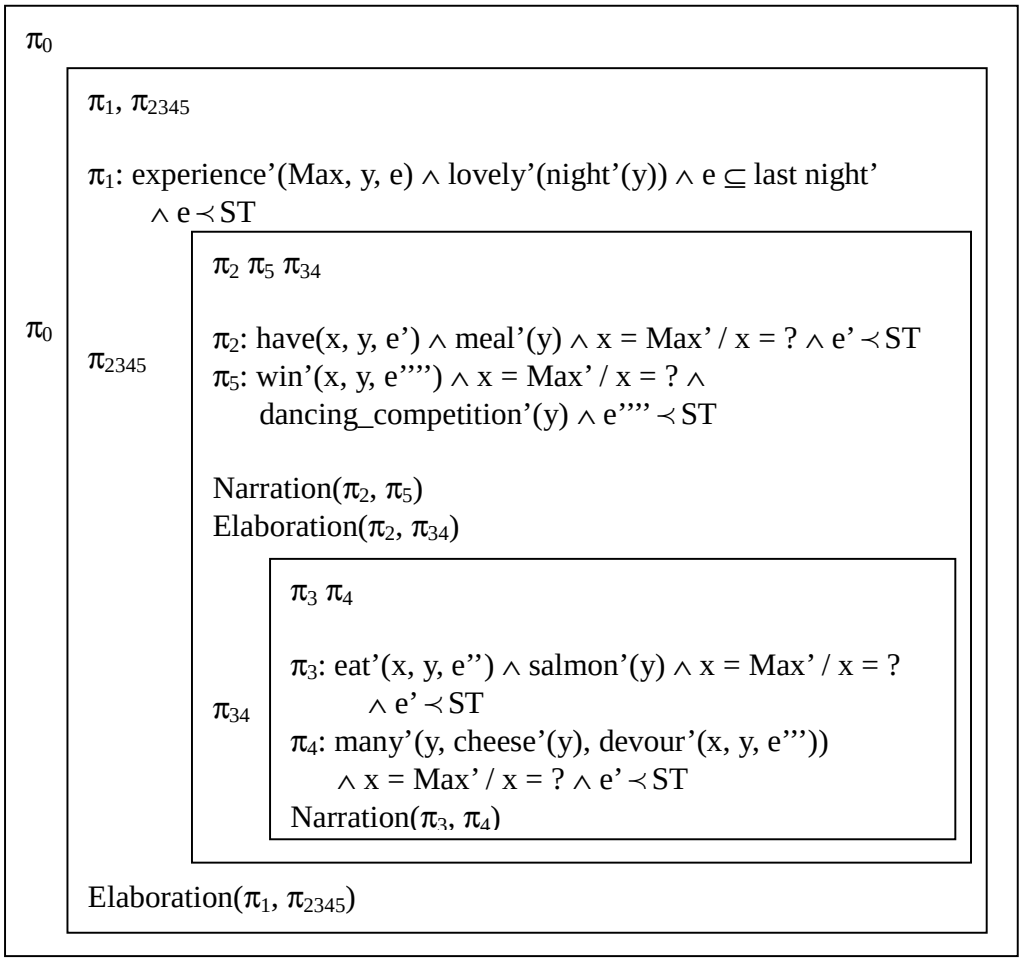
d': π_4: many'(y, cheese'(y), devour'(x, y, e''')) $\wedge$ x = Max' / x = ? $\wedge$ e' $\prec$ ST

π_{34}: Narration(π_3, π_4) / $?_{34}$(π_3, π_4)

When (14e), labeled as π_5, comes into the discourse, it has five choices of attachment site: π_0, π_1, π_2, π_{34}, and π_4. MDC has to help to decide which site π_5 is attached to. There are no axioms which allow to infer *occasion* (for *Narration*), $subtype_D$ (for *Elaboration*) or $cause_D$ (for *Explanation*) to connect π_5 and π_4 together. This will leave an underspecified rhetorical relation in the discourse, which is not

coherent. The same holds between π_5 and π_{34}. If π_5 is attached to π_1, then *subtyep*$_D$ verifies that π_5 is a subtype of π_1, and the underspecified rhetorical relation can be resolved to *Elaboration*(π_1, π_5). This additional information can verify an *occasion*-axiom for π_5 and π_2, producing *Narration*(π_2, π_5). Since *Elaboration*(π_1, π_5) and *Elaboration*(π_1, π_5) have been inferred, π_1 can be treated as the common topic to the narrative sequence consisting of π_2 and π_5, which is labeled as π_{2345}. The result of the discourse update of (14) can be represented as the SDRS in (17).

17.



This SDRS is interpreted in the logic of information content by the Satisfaction Schema for veridical rhetorical relations (Asher and Lascarides 2003: 156). The temporal relations between the clauses in this discourse are also determined, in the Satisfaction Schema, by the meaning postulates for different rhetorical relations. The Satisfaction Schema is stated in (18).

18. a. Satisfaction Schema for Veridical Rhetorical Relations:

(w, f) $[\![R(\pi_1, \pi_2)]\!]_M$ (w', g) iff

(w, f) $[\![K_{\pi_1} \wedge K_{\pi_2} \wedge \Phi_{R(\pi_1, \pi_2)}]\!]_M$ (w', g)

b. A relation R is veridical iff $R(\alpha, \beta) \Rightarrow (K_\alpha \wedge K_\beta)$

In words, (18) says that $R(\pi_1, \pi_2)$ can relate an input world-assignment pair (w, f) to an output pair (w', g) if and only if the SDRS labeled by π_1, K_{π_1}, the SDRS labeled by π_2, K_{π_2}, and the meaning postulate for the rhetorical relation R can relate the same input pair to the same output pair, where $\wedge$ is interpreted dynamically.

Take *Elaboration*(π_2, π_{34}) and *Narration*(π_3, π_4) as an example. These two rhetorical relations have their own meaning postulates which specify their temporal consequence, as presented below.

19. a. $\Phi_{Elaboration(\alpha, \beta)} \Rightarrow$ Part_of(e_β, e_α)

b. $\Phi_{Narration(\alpha, \beta)} \Rightarrow$ overlap(prestate(e_β), ADV(poststate(e_α))

(19a) says that if the elaboration of α is β, then the event β is part of the event α, that is, temporal overlapping. (19b) says that if β narrates α, then the prestate of the event

β overlaps the result of the poststate of the event α modified by an adverbial.

Therefore, to interpret *Elaboration*(π_2, π_{34}), it is put into the Satisfaction Schema, as shown in (20).

20. (w, f) $[\![$*Elaboration*(π_2, π_{34})$]\!]_M$ (w', g) iff

(w, f) $[\![K_{\pi_2} \wedge K_{\pi_{34}} \wedge \Phi_{\text{Elaboration}(\pi_2, \pi_{34})}]\!]_M$ (w', g)

According to the meaning postulate (19a), the event π_{34} is part of the event π_2, that is, π_{34} temporally overlaps π_2. This inference accurately captures the intuition about the temporal relation between π_2 and π_{34}.

To interpret *Narration*(π_3, π_4), it is also put into the Satisfaction Schema:

21. (w, f) $[\![$*Narration*(π_3, π_4)$]\!]_M$ (w', g) iff

(w, f) $[\![K_{\pi_3} \wedge K_{\pi_4} \wedge \Phi_{\text{Narration}(\pi_3, \pi_4)}]\!]_M$ (w', g)

Based on the meaning postulate (19b), the prestate of the event π_4 overlaps the postsate of the event π_3 modified by an adverbial. Since there is no adverbial in this sentence, the prestate of π_4 overlaps the poststate of π_3. That is, π_4 temporally follows π_3. This inference also captures the intuition about the temporal relation between π_3 and π_4.

In sum, SDRT models temporal progression in a context, utilizing the meaning postulates for rhetorical relations. The clauses in a discourse are translated into the formulae of the glue language first. Then discourse update attaches the new information of a new clause to the current SDRS, and decides which rhetorical

relation connects them together. Discourse update does not decide the attachment site of the new information. Maximize Discourse Coherence (MDC) decides what is the best attachment site for the information of a new clause coming in the discourse. When all of the clauses are processed, the discourse is interpreted in the logic of information content, and the temporal relations between the clauses are determined by the meaning postulates for rhetorical relations in the Satisfaction Schema.

1.4 Organization of the Dissertation

This dissertation is organized as follows.

Chapter Two is an introduction to two important concepts used in this dissertation: situation types and rhetorical relations. Section 2.1 is an introduction to this chapter. Section 2.2 talks about situation types and the significant point analysis. Section 2.3 discusses the rhetorical relations used in SDRT.

Chapter Three discusses the progressive marker *zai* and its role in temporal progression. Section 3.1 is an introduction. Section 3.2 reviews pertinent literature. In Section 3.3, a semantic definition of *zai* and a hypothesis about its role in temporal progression are proposed. In Section 3.4, the hypothesis is tested against the data extracted from the Sinica Corpus. Section 3.5 summarizes this chapter.

Chapter Four deals with the durative marker *zhe*. Section 4.1 is an introduction. Section 4.2 is a critical review of previous studies on *zhe*. In Section 4.3, a semantic translation of *zhe* is provided and a hypothesis about its role in temporal relations is proposed. In Section 4.4, the hypothesis is tested against the examples retrieved from the Sinica Corpus. Section 4.5 summarizes this chapter.

Chapter Five talks about the perfective marker *le* and its interaction with temporal progression. Section 5.1 is an introduction. Section 5.2 is a critical review of the literature on *le*. Section 5.3 examines the semantics of the perfective marker *le*. In addition, a hypothesis of the role of the perfective *le* in temporal progression is proposed in this section. In Section 5.4, the hypothesis is tested against the examples collected from the Sinica Corpus. Section 5.5 summarizes this chapter.

Chapter Six addresses the semantic properties of the experiential marker *guo* and its function in temporal progression. Again, Section 6.1 is an introduction. Section 6.2 is a critical review of previous studies on *guo*. In Section 6.3, a semantic translation of *guo* is provided, and a hypothesis about the function of *guo* in temporal progression is proposed. In Section 6.4, the hypothesis is tested against the data taken from the Sinica Corpus. Section 6.5 summarizes this chapter.

Chapter Seven discusses the relationship among aspect markers, rhetorical relations and temporal relations, and use SDRT to model temporal progression in Mandarin. Section 7.1 is an introduction. Section 7.2 discusses the interaction between aspect markers and rhetorical relations. Section 7.3 discusses the relationship between rhetorical relations and temporal relations. Section 7.4 demonstrates how SDRT models temporal progression in Mandarin. Section 7.5 is a summary.

Chapter Eight concludes this dissertation. In addition to summarizing all of the discussions made in the previous chapters, theoretical implications, remaining issues and topics for future studies are also discussed in this chapter.

CHAPTER TWO

Situation Types and Rhetorical Relations

2.1 Introduction

This chapter is an introduction to two important concepts used in this dissertation: situation types and rhetorical relations. The significant point (SigP) analysis is utilized to account for the semantic properties of aspectual markers. The SigP of an event/eventuality is defeasibly inferred from its situation type. In SDRT, temporal relations are determined by rhetorical relations. Given the fact that these two concepts play a crucial role in this dissertation, they deserve an introduction.

This chapter is organized as follows. Section 2.2 is an introduction to situation types (aktionsart or lexical aspect) and the SigP analysis. Section 2.3 is an introduction to the rhetorical relations adopted in SDRT and how they are indicated in Mandarin.

2.2 Situation Types and The SigP Analysis

Situation types (Smith 1997: 17-38) are a classification of events/eventualities. Since Vendler (1957) proposes his classification of events/eventualities, the classification of events/eventualities (i.e. situation types, aktionsart, lexical aspects) has played an important role in linguistic research. The basic classification includes accomplishment, achievement, activity, and state.

Smith (ibid: 26) proposes that accomplishment consists of a process and a change of state. This change of state indicates the completion of the process. Accomplishment is finite and intrinsically bound. Since accomplishment includes a

process and a change of state, an accomplishment event is compatible with both durational phrases and completive phrases[11]. This point is demonstrated below.

22. a. ta xie zhe wu feng xin xie le san ge xiaoshi
he write this five CL letter write PFV five CL hour
'He wrote these five letters for five hours.'

b. ta yi ge xiaoshi nei jiu xie le zhe wu feng xin
he one CL hour within JIU write PFV this five CL letter
'He finished these five letters in (as little as) one hour.'

Intuitively, *xie zhe wu feng xin* 'to write these five letters' contains both a process and a natural final endpoint, and therefore it should be classified as accomplishment. Since it has a process, it should be compatible with a durational phrase, for example, *san ge xiaoshi* 'three hours' in (22a)[12]. Since it has a natural final endpoint, it should be compatible with a completive phrase, e.g. *yi ge xiaoshi nei* 'within one hour' in (22b)[13].

Achievement is the kind of events that are instantaneous and result in a change of state. The difference between accomplishment and achievement is that accomplishment has a (noticeable) process while achievement does not. In Mandarin, achievement events are not compatible with a durational phrase and the progressive

[11] Completive phrases refer to temporal phrases such as *in one hour*, *in two days*, etc., as defined in Smith (1997: 43).

[12] Note that verb copying (i.e. reduplication of a verb) is required in order to express the duration of an event in Mandarin. In (22a), the verb *xie* 'to write' is repeated twice. There is no Mandarin counterpart of the English preposition *for* in a durational phrase such as *for three years*.

[13] In Mandarin, a completive phrase is identified by its syntactic position. That is, *nei* 'within' in (22b) is actually optional. A completive phrase is located at the preverbal position, as suggested in Tai (1984), He (1992) and Kang (1999: 40).

aspect. This point is demonstrated in the examples below.

23. a. *ta zai dida taibei

he PRG arrive Taipei

'*He is arriving at Taipei.' (the on-going reading)

b. *ta dida taibei dida le wu fen zhong

he arrive Taipei arrive PFV five CL minute

'*He has been arriving Taipei for five minutes.'

For an event to be on-going, it needs an internal process. Verbs such as *dida* 'to arrive' are instantaneous and do not have a process. This kind of verbs can be classified as achievement. They are not compatible with the progressive aspect, as shown in (23a). Achievement does not have a process and therefore it is not compatible with a durational phrase, as in (23b).

Activity has a process but does not result in a change of state, i.e. it has no natural final endpoint. Since it has a process but no natural final endpoint, activity is compatible with a durational phrase, but is incompatible with a completive phrase. See the following examples.

24. a. ta youyong you le yi ge xiaoshi

he swim swim PFV one CL hour

'He swam for one hour.'

b. *ta yi ge xiaoshi nei you le yong

he one CL hour within swim PFV swim

'*He swam in one hour.'

Intuitively, *youyong* ‘to swim’ does not have a natural final endpoint and theoretically this predicate has the potential to last forever. It has a process, which is why it can go with a durational temporal phrase, as in (24a). It does not have a natural final endpoint, which is why it cannot go with a completive phrase, as shown in (24b).

State is usually considered to consist of a homogeneous state. State is different from activity and accomplishment in that state is not compatible with the progressive aspect. While both state and achievement are incompatible with the progressive aspect, their difference lies in that state can go with a durational phrase while achievement cannot. These two differences are demonstrated below.

25. a. *hua zai hong
flower PRG red
‘*The flower is being red.’

b. hua hong le san ge yue le
flower red PFV three CL month Prc
‘The flower has been red for three months.’

The above discussion about accomplishment, achievement, and activity show that the way to distinguish these three active situation types is their natural final endpoints. All actions have a starting point. That is, all of three active situation types have an initial endpoint. Accomplishment has a noticeable process between its initial endpoint and its natural final endpoint. The initial endpoint and the natural final endpoint of achievement coincide with each other. Activity does not have a natural

final endpoint. Since these three active situation types can be distinguished from each other by their natural final endpoints, their natural final endpoints can be called their significant points (SigP).

For state, the situation is more complicated. Smith (1997: 32) proposes that state consists of undifferentiated period without an internal structure. That is, state does not include an initial endpoint or a natural final endpoint. While state behaves just like activity in that they both have the potential to last forever, i.e. neither of them has a natural final endpoint to reach, some state predicates in Mandarin seem to have an initial endpoint. In Mandarin, some of the state predicates can go with *kaishi* 'to begin', while others cannot. This difference is demonstrated below.

26. a. hua kaishi hong le
flower begin red Prc
'Flowers started to turn red.'

b. ta kaishi shou le
he begin thin Prc
'He started to become thin.'

c. ta kaishi xie na feng xin le
he start write that CL letter Prc
'He started writing that letter.'

c'. ta kaishi xie *le na feng xin
he start write PFV that CL letter

d. hua hong le hen jiu

flower red PFV very long

'Flowers are/were red for a long time.'

State predicates such as *hong* 'red' and *shou* 'thin' are compatible with *kaishi* 'to begin', as shown in (26a) and (26b). (26c) is to show that the *le* at the end of (26a) and (26b) is not the perfective *le* and, instead, it is the sentential *le*. If the *le* in a sentence with *kaishi* 'to begin' were the perfective *le*, it should be located between the verb and the object when it goes with a transitive verb. That is, if the *le* in a sentence with *kaishi* 'to begin' were the perfective *le*, (26c') would be grammatical. However, this is not true. As in (26c), the *le* should be placed at the end of the sentence. This example suggests that the inchoative readings of the examples from (26a) to (26c) come from *kaishi* 'to begin', not from *le* because the *le* here is the sentential *le* and it indicates a change of state. Since these state predicates can go with *kaishi* 'to begin', it seems reasonable to suggest that they have an initial endpoint.

In (26d), the durational temporal phrase *hen jiu* 'very (temporally) long' indicates that there is a long temporal span between the initial endpoint of an event/eventuality to a certain point, as shown in (27).

27. a. zhe dong fangzi gai le hen jiu

this CL house build PFV very long

'This house has been under construction for a long time.'

(27) does not mean that the time from any point in the process of *building this house* up to the present time is long. Instead, it means that the time from when the

house started being built up to the present is long. Therefore, the fact that some state predicates such as *hong* 'red' can go with *hen jiu* 'very (temporally) long' suggests that these state predicates have an initial endpoint, just like the accomplishment predicate *gai zhe dong fanzi* 'to build this house' has an initial endpoint.

The examples in (28) include state predicates that are incompatible with *kaishi* 'to begin'. Their incompatibility with an inchoative reading suggests that they do not include an initial endpoint in their semantics. The fact that these state predicates are not compatible with *hen jiu* 'very (temporally) long' can also be explained by the proposal that these state predicates do not have an initial endpoint.

28. a. *ta kaishi congming le
    he begin smart Prc
  b. *ta kaishi gao le
    he begin tall Prc
  c. *ta congming le hen jiu
    he smart PFV very long

The discussion above suggests that there are two kinds of states in Mandarin. One includes an initial endpoint in its semantics, and the other does not. For the state with an initial endpoint, its SigP is its initial endpoint because it is the only point noticeable in the semantics of this kind of state. For the state without an initial endpoint, its SigP is undefined because its semantics includes a homogeneous state and no point stands out in the homogeneous state.

Given the discussion above, it can be concluded that the SigP of an

event/eventuality can be inferred from its situation type. This is a defeasible inference because the SigP of an event/eventuality can be changed by other information, such as a durational phrase, as shown below.

29. a. hua hong le san ge yue
flower red PFV three CL month
'The flower has been red for three months.'

b. zhe dong fangzi gai le san ge yue haimei gaihao
this CL house build PFV three CL month not yet build-finish
'This house has been under construction for three months, but it is not finished yet.'

In (29a), *hong* 'red' is a state predicate with an initial endpoint. However, with the duration phrase *san ge yue* 'three months', this sentence does not have an inchoative reading any more. Instead, now it has a durational (and perhaps terminational) reading. That is, the most noticeable (significant) point is no longer the initial endpoint of the state predicate. The SigP is, now, the final endpoint of the durational phrase.

(29b) has an accomplishment predicate, whose SigP is its natural final endpoint. However, this sentence does not have a completive reading. Here, the SigP is also the final endpoint of the durational temporal phrase. It does not coincide with the natural final endpoint of the predicate because it is specified that the event is not finished yet. This is why the SigP of a predicate should be defeasibly inferred from its situation type.

The SigP's for different situation types is presented in (30). The formal definition of the SigP for different situation types is presented in (31), which also includes the representations of different situation types.

30. a. The SigP for **accomplishment** is its **natural final** endpoint.

    b. The SigP for **achievement** is its **initial/final** endpoint.

    c. The SigP for **activity** is **undefined** and is arbitrarily determined only if there is a reason to do so.

    d. The SigP for **state**$_1$ (with an initial endpoint) is its **initial** point. The SigP for **state**$_2$ (without an initial endpoint) is undefined.

    e. A **durational** phrase specifies as a SigP the **final endpoint** of the duration denoted by the phrase. A duration phrase just specifies the duration, and does not indicate termination or completion.

31. I. Prerequisites:

    Suppose that ϕ is an event/eventuality, and $[\phi]$ is a representation of that event/eventuality. It is defined as follows:

    (i) accomplishment(ϕ) $\rightarrow [\phi] =_d t_{initial} - t_1 - t_2 - t_3 - ..... - t_{final}$

    (ii) achievement(ϕ) $\rightarrow [\phi] =_d t_{initial+final}$

    (iii) activity(ϕ) $\rightarrow [\phi] =_d t_{initial} - t_2 - t_3 - ..... - t_2 - t_3 - .....$

    (iv) state$_1$(ϕ) $\rightarrow [\phi] =_d t_{initial} - s - s - s - .....$

    state$_2$(ϕ) $\rightarrow [\phi] =_d ..... - s - s - s - .....$

(v) durational_phrase(ϕ) $=_d t_{initial} - t_1 - t_2 .... - t_{final}$

where length(ϕ) = ⟦duration_phrase⟧

(iv) Resultative Verb Compound = achievement/activity + state

$\therefore$ [RVC] $=_d$ [achievement/activity]–[state]

where:

(a) $t_{initial}$ is an initial endpoint, t_{final} is a natural final endpoint, t_n is the points of the process of an event or the points of the duration of a durational phrase and s is state.

(b) – puts a partial order on the (initial, process and natural final) points of an event/eventuality or the points of a durational phrase.

II. Formal Definition of SigP

a. accomplishment(ϕ) > (SigP(ϕ) = t $\wedge$ $\neg\exists$ t' $\in_-$ [ϕ] $\wedge$ t $\prec$ t')

b. achievement(ϕ) > (SigP(ϕ) = t $\wedge$ $\neg\exists$ t' $\in_-$ [ϕ] $\wedge$ t $\prec$ t')

c. activity(ϕ) > (SigP(ϕ) = undefined)

d. $state_1$(ϕ) > (SigP(ϕ) = t $\wedge$ $\neg\exists$t' $\in_-$ [ϕ] $\wedge$ t' $\prec$ t)

$state_2$(ϕ) > (SigP (ϕ) = undefined)

e. (RVC(ϕ) $\wedge$ [ϕ] = [φ]-[μ]) $\rightarrow$ (SigP(ϕ) = t $\wedge$ ($\neg\exists$ t' $\in_-$ [φ] $\wedge$ t $\prec$ t') $\wedge$ ($\neg\exists$ t''$\in_-$ [μ]] $\wedge$ t'' $\prec$ t))

f. durational_phrase(ϕ) $\rightarrow$ SigP(ϕ) = t $\wedge$ $\neg\exists$ t' $\in_-$ [ϕ] $\wedge$ t $\prec$ t'

The definition of [ϕ] in the prerequisite in (30) is similar to Smith's (1997: 22-35)

analysis though there are a few differences. First, Smith poses an arbitrary final endpoint for activity. No final endpoint is given to activity in (30). Secondly, Smith defines achievement as consisting of a single point. In (30), achievement is defined in a way that its initial endpoint and final endpoint coincide. Thirdly, Smith proposes that state consists of an undifferentiated period without internal structure. In (30), one kind of state is defined as consisting of an initial point and a homogeneous period without process.

The SigP determined by the situation type of an event/eventuality is a defeasible implication, hence >, and can be overridden. The SigP determined by a durational phrase such as *for three hours* and by an RVC is a monotonic implication, represented by →, and therefore cannot be overridden.

2.3 Rhetorical Relations

The rhetorical relations used in SDRT include *Background*, *Consequence*, *Parallel*, *Narration*, *Elaboration*, *Explanation*, *Result*, and so on (Asher and Lascarides 2003: 460-471). Though these rhetorical relations can be all found in the contexts of English and Mandarin, Mandarin is different from English in that Mandarin requires, for most of the rhetorical relations, indicators[14, 15] which specifically spell out rhetorical relations while English can rely more on lexical (or pragmatic) information. See the following example.

[14] This generalization is made based on the observation of examples from the Sinica Corpus, where except for *Narration*, *Background* and *Elaboration*, the examples of the other rhetorical relations all contain indicators, which cannot be removed. This point is discussed in detail in the later chapters.
[15] Indicators will be discussed in detail in Chapter Three.

32. a. John fell down.

b. Mary pushed him.

33. a. zhangsan diedao le

Zhangsan fall PFV

‘Zhangsan fell down.’

b. !lisi tui le ta yi ba

Lisi push PFV he one CL

‘Lisi pushed him.’

b’. shi lisi tui ta de

be Lisi push he Prc

‘It was Lisi who pushed him.’

b’’. yinwei lisi tui le ta yi ba

because Lisi push PFV he one CL

‘Because Lisi pushed him.’

In English, the causal relation between *push* and *fall* is sufficient to determine that (32b) explains (32a), i.e. (32b) is connected to (32a) by *Explanation*. In this example, (32b) occurs before (32a), that is, the temporal order is the reversed contextual order, which can be called ‘temporal reversal’. Mandarin texts do not like temporal reversal if there is no indicator in the texts. This is why (33b) is not a good continuation to (32a) even though the causal relation between *diedao* ‘to fall down’ and *tui* ‘to push’ also exists. To make this discourse coherent, either *shi...de* is used to specify *who* did something or *yinwei* ‘because’ is used to spell out that the clause is an

explanation of the previous clause.

Now, let's discuss the pragmatic functions of these rhetorical relations. *Narration* indicates that one clause narrates another and involves advancement of narrative time. *Narration* does not need any indicator. It is identified mostly by the natural sequence of events in a discourse. Of course, there are some indicators that specify *Narration*, such as *ranhou* 'then', etc.

34. a. ta cong zhuo shang ba shu na le qilai
he from desk on DISP book pick PFV up
'He picked up the book from the desk.'

b. zhuan shen
turn body
'(and) he turned around.'

c. zou le chuqu
walk PFV out
'(and) he went out.'

The three clauses in (34) are connected together by *Narration*. This discourse is a sequence of consecutive events. The temporal order matches the contextual order.

When a clause serves as *Background*[16] for another, it means that the former provides a temporal frame for the latter. *Background* involves temporal overlapping. (35) is a typical example. *Background* does not need any indicator as long as a clause

[16] Two different kinds of *Background* are identified in this dissertation. Both kinds of *Background* provide a temporal frame though the events serving as different kinds of *Background* offer different time as a temporal frame. The difference is discussed in Chapter Seven.

can provide some time as a temporal frame, though there are indictors that can specify *Background*, such as *dang...de shihou* ‘when’.

35. a. dang ta zai kan shu de shihou
when he PRG read book DE time
‘When he was reading,’
b. wo zai kan dianshi
I PRG watch TV
‘I was watching TV.’

In this example, (35a) is a temporal background for (35b). It is clear that these two events are temporally overlapping.

Consequence is the rhetorical relation that connects a conditional to its consequent. *Consequence* needs indicators such as *yaoshi* ‘if’, *ruguo* ‘if’, etc. (36) is a typical example.

36. a. yaoshi ni mingtian bu lai
if you tomorrow no come
‘If you don’t come tomorrow,’
b. wo jiu dao ni jia qu zhao ni
I then go to you home go find you
‘I will go to your home to look for you.’

Parallel connects together two clauses with the same (or maybe similar) syntactic structure. *Parallel* is indicated by syntactic parallel. See the following example.

37. a. gu shihou de ren ruhe shenghuo bingbu zhongyao

old time DE person how live not important

'It is not important how ancient people lived.'

b. zhongyao de shi

important DE be

'The important thing is:'

c. shidai **zai** bian

time PRG change

'Time is changing.'

d. huanjing **zai** bian

environment PRG change

'The environment is changing.'

e. danshi renxing he ta de jiben yaoqiu dou

but human nature and it DE basic requirement all

shi yiyang de

be same Prc

'But, human nature and its basic requirements are all the same.'

In this example, (37c) and (37d) are syntactically similar[17]. They do not have the features of any other rhetorical relation. Therefore, they are connected together by *Parallel*.

[17] These two clauses are semantically similar too. But, semantic similarity is not a requirement of *Parallel*.

When two clauses are connected by *Elaboration*, the elaborating clause(s) provide more information about the elaborated clause. Therefore, an elaborated clause must contain information that is more general, and an elaborating clause must provide more specific information, examples, etc. for its elaborated clause. *Elaboration* does not need indicators though some indicators can specify it, such as *bifangshuo* 'for example'.

In the example below, (38a) introduces a dog into the discourse. (38b) elaborates what kind of dog it is, i.e. it is white and it is a puppy. (38b) provides more specific information about a general term in (38a).

38. a. wo yang le yi zhi gou
I feed PFV one CL dog
'I have a dog.'

b. na shi yi zhi bai se de xiaogou
that be one CL white color DE puppy
'That is a white puppy.'

When two clauses are connected together by *Result*, one event is the result of another. The examples of *Result* must manifest a certain kind of cause-effect relation. Indicators such as *jieguo* 'as a result', *suoyi* 'so', etc. can specify *Result*. The temporal relation of examples of *Result* is identical to that of *Narration*.

39. a. tamen nuli lianxi
they diligently practice
'They practiced diligently.'

b. suoyi yingde le shengli

so win PFV victory

‘So, they won the victory.’

In (39), *they winning the victory* is a result of *they practicing diligently*. The indicator *suoyi* ‘so’ explicitly points this rhetorical relation out. In addition, (39a) occurs before (39b), i.e. the temporal order matches the contextual order. This temporal relation is just like *Narration*.

Rhetorical relations are very important if a discourse is to be accurately interpreted because they have truth-conditional effects. Listeners are required to infer rhetorical relations because rhetorical relations are not always made explicit in the discourse and because the discourse cannot be accurately interpreted if listeners do not infer rhetorical relations. Rhetorical relations can also capture a lot of important generalizations. These points are demonstrated below.

40. a. zhangsan diedao le

Zhangsan fall PFV

‘Zhangsan fell down.’

b. yinwei lisi tui le ta yi ba

because Lisi push PFV he one CL

‘Because Lisi pushed him.’

41. a. zhangsan diedao le

Zhangsan fall PFV

‘Zhangsan fell down.’

b. lisi ba ta fu le qilai

Lisi DISP he help PFV up

‘Lisi helped him up.’

These two examples manifest two different temporal relations. (40) shows temporal reversal, while (41) shows a progressive temporal relation. This is because (40b) explains (40a) while (41b) narrates (41a). If the listener cannot infer different rhetorical relations for these two examples, he will not only be unable to understand the difference between these two clauses but also will fail to capture the different temporal relations of these two examples.

In sum, rhetorical relations are the pragmatic relations between clauses. Different rhetorical relations specify different temporal relations. Listeners are required to infer rhetorical relations because, otherwise, the discourse cannot be understood and interpreted accurately and important generalizations cannot be captured.

2.4 Summary

In this chapter, two important concepts used in this dissertation are introduced: situation types and rhetorical relations. The SigP analysis is used in this dissertation to account for the semantic properties of the aspectual markers in Mandarin. The SigP of an event/eventuality is defeasibly inferred from the situation type of that event/eventuality.

Rhetorical relations play an important role in SDRT. In this chapter, it is shown that in Mandarin most rhetorical relations require indicators (cue phrases) while in

English lexical (or pragmatic) information is sufficient to infer most rhetorical relations. In addition, the importance of rhetorical relations is also discussed. Listeners must infer rhetorical relations in order to accurately interpret a discourse and to capture important generalizations.

CHAPTER THREE

The Progressive Marker *zai* and Its Role in Temporal Progression

3.1 Introduction

This chapter deals with the aspectual properties of the progressive marker *zai*, and discusses its interaction with rhetorical relations and with temporal relations, in terms of its aspectual properties.

The progressive *zai* is argued to present an event on-going at an instant. It can present any point in an event except for the SigP of that event. Since *zai* does not present a SigP, it is unknown when the event denoted by a *zai* clause is terminated or completed, and therefore the event time of a *zai* clause cannot be advanced. On the other hand, since *zai* can present the initial endpoint of an event, a *zai* clause can advance the event time of a non-progressive clause.

This chapter is organized as follows. Section 3.2 is a review of the literature on *zai*, including Teng (1979), Li and Thompson (1981), and Smith (1997)[18]. Section 3.3 discusses the syntactic and semantic behavior of *zai*, and provides a semantic translation for it. In addition, a hypothesis about the role of *zai* in temporal progression is proposed in this section. Section 3.4 provides examples, sorted by rhetorical relations, retrieved from the Sinica Corpus, and the hypothesis proposed in Section 3.3 is tested against these examples. Section 3.5 is a summary of this chapter.

[18] The progressive marker *zai* is the least controversial one among the four aspect markers in Mandarin. None of the literature reviewed here is devoted solely to *zai*. Even Teng (1979) discusses *zhe* and progressive markers in Amoy, in addition to *zai*. Only the part about *zai* in these works is reviewed.

3.2 Literature Review

3.2.1 Teng (1979)

In this paper, Teng discusses both *zai* and *zhe*. He calls the former non-stative progressive, and the latter stative progressive. Chao (1968: 333) suggests that *zai* + verb is a reduced form of *zai*[19] + location + verb. Teng refutes this analysis, using the following two observations. First, *zai* can appear in progressive sentences which cannot have a locative phrase at all. Secondly, a *zai* progressive sentence can have a habitual reading while a *zai* + location progressive sentence cannot. (42) and (43) demonstrate these two observations.

42. a. ta ershi sui le hai zai (*nar) zhang
he twenty year-old Prc still PRG (*there) grow
'He is already twenty years old, but he is still growing up[20].'

b. women xi hai zai (*nar) zhao ren
our department still PRG (*there) look for person
'Our department is still hiring[21].'

43. a. wo zai nian dewen
I PRG study German
'I am studying German.'

[19] In Mandarin, the same word can either function as a progressive marker or a preposition meaning *at*, which indicates a temporal or physical location.
[20] This translation is different from the one in Teng's paper. Teng's original translation lacks the contrast denoted by these two clauses. The one used here shows that contrast.
[21] Again, this translation is different from Teng's translation. In Mandarin, *zhao ren* 'look-for person' is an idiom meaning *to hire*. For some unknown reason, Teng's translation does not accurately translate this idiom.

b. wo zai nar nian dewen

I PRG there study German

'I am studying German over there.'

In (42), both sentences are progressive, but neither of them is compatible with a locative phrase. These two sentences show that a *zai* progressive sentence cannot possibly be a reduced form of *zai* + location + verb because some progressive sentences simply do not have a *zai* + Loc + Verb counterpart.

The two sentences in (43) illustrate the second observation. (43a) can either be an on-going event at the speech time, or it can be a habitual sentence, meaning that the speaker is studying German this year/this semester. If a locative phrase is inserted after *zai*, as in (43b), the habitual reading does not surface and only the on-going reading remains. This contrast also shows that the progressive *zai* + verb cannot be a reduced form of *zai* + location + verb.

Instead, Teng suggests that *zai* can either locate an NP at a spatial reference or a temporal reference, and that the progressiveness of *zai* is a manifestation of its temporal function. In Mandarin, *zai* can either indicate a physical location, as in (44a), or a temporal location, as in (44b). Teng suggests that the progressive usage of *zai* is an example of the temporal location, i.e. locating an event at a time.

44. a. beijing zai zhongguo

Beijing at Zhongguo

'Beijing is in China.'

b. meiguo duli shi zai 1776 nian

USA independence be at 1776 year

'The US independence was in 1776.'

c. wo zai nian dewen

I PRG study German

'I am studying German.'

As for the stative progressive *zhe*, Teng suggests that it describes a state. The difference between the non-stative progressive *zai* and the stative progressive *zhe* is that action verbs can, on the whole, be modified by *zai* while the stative progressive *zhe* defines states that result from activities, and thus it does not occur with intrinsic state, or process verbs. The examples above all show that *zai* goes with action verbs. The examples below demonstrate the behavior of *zhe*.

45. a. ta zai chuang shang zuo zhe

he at bed top sit DUR

'He is sitting on the bed.'

b. *ta gao zhe

he tall DUR

'He is being tall.'

The verb *zuo* 'to sit' has two parts in its lexical meaning. One is the action part, as in *he sat down*, and the other is the resultative state part, as in *he was sitting there*.

Teng suggests that *zhe* can go with a state resulting from an action only[22]. (45a) is an example of this kind of state. On the contrary, *gao* 'to be tall' is an intrinsic state that does not involve change of state and does not result from some activity. This is why *zhe* cannot go with it.

Teng's paper is a very good observation of the two imperfective markers in Mandarin. One thing about his analysis of *zai* is worth mentioning. He suggests that *zai* is progressive because it locates an event at a time. However, locating an event at a time does not necessarily involve progressiveness, depending on how the event is placed relative to a time, and hence this analysis is not precise enough to accurately account for the progressiveness of *zai*.

3.2.2 Li and Thompson (1981)

Li and Thompson (1981: 217) state a simple rule about the progressive marker *zai*, i.e. only activity verbs can take *zai* to indicate the progressive aspect. They also note that for verbs of posture and of placement, both of which include in their lexical meanings an action and a resultative state, *zai* presents the action part of their verbal meanings. These two points are illustrated below.

46. a. zhangsan zai da lisi
Zhangsan PRG hit Lisi
'Zhangsan is hitting Lisi.'

[22] This is not entirely true. Yeh (1993a) has a detailed discussion of *zhe*, which is reviewed and discussed in Chapter Four.

b. zhangsan zai paobu

Zhagnsan PRG run

'Zhangsan is running.'

c. *ta zai you qian

he PRG have money

d. *pinzi zai po

bottle PRG broken

47. a. ta zai chuan dayi

he PRG wear coat

'He is putting on his coat.'

b. ta chuan zhe dayi

he wear DUR coat

'He is wearing a coat.'

In (46a) and (46b), both *da* 'to hit' and *paobu* 'to run' are activity verbs, and hence are compatible with *zai*. But, in (46c) and (46d), both *you* 'to have' and *po* 'to be broken' are state predicates and are not compatible with *zai*.

In (47), *chuan* 'to put on, to wear' includes in its lexical meaning both an action and a resultative state. The progressive marker *zai* presents its action part, as shown in (47a), and the durative marker *zhe* presents its resultative state, as illustrated in (47b).

3.2.3 Smith (1997)

Smith (1997: 271-273) discusses two points about the progressive marker *zai*. First, she proposes that "it presents an internal interval of a durative situation, and

often has the connotations of activity associated with events" (ibid: 271). This means that through *zai* the interval process of an event is presented, and that the event presented often has the connotation of activity. Secondly, *zai* is not compatible with an interval with a final endpoint. That is, the final endpoint of an event cannot be included in the internal interval presented by *zai*. Instantaneous events do not have an interval of this kind and hence are not compatible with *zai*. These two points are illustrated by (48) and (49).

48. a. ta zai da qiu — activity
he PRG play ball
'He is playing ball.'

b. ta zai xie yi feng xin — accomplishment
he PRG write one CL letter
'He is writing a letter.'

49. a. *ta zai ying saipao — achievement
he PRG win run
'He is winning the race.'

b. *ta zai si — achievement
he PRG die
'He is dying.'

Only activity and accomplishment have an internal durative interval, and hence verbs of both types can go with *zai*. In (48a), *da qiu* 'to play ball' is an activity, and *xie yi feng xin* 'to write a letter' in (48b) is an accomplishment. Both of them can

be presented by the progressive marker *zai*.

Achievement does not have process and hence no durative interval. Predicates of achievement are not compatible with *zai*. This is borne out by (49a) and (49b). It is worth noting that though in English *win* and *die* seem to be compatible with the progressive aspect, in fact these two sentences denote events that are about to take place, instead of on-going events.

While the studies reviewed above provide a generalization about the progressive *zai*, all of them fail to observe that *zai* can present an event on-going at an instant only. This insufficiency is discussed in detail in the next section.

3.3 Semantics of the Progressive Marker *zai*

3.3.1 The Imperfective Paradox and the Interval Semantics

Few works, if any, discusses the semantics of *zai* since *zai* is the least controversial one among the four aspect markers in Mandarin. Usually, the semantics of *zai* is assumed to be just like the semantics of the progressive.

The progressive involves the Imperfective Paradox (Dowty 1977, 1979: 133-138), and therefore its semantics has been a very popular issue in formal semantics and a lot of works have been devoted to solving this paradox (Asher 1992, Bonomi 1997, Dowty 1979, Landman 1992, Ogihara 1990, Parsons 1989, Vlach 1981, Zucchi 1999, and so on).

Among all of those works, three major approaches can be found. The first is Dowty's (1979) approach. Dowty utilizes inertial worlds to solve the Imperfective Paradox. Besides, he also proposes that the semantics of progressive should be made

relative to intervals, not to instants.

The second is Vlach's (1981) approach. Vlach proposes that a Proc (process) operator converts an event into a process and PROG Φ is true iff Proc Φ, which is stative, goes on. This approach can avoid the Imperfective Paradox because it is the process of an event, not the whole event, that is used in the semantics of progressive. Since no final (culmination) endpoint is included, Vlach's semantics of progressive does not evoke the Imperfective Paradox.

The third is Parsons' (1989) approach. Parsons proposes two operators HOLD and CUL (culmination) [23]. He proposes that progressive holds while perfective culminates. Since his approach does not involve the final (culmination) point of an event, the Perfective Paradox is not a problem for it either.

While the three major approaches[24] differ in the way the Imperfective Paradox is dealt with, they share one feature, that is, they all define the semantics of progressive in terms of intervals[25].

3.3.2 Interval vs. Instant

In the literature on the progressive, the interval semantics is used to account for

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[23] In this paper, Parsons also discusses unfinished objects and how to refer to unfinished objects since in his approach when an event holds, an unfinished object is referred to, and hence the question surfaces whether it is fine to refer to an unfinished object as that object, e.g. referring to an unfinished house as a house.

[24] Other works adopt and modify one of the three major approaches. For example, Landman (1992) and Asher (1992) both adopt Dowty's idea and make significant modifications though they differ in that Asher utilizes a more complex modal structure and defines progressive relative to information about a subset of the information about a state, which is called perspective. Zucchi (1999) adopts Parson's idea while a few modifications are made in order to avoid the problems raised by Landman (1992).

[25] Leith and Cunningham (2001) even utilizes a necessity operator D to capture the homogeneity property of progressive over an interval.

the semantics of the progressive. However, this definition of the progressive aspect does not seem to work for *zai* because *zai* is not compatible with a durational phrase, while in English the progressive aspect is compatible with one. (50a) and (50b) demonstrate this syntactic difference in the progressive aspects of English and Mandarin.

50. a. John was running for ten minutes.

b. *zhangsan **zai** paobu shi fenzhong

Zhangsan PRG run ten minute

c. zhangsan **zai** paobu ta xiang pao shi fenzhong

Zhangsan PRG run he want run ten minute

'Lit. Zhangsan was running. He intended to run for ten minutes.'

(= Zhangsan was running for ten minutes.)

In Mandarin, to express the intended duration of an on-going/continuous event like (50a), the intended duration part is expressed by an intentional verb, such as *xiang* 'to want' in (50c), and the on-going/continuous part is expressed by the progressive aspect, as the *zai* part in (50c). In Mandarin, the progressive aspect alone cannot express the intended duration of an on-going/continual event, as shown in (50b).

Since the progressive *zai* cannot express the duration of an on-going event, the definition of the progressive aspect in terms of intervals does not seem to fit the semantic behavior of *zai*. The following examples further support this point and offer a hint on the semantics of *zai*.

51. a. ta zheng ge wanshang **dou zai** kanshu

he whole CL night all PRG study

'He was studying the whole night.'

b. ???ta zheng ge wanshang **zai** kanshu[26]

he whole CL night PRG study

In (51), *zheng ge wanshang* 'the whole night' is an interval. The progressive marker *zai* needs the distributive operator *dou* 'all' to go with an interval, as shown in (51a). Without the distributive operator, the sentence is bad, as (51b). This contrast supports that *zai* is not compatible with an interval. The three examples below in (52) not only further confirm this observation, but can specify the semantics of the progressive *zai*.

52. a. ta zuotian xiawu wu dian de shihou **zai** kan dianshi

he yesterday afternoon five o'clock DE time PRG watch TV

'At five o'clock yesterday afternoon he was watching TV.'

b. dan ta baba zuotian huidao jian de shihou ta **zai**

when he dad yesterday return-arrive home DE time he PRG

kan dianshi

watch TV

'When his father returned home yesterday, he was watching TV.'

[26] In this dissertation, the question mark is used to indicate syntactically unnatural, and the asterisk is used to indicate syntactically ill-formed. A sentence marked with three question marks means that the sentence is really unnatural though it may not be really ungrammatical yet.

c. dan ta shengbing de shihou xiaomei *(**yizhi**) **zai**
when he sick DE time Xiaomei continuously PRG
zhaogu ta
take care of he
'When he was sick, Xiaomei was continuously taking care of him.'

(52a) provides a hint on the semantics of *zai*. The progressive *zai* can go with an instant, e.g. *zuotian xiawu wu dian* 'five o'clock yesterday afternoon'. This suggests that *zai*, at least, can express an on-going event at an instant. (52b) and (52c) suggest that the progressive *zai* actually expresses an on-going event at an instant. *dan...de shihou* 'when' is ambiguous in that it can either denote an instant or an interval. In (52b), since *huidao jia* 'to return-arrive home' is instantaneous, *dan ... de shihou* denotes an instant. In this case, the progressive *zai* can go with this clause. On the contrary, in (52c), *shengbing* 'to be sick' has a process and can last for some time. Therefore, *dan ... de shihou* 'when' denotes an interval. In this case, the progressive *zai* needs an adverbial that functions like the distributive operator *dou* to go with this temporal clause. In (52c), *yizhi* 'continuously' functions as the distributive *dou* operator and it is obligatory so that the sentence is grammatical.

It is argued above that the progressive marker *zai* expresses an event on-going at an instant, instead of over an interval. However, which point of an event is presented by *zai* remains a question. As shown in (53), *zai* is compatible with verbs denoting inchoation, such as *kaishi* 'to start'. This example suggests that *zai* can

present the inchoative point of an event. The fact that the final endpoint of an event cannot be presented by *zai* has been discussed and established in the works on the Imperfective Paradox.

53. tamen kaishi **zai** gai xin fangzi le[27]

they start PRG build new house Prc

'They started to be building the new house.'

That is to say, the progressive marker *zai* can present any point (instant) of an event from the initial one up to the one before the final endpoint. This generalization can be easily captured by the SigP analysis, which is discussed in Section 2.2.

Which point of an event can be presented by *zai* can be easily stated in terms of the SigP, that is, *zai* can present any point in the process of an event, except for the SigP. The initial endpoint and the final endpoint of achievement coincide with each other. Since *zai* does not present a SigP, the progressive marker *zai* is not compatible with achievement[28] in Mandarin. Some state predicates have an initial endpoint, which is also its SigP followed by a homogeneous state, but does not have a process. Some state predicates have in their semantics only a homogeneous state Since *zai* presents a non-SigP point in a process, and these state predicates have no process at all, *zai* is not compatible with state in Mandarin.

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[27] Here, *le* indicates a change of state, that is, a change from *they being not building the new house* to *they being building the new house*. It is not the perfective marker.

[28] Dowty (1979: 136-138) discusses some English achievement verbs that are compatible with progressive. He proposes that those verbs, such as *fall asleep*, in fact consist of an activity followed by a result, and the progressive expresses the on-going activity. If this is true, it seems that achievement verbs in Mandarin do not have this activity part in their semantics.

To summarize the above discussion, *zai* presents an event on-going at an instant, and it can present any non-SigP in the process of an event. Achievement does not have a process without its SigP. This is why *zai* cannot go with it. State has no process at all, which is why *zai* does not present a state predicate. Both accomplishment and activity can have a process without their SigP's, and this is why *zai* is compatible with these predicates of these two situation types only.

3.3.3 Semantics of *zai* and the Hypothesis for Its Role in Temporal Progression

Since the progressive marker *zai* expresses an event on-going at an instant, which can be any point other than the SigP, in the process of an event, its semantics can be defined as in (54a). Its compositional semantics can be defined as (54b). The compositional semantics in (54b) does not do much except that it specifies that *zai* requires an instant-denoting adverbial.

54. a. $[\![\text{zai } \varphi]\!] = 1$ at $<t, w>$ iff for instant t and t is not the SigP of φ and for all w' and there is an i, $t \subset i$, such that $w' \in \text{Inr}(<t,W>)$, φ is true at $<i, w'>$[29].

b. $[\![\text{zai}]\!] =_d \lambda P\, (\lambda t)\, \lambda x\, \lambda e\, [(e \circ t) \wedge \text{zai}(P(x,e))]$

Because *zai* does not present the SigP of an event, the time when the event presented by *zai* is terminated/completed is not available, and therefore the event time of a progressive sentence in Mandarin cannot be advanced. However, since it is

[29] This is a revised version of Dowty's (1979) semantics of progressive. Though there are a lot of discussions on the problems of inertial worlds, this definition is still adopted here because it has the simplest logic form. The important thing here is that *zai* presents an instant, not an interval. Other proposals, such as Parsons (1989), Landman (1992), or Asher (1992), also work, with modifications.

possible for the progressive marker *zai* to present the initial endpoint of an event, which means that the time when the event presented by *zai* starts is available, it can advance the event time of a non-progressive sentence. Based on this observation, the hypothesis for the role of the progressive marker *zai* in temporal progression is proposed in (55).

55. Hypothesis for the role of *zai* in temporal progression:
    The event time of a clause with the progressive marker *zai* cannot be advanced.

3.4 The Role of the Progressive Marker *zai* in Temporal Progression

In this section, the hypothesis (55) is tested against the data extracted from the Sinica Corpus. After the texts of Report, Commentary, Fiction and Personal Essay are examined, the result is summarized as follows:

(a) A sentence with *zai* can be connected to other sentences by the following rhetorical relations: *Contrast*, *Elaboration*, *Parallel*, *Narration*, *Background*$_{T}$, *Explanation*, *Reason*, *Result*, *Consequence*, etc.

(b) Among all of the rhetorical relations, the first five are most common.

(c) The examples of *Elaboration* outnumber those of all the other rhetorical relations.

(d) All kinds of rhetorical relations can appear in every genre, except *Narration*, which is observed in Fiction only.

(e) Only *Elaboration*, *Narration* and *Background*$_{T}$ do not require explicit indicators in clauses to explicitly indicate their rhetorical relations.

Others require explicit indicators, either structural or syntactic.

(f) The examples of *Narration* have two points worth noting:

(f-1) The examples of *Narration* occur in the texts of Fiction only.

(f-2) A clause with *zai* can be attached to a non-progressive clause by *Narration*, but a non-progressive clause cannot be attached to a progressive clause by *Narration*.

(g) There are also examples where *zai* occurs either in a relative clause or an embedded clause, and hence has no direct interaction with the main timeline of the stories.

Before the relevant examples are presented to illustrate the above result, and before their implication to the Hypothesis (55) is discussed, the concept of *indicator* needs clarifying. There are two kinds of indicators that explicitly spell out which rhetorical relation connects together two clauses. The first one is a structural indicator, and the other a syntactic indicator[30].

A structural indicator is an adverbial or a conjunction that make clause transition more coherent, e.g. *then* indicates *Narration*, *that is to say* specifies *Elaboration*, *when* represents *Background*$_{T}$, *because*[31] spells out *Explanation*, etc.

A syntactic indicator is a specific syntactic structure that marks a rhetorical

[30] Phonology also plays a role in determining a rhetorical relation, such as intonation. Since all of the data examined here are from a corpus with only a little spoken data and since only written data are examined, phonological indicators are not discussed here.

[31] The counterparts of those words in other languages have the same function and are also referred to as structural indicators.

relation, such as syntactic structural parallel for *Parallel*.

These two kinds of indicators can monotonically decide which rhetorical relation connects sentences together, and no other information is required. Clauses without indicator of either kind will have to rely on other information, e.g. lexical information, to determine the rhetorical relation between them.

Before the statistics of *zai* examined is presented, the notation used in Table III needs explanation. The column *context* is for the examples where the clauses with *zai* have the potential to be connected to their adjacent clauses with rhetorical relations. On the other hand, the column *isolated* is for those examples where *zai* occurs in an embedded clause and does not interact with the main timeline of a text.

The column *related* is for those examples where the clauses with *zai* are connected to their adjacent clauses by rhetorical relations. On the contrary, the column *unrelated* is for the examples where the clauses with *zai* are not connected to their adjacent clauses by rhetorical relations. For example, the clause with *zai* at the beginning of a paragraph is not connected to its previous clause, which is the last clause of the previous paragraph. The examples of this kind are referred to as *unrelated*, which differs from *isolated* in that the clauses with *zai* in the examples of *unrelated* have the potential to be connected to their adjacent clauses with rhetorical relations whereas the clauses with *zai* in the examples of *isolated* do not have this potential because *zai* is in an embedded clause and does not directly interact with other clauses in a text. That is, both the examples of *related* and those of *unrelated* belong to *context*.

Since each clause may be connected to its previous clause or its following clause, or both, by a rhetorical relation, the number of *related* plus the number of *unrelated* will equal twice as much as the number of *context*. Take Personal Essay as an example. In the data examined, 29 clauses with *zai* are found. Since each clause can be connected to either its preceding clause or its following clause, there are 58 possible scenarios for the 29 clauses with *zai* found in Personal Essay. 40 of the 58 scenarios are examples where rhetorical relations connect the clauses with *zai* to other clauses. 18 of the 58 scenarios are those where the clauses with *zai* are not connected to other clauses by any rhetorical relation. That is, the number of *related* is the sum of the numbers of the examples of all rhetorical relations.

The statistics of *zai* examined is given below.

Table III: The Distribution of *ZAI* Examined

	context	isolated	related	unrelated
Personal Essay	29	2	40	18
Fiction	40	2	60	20
Report	76	6	110	42
Commentary	37	6	60	14
Total	182	15	270	94

Table III (Continued)

	Elaboration	Narration	Parallel	Contrast	Background
Personal Essay	13	0	4	7	10
Fiction	24	12	8	10	6
Report	61	0	14	19	14
Commentary	39	0	2	17	0
Total	137	12	28	53	30

Table III (Continued)

	others	embedded
Personal Essay	6	2
Fiction	0	2
Report	2	6
Commentary	2	5
Total	10	15

Table IV: Percentage of *ZAI* in the Sinica Corpus Examined

	total number examined	total number in the Sinica Corpus	Percentage
Personal Essay	31	310	10.00 %
Fiction	42	333	12.61 %
Report	82	856	9.57 %
Commentary	42	206	20.38 %
Total	197	1705	11.55 %

3.4.1 Elaboration

A clause with *zai* can either elaborate another clause, or can be elaborated by another one. In this section, examples of both kinds are presented and discussed in detail.

Elaboration does not require either a structural indicator or a syntactic indicator to explicitly point it out, though there are some structural indicators that can do so, e.g. *najiushi* ‘that is’, *bifangshuo* ‘for example’, etc. The following example demonstrates sentences with structural indicators indicating *Elaboration*. Structural indicators monotonically determine which sentence elaborates which, and hence no other information is required to make that decision.

56. a. shan chuan zhaoze shi wujiwu

mountain river swamp be not organic

‘Mountains, rivers and swamps are not organic.’

b. cao mu niao shou chong yu shi youjiwu

grass tree bird animal bug fish be organic

‘Grass, trees, birds, animals, bugs, fish are organic.’

c. danshi bulun you mei you shengming

but regardless have no have physical life

‘But, no matter whether they have physical life or not,’

d. tamen dou you yi ge gongtong de texing

they all have one CL common DE feature

‘they all have a feature in common, ’

e. najiushi dou **zai** butingde bianhua he yundong

that is all PRG continuously change and move

‘that is, they are all continuously changing and moving.’

f. bifangshuo ri yu xingchen **zai** kong zhong yunxing

for example sun moon star PRG space inside moving

‘For example, the sun, the moon and stars are moving in space,’

g. shan nenggou xingcheng yunwu[32]

mountain can form cloud and fog

'mountains can form clouds and fogs,'

h. hechuang butingde liudong

river continuously flow

'rivers continuously flow,'

i. cao mu niao shou chong yu buduande fanzhi

grass tree bird animal bug fish continuously propagate

'grass, trees, birds, animals, bugs and fish propagate continuously.'

j. meiyou yi yang dongci shi yungyuan bu bian de

no one CL thing be forever no change Prc

'Nothing remains unchanged forever.'

(56) is a good demonstration of the function of structural indicators. In (56), the progressive marker *zai* is in (56e). (56e) elaborates (56d), specified by *najiushi* 'that is to say'. (56e) is the common feature shared by all of the things mentioned from (56a) to (56c).

In turn, (56f) to (56j) elaborate (56e), and this is determined by *bifangshuo* 'for example' in (56f). The five clauses are the examples of the general statement that

[32] This was how ancient Chinese explained why clouds and fogs usually gathered around mountains. This article is about pantheism in Chinese culture. Ancient Chinese believed that everything in the world was under constant change, and hence everything had some form of physical life. This belief led to pantheism. Pantheism still exists in the present Chinese culture.

everything keeps changing.

The example above manifests two important points. First, there are indicators, either structural or syntactic, which suffice to determine the rhetorical relations that connect two (or more) clauses together. No other information is required as long as there is an indicator in one of the sentences in discussion. Secondly, *Elaboration* may imply temporal inclusion, but not necessarily so. It depends on what is elaborated. If it is an event that is elaborated, it should involve temporal inclusion. On the other hand, if it is an NP (entity or object) that is elaborated, temporal inclusion is not required. Compare the *Elaboration* between (56d) and (56e), on the one hand, with the *Elaboration* between (57b), (57c) and (57d), on the other.

57. a. John had a lovely evening.

    b. He had a great meal.

    c. He devoured cheese.

    d. He ate salmon.

    e. He won a dance competition.

(57b) and (57e) elaborate (57a). In turn, (57c) and (57d) elaborate (57b). In these two cases of *Elaboration*, what is elaborated is events. Having a great meal and winning a dance competition are both instances of having a lovely evening. Devouring cheese and eating salmon are also instances of having a great meal for some persons. When an event is elaborated, temporal inclusion is inferred.

This observation is further borne out by the *Elaboration* between (56f) to (56j) on the one hand and (56e) on the other. (56f) to (56j) are all instances of *things*

keeping changing and moving, i.e. they elaborate an event. Temporal inclusion is involved here. Note that *butingde* 'continuously' in (56e) functions like a distributive operator, distributing an event ongoing at an instant over an interval[33], and hence makes temporal inclusion possible. On the other hand, (56e) is not an instance of *having a feature in common*. Instead, (56e) *is* that feature that both organic and inorganic things have in common. That is, it is an NP that is elaborated. When an NP is elaborated, temporal inclusion is not required.

Passages without any indicator have to rely on other information to determine which rhetorical relation connects clauses together. Most of the time, lexical information plays a crucial role in this respect. See the following example.

58. a. xiao dian li mai bing de lao taitai shi ji nian
small store inside sell ice REL old woman ten several years
xialai hai **zai** mai bing
down still PRG sell ice
'For over a decade, the old woman selling ice in the small store is still selling ice.'

[33] Since this is a generic sentence, the interval can be all the time ever existed. Removing *butingde* 'continuously' will make the passage incoherent.

b. ta de shengming haoxiang jingzhi zai na ge xiaoxiao
she DE life seem freeze at that CL small
de fanwei li
DE domain inside
'Her life seems to freeze in that small domain,'

c. buduan **zai** zuo tongyang de shi
without stop PRG do same DE thing
'(and she) is doing the same thing without stop.'

(58a) sets up a temporal background for the comments following. (58c) is an example of *life freezing in a small domain*, and hence elaborates (58b). Lexical and pragmatic information determines that (58b) and (58c) are connected together by *Elaboration*. Semantically, the usage of *freeze* here includes *no change* and *the same*. Any sentence denoting either of the two meanings[34] can be an example of *freeze*. Besides, one's life also includes one's behavior and doings as far as world knowledge is concerned. This is why *she continuously doing the same thing* can elaborate *her life seeming to freeze in a small domain*.

In this example, (58b) temporally includes (58c) because it is an elaboration on an eventuality, and (58b) is a state, which lasts for an interval, and can temporally include other events.

(59) is also an example of *Elaboration* without any indicator. This example is

[34] This is ametaphor, i.e. *freeze* is a metaphor or *the same*.

different from (58) in that *Elaboration* is inferred purely from lexical semantics without the help of other information.

59. a. na ren dangran daxiruokuang
    that person certainly very happy
    'The person was certainly very happy,'
  b. yiwei zhaodao le daolu
    mistakenly think find PFV road
    '(and he) mistakenly thought he found a road,'
  c. gen zhe zuji er xing
    follow DUR foot trace and walk
    'and followed the trace.'
  e. dan zou dao houlai
    but walk until later
    'But, when he walked a long enough period of time,'
  f. zhe zuji yuanlai shi ziji liuxia de
    this foot trace originally be self leave Prc
    'it turned out that the trace was left by him,'
  g. ta zoulaizouqu
    he walk
    'and he walked and walked,'

h. zhishi **zai** raoquanzi

only PRG go circle

'he was only going in circle.'

In (59), the progressive marker *zai* is in (59h)[35]. Here, *going in circle* is one instance of *walk*. This piece of lexical information implies that (59h) elaborates (59g). In this case, (59h) is temporally included in (59g) since he was going in circle when he walked.

The two examples above are typical of a clause with *zai* elaborating other clauses without any indicator specifying which elaborates which. Regardless of whether there is a distributive operator in it, a clause with *zai* can freely elaborate others because it is an event on-going at an instant, and hence, temporally, it can be easily included in an event lasting for a period of time, an instantaneous event which completes at an instant, or a state. In addition, lexical information, i.e. entailment, hypernym/hyponym, etc., plays a crucial role in the determination of the rhetorical relation in these two examples.

The following two examples are typical passages where a clause with *zai* is elaborated by other clauses, without any indicator specifying the rhetorical relation. Therefore, other information must be depended on, in order to determine which rhetorical relation connects those clauses together.

[35] Actually, the relevant clauses here are only (59g) and (59h). The other clauses are provided so that the relevant ones are not out of context, and the rhetorical relation between (59g) and (59h) can be verified.

60. a. shan bei de nongming dui kao na kuai genjudi
Shan north DE farmer to depend on that CL base
fazhan zhuangda de gongchandang laishuo geng shi
develop strengthen DE communist speak even be
touhao gongchen
number one helper
'To the communist party that relied on the north of Shan as a base to develop and strengthen itself, the farmers on that area were their No. 1 helpers.'

b. zai na kuai zhongguo zui pinji de tudi shang renmen
at that CL China most barren DE land on people
changjiuyilai jiu **zai** panwang you ren neng qu dajiu
long JIU PRG expect have person can go save
tamen tuoli kuhai
they leave miserable situation
'People are long expecting that someone can come and save them from their miserable situation.'

c. san bai duo nian qian tamen chuansong shan bei
three hundred more year ago they compliment Shan north
nongming yingxong lizicheng
farmer here Li Zicheng
'Over three hundred years ago, they complimented Li Zicheng,
the farmer hero from the north of Shan:'

d. ying chuang wang pan chuang wang,
Welcome Chuang king expect Chuang king
'Let's welcome King Chuang[36], and Let's expect King Chuang.'

e. chuang wang lai le bu naliang
Chuang king come PFV no pay tax
'When King Chuang comes, we won't have to pay tax (to him)!'

In (60), the progressive marker *zai* is in (60b). In this case, the rhetorical relation is inferred from world (historical) knowledge, instead of any lexical entry. People living in the north of Shan are expecting a savior. Though nothing in the following clauses mentions anything about a savior, from the historical knowledge about Li Zicheng, and from the world knowledge about why someone was so much expected, as denoted by (60d) and (60e), it can be inferred that Li Zicheng was regarded as a savior by the people at that area. This is why (60c) to (60e) can be argued to elaborate (60b).

[36] King Chuang was the title that Li Zicheng gave himself, though he did not officially establish his own country.

This example also shows temporal inclusion. Though in Section 3.3 it is argued that the progressive marker *zai* expresses an event on-going at an instant, the adverb *changjiuyilai* 'long (temporally)' functions like a distributive operator that distributes the on-going expectation over a long period of time, and hence can temporally include another event, especially a past event.

(61) is also an example of the latter clause elaborating the former one with *zai*. This time, it is lexical information that implies *Elaboration*.

61. a. zhiyao you ren de difang jiu you ren **zai**
as long as have person DE place then have person PRG
daliangang
steel-tempering
'As long there were persons, there are persons who were tempering things into steel.'

b. guojia jihua weiyuanhui ying shi jingji zhuanjia de
national plan committee should be economics expert DE
dabenying
base
'The National Planning Committee was supposed to be the base for economists,'

c. shi yunchou juece de difang
be make policy DE place
'(and it) was supposed to be a place where policy was made.'

d. keshi nali yie you lianganglu

but there also have converter for steel-tempering

'But, there was also a converter.'

In this example, *zai* is in (61a). (61b), (61c) and (61d) together elaborate (61a). *lianganglu* 'converter for steel-tempering' in (61d) shows that it is related to (61a). The committee is also a place, i.e. a specific example of *difang* 'place'. Since (61d) is related to (61a) and the committee mentioned in (61b) to (61d) is an example of *difang* 'place', it can be inferred that *Elaboration* connects the chunk consisting of (61b), (61c) and (61d) to (61a).

This case also involves temporal inclusion though there is nothing with functions similar to a distributive operator in (61a). The progressive marker *zai* expresses an event on-going at an instant, and therefore (61a) is an event on-going at an instant. The sentence *there was a converter at the committee* is a state, which is homogeneous and can be true either at an instant or an interval. Hence, at the instant[37] when everyone was tempering things into steel, there was also a converter at the committee.

These two examples are typical of a clause with *zai* being elaborated by other clauses. In all of the examples of this kind examined, when a clause with *zai* is elaborated by others, either the clause with *zai* also has a distributive operator that can distribute the on-going event over an interval, or the elaborating clause must be able

[37] Note that *zai* says nothing about the termination/completion of an event after the particular instant. It just presents a particular instant that the speaker wants to comment on.

to be evaluated as true at an instant. This observation complies with the Hypothesis (55) since the event time of clauses with *zai* is not advanced.

To sum up the discussions about *Elaboration*, first, *Elaboration* does not require a syntactic or structural indicator to specify it though there are some structural indicators, such as *najiushi* 'that is, namely' or *bifangshuo* 'for example', can do that.

Secondly, for those examples of *Elaboration* without any indicator, there have to be either words that involve semantic subordination, such as entailment, hypernym/hyponym, etc., or clauses expressing world knowledge that manifests the generalization/instance relation. This observation follows naturally from the function of *Elaboration*. For one clause to elaborate another, the elaborating one must provide more information about the elaborated one. The information provided by the elaborating clause must be related to the information provided by the elaborated clause, and can make the latter clearer and more specific. This is why the examples of *Elaboration* need either words involving semantic subordination or clauses expressing world knowledge in the generalization/instance relation.

Thirdly, while a clause with *zai* can freely elaborate others, it either needs a distributive operator to be elaborated by others, or requires events/eventualities that can be evaluated as true at an instant.

A clause with *zai* is an event on-going at an instant, and hence can easily elaborate either an event lasting for a period of time, an instantaneous event which is completed at an instant, or a state. On the contrary, to elaborate a clause with *zai*, the elaborating clauses must be those which can be evaluated as true at an instant because

zai presents an event on-going at an instant, and the progressive clause can be sure to be true only at that instant. The elaborating clause must be able to be evaluated as true at the same instant, in order to elaborate the progressive clause.

Fourthly, *Elaboration* can imply temporal inclusion, but not necessarily so, depending on whether the elaborated part is an event or an NP (object). Elaborating an event involves temporal inclusion, while elaborating an NP (object) does not necessarily involve temporal inclusion.

3.4.2 Narration

Though there are not many examples of *Narration*, these examples show an interesting property that is worth discussing. The following examples demonstrate this property.

62. a. liwenxiu weiwei lengxiao dao
    Li Wenxiu slightly sneer say
    'Li Wenxiu slightly sneered and said,'
  b. ni bu rende wo wo que rende ni
    you not recognize I I but recognize you
    'You don't recognize me, but I recognize you.'

c. qianjie hasake buluo haisi bushao hasakeren de

rob Kazakhstan tribe kill many Kazakhstan people REL

jiu shi ni zhe pi hanren qiangdao

JIU be you this group Han robber

‘You are the group of Han robbers who rob the Kazakhstan tribes, and kill the Kazakhstan people.’

d. shuo dao zheli

speak to here

‘(When) she spoke to this point,’

e. shengyin bian de shenwei kuse

voice become DE pretty dry

‘Her voice became pretty dry.’

f. xin zhong **zai** xiang

mind inside PRG think

‘She was thinking in her mind,”

g. ruguo bushi nimen zhe xie qiangdao zuo le zhe xuiduo

if no you this CL robber do PFV so many

huai shi

bad thing

‘If you robbers had not done so many bad things,’

h. suluke yie bu hui zheyang zenghen women hanren

Suluke also no will so hate we Han people

'Suluke would not have hated us Han people so much.'

In (62), the progressive marker is in (62f). (62b) and (62c) are attached to (62a) as the content of what the subject says. In addition, (62e) and (62f) are also attached to (62d) by a rhetorical relation.

It can be seen that there is a zero anaphor in each of (62d), (62e) and (62f). A zero anaphor refers to a missing NP in a clause, and Mandarin utilizes zero anaphora in texts very often. Whenever a zero anaphor[38] appears in the clauses of a text, it means that these clauses share a syntactic topic, which may be a grammatical subject or grammatical object. The antecedent of those zero anaphors, which is also the shared syntactic topic, is the full NP subject or object in the first clause in a sequence of clauses (Pu 1997).

In (62d) and (62e), there are neither words that involve semantic subordination nor clauses expressing world knowledge that manifests the generalization/instance relation. That is, there is no information indicating that these clauses are connected together by *Elaboration*.

Asher and Lascarides (2003: 124) argue that clauses connected together by *Narration* must have a shared topic. The topic discussed in Asher and Lascarides (ibid)

[38] This is called a topic chain, which means a chain consisting of a full NP plus as many zero anaphors as possible, where the only full NP is the antecedent of all of the zero anaphors. For zero anaphora, in addition to Pu (1997), interested readers are referred to Tao (1996), which is on zero anaphora in Mandarin, and Clancy (1980), which is on zero anaphor in English and Japanese.

is, in fact, more like a theme of a paragraph, which is not realized in a syntactic position.

The concept of topic in Mandarin is a little different. Since Chao (1968: 69) proposes that "[t]he grammatical meaning of subject and predicate in a Chinese sentence is topic and comment, rather than actor and action', *topic* has had a syntactic position, such as the sentence-initial position (Shi 2000, Her 1991[39], Tan 1991, Li and Thompson 1981, etc), or preverbal position (Li 1996). Zero anaphora is a form of topic chain, where a full NP in the first clause serves as the antecedent for all of the zero anaphors in the clauses following it, and the antecedent full NP is the topic.

Though the topic discussed in Asher and Lascarides (ibid) is a little different from the concept of topic in Mandarin in that the former does not occupy a syntactic position whereas the latter does, they DO share one similarity, that is, both of them are the theme commented on by different clauses, which is exactly why Asher and Lascarides (ibid) argue that the clauses connected together by *Narration* must share a topic. Therefore, both kinds of *topic* can be used as an indication of *Narration*.

In (62), zero anaphora indicates that Li Wenxiu, the subject of (62a), which is the antecedent of the zero anaphors in (62d), (62e) and (62f), is the shared topic. Since no information indicates otherwise, it can be concluded that (62d) narrates (62a), and, both (62e) and (62f) narrate (62d). Note that it is (62f) being a narration of (62d), not vice versa, i.e. the clause with *zai* is a narration of a clause without *zai*.

[39] Her (1991) proposes that, in Mandarin, *topic* is a syntactic notation, which can be subcategorized by a predicate and the topic in the sense of Asher and Lascarides (ibid) should be called *frame*. Shi (1989) also proposes that topic chain is a syntactic category.

The next example shows that in addition to the topic that occupies a syntactic position, the topic in Asher and Lascarides' sense can also help determine the rhetorical relation between clauses in Mandarin. In the example below, no information indicates any rhetorical relation, except a shared topic (theme), and the clause with *zai* is a narration of one without *zai*.

63. a. suluke nanade dao han ren zhong ye you hao ren
Suluke murmuring say Han people inside also have good person
'Suluke murmured, "are there good persons among the Han people?"'

b. huanhuan yao le yao tou
slowly shake PFV shake head
'He shook his head slowly.'

c. keshi ta de xingming ta erzi de xingming dou shi zhe ge
but he DE life he son DE life all be this CL
han ren jiu de
Han person save Prc
'But, his life and his son's life were both saved by this Han.'

d. que buyoude ta bu xin
but not allow he not believe
'He was not allowed not to believe that fact.'

e. ta yi sheng zenghen han ren

he one life hate Han people

'He hated the Han people for his whole life.'

f. xianzai zhe ge xinnian **zai** dongyao le

now this CL belief PRG shake Prc

'Now this belief was shaking.'

In (63), *zai* is in (63f). (63f) does not share a syntactic topic with the other clauses. However, it comments on the same theme as the other clauses do, i.e., *zhe ge xinnian* 'this belief' in (63f) is the shared topic, though not one that occupies a syntactic position.

One feature about the *Narration* examples of *zai* is worth noting. The progressive is generally regarded as a state (Vlach 1981, Kamp and Reyle 1993: 575-578). A state is supposed to be true at any time point. To narrate another clause, a state must be evaluated as true after the time when the narrated clause is true. That is, there must be some kind of *localizer* in the clause with *zai* that can temporally relate the narrating clause to the narrated one.

In (62), the localizer is in (62d), *shuo dao zheli* 'when she spoke to this point'. It is after this point when the clause with *zai* can be evaluated as true. If this localizer is removed, the passage becomes incoherent.

In (63), the localizer is *xianzai* 'now' in (63f). It is after this time point when the clause with *zai* (63f) can be evaluated as true, that is, the subject remained confident in his belief until now. Again, if *xianzai* 'now' is removed from the clause,

the passage becomes incoherent.

Narration indicates advancement of time as a text goes on. From the example above, it can be seen that (62f) temporally follows (62d) and (63f) temporally follows (63e). All of the examples of *Narration* show that a *zai* clause can be connected to its preceding non-progressive clause by *Narration*, and there is no example where a *zai* clause is connected to its following clause by *Narration*.

This observation complies with the Hypothesis (55), which says that the event time of the progressive marker *zai* cannot be advanced because it presents an event on-going at an instant. Therefore, it is fine that after a terminated or completed event comes an on-going event, but it is semantically implausible that a clause with *zai* is connected to another clause by *Narration* because *Narration* involves advancement of time and the final endpoint of an event on-going at an instant is not presented and hence the event time of a progressive clause cannot be advanced.

One question to ask at this point is whether a clause with *zai* can narrate another clause with *zai* with the time of the narrated clause being included in the time of the narrating clause. This situation is demonstrated by the following examples.

64. a. John was building a house.

b. Yet later, he was still living in it.

65. a. laozhang **zai** gai fangzi

Laozhang PRG build house

'Laozhang was building a house.'

b. !keshi houlai ta haishi **zai** limian zhu

but later he still PRG inside live

'But later he was still living inside (it).'

In (64), (64b) narrates (64a) and this rhetorical relation is spelled out by *later*. (64a) is temporally included in (64b). This small passage basically says that John was living in the house which he was building.

However, the Mandarin counterpart of the same passage (65) is incoherent and sounds rather unnatural. This is due to the difference between the English progressive and *zai*. In English, the progressive can describe an on-going event which is intended to last for an interval, while *zai* denotes an event on-going at an instant, as argued in Section 3.3. Since the English progressive can last for an interval, (64a) can express the interval when John was building a house and it can last long enough for (64b) to start, to be on-going and to be included in the event time of (64b). On the contrary, (65a) is an event on-going at an instant. It can be temporally included in an event that is on-going at the same instant only. That is, the event time of a clause with *zai* can be included in the event of another clause with *zai* only when they are simultaneously taking place. *Narration* is not an option.

There is one more thing worth noting. That is, zero anaphora does not function as a syntactic indicator for *Narration* though it indicates a shared (syntactic) topic and a topic chain. Though there is also a zero anaphor in each of (59b), (59c), (59g) and (59h), they are examples of *Elaboration* according to semantic subordination and, maybe, world knowledge. This observation suggests that while *Narration* must have a

shared topic, a passage with a shared topic, which either occupies a syntactic position or does not, is not necessarily *Narration*. That is, zero anaphora indicates *Narration* by default, but it can be overridden by other explicit information.

To sum up the discussions about *Narration*, first, when there is zero anaphora and no information indicates otherwise, it can be inferred that clauses are connected together by *Narration*. Secondly, a *zai* progressive clause can be attached to its preceding non-progressive clause by *Narration*, but a non-progressive clause cannot be attached to its preceding *zai* clause by *Narration*, and this is exactly what the Hypothesis (55) predicts. Thirdly, there must be a localizer that can locate the time of a *zai* progressive clause relative to a time point, after which the progressive clause can be true.

3.4.3 Background$_{T}$

Though many examples of *Background*$_{T}$, which means a temporal background, have a structural indicator, e.g. *dan... de shihou* 'when', this rhetorical relation does not require one. Examples of both kinds are presented and discussed in this section. Focus is put on the kind without any indicator, and these examples are compared to those of *Elaboration* and of *Narration* to examine what factor tells them apart.

The following two examples are the kind that does not have an indicator specifying which rhetorical relation connects those clauses together.

66. a. zilu bijiao mei you yinyue xibao
Zilu comparatively no have music cell
'Zilu had less talent for music.'

b. ta ye **zai** xue tan se

he also PRG learn play ancient Chinese musical instrument

'He was also learning how to play Se.'

c. kongzi ting le shoubuliao jiu shuo

Confucius hear PFV cannot bear then say

'Confucius heard him play, couldn't stand it, and then said.'

d. zilu tan se tan de zheme cha

Zilu play Se play DE so bad

'Zilu plays Se so badly,'

e. zai wo menxia you sheme yongchu ne

at my school have what use Prc

'What good does his staying as my student do (to himself)?'

67. a. xiaoli **zai** youyong

Xiaoli PRG swim

'Xiaoli was swimming.'

b. laozhang kandao le renbuzhu jiao le ta ji zhao

Laozhang see PFV cannot help teach PFV he several move

'Laozhang saw him swim, and couldn't help himself but showed him a few moves.'

In the two examples, (66b) and (67a) both serve as a temporal background for the clause(s) following it. It is not *Narration* because there is no shared topic, syntactic or semantic. It is not *Elaboration* because no semantic subordination or

world knowledge indicate that. In addition to these two pieces of negative evidence, both (66b) and (67a) can be rephrased, using *dang ... de shihou* ‘when’, which indicates *Background*$_T$. This is why (66b) and (67a) are both argued to be *Background*$_T$ for the clauses following them.

Hopper (1979: 215) observes “a tendency for punctual verbs to have perfective aspect (i.e. to occur in foregrounded sentences) and conversely for verbs of the duraitve/stative/iterative types to occur in imperfect, i.e. backgrounded, clauses.” That is, Hopper suggests that an imperfective clause tends to be a backgrounded clause. The above observation about *zai* supports this viewpoint. Without information indicating otherwise, a clause with *zai* serves as a temporal background. Therefore, it can be argued that the progressive marker *zai*, by default, indicates that other clauses can be connected to a *zai* clause by *Background*$_T$.

Other examples of *Background*$_T$ all have structural indicators, such as *dang... de shihou* ‘when’, *dang....shi* ‘when’, *....shi* ‘when’, etc. One typical example is presented below.

68. a. ji nian qian wo nuer hai **zai** nian xiaoxue
several year ago I daughter still PRG study primary school
shi
time
‘A few years ago, when my daughter was still studying at primary school,’

b. youyitian dui wo shuo

one day to I say

'one day she said to me,'

c. ta xianzai xihuan yi shou gequ shi madana de wuzhi nuhai

she now like one CL song be Madonna DE material girl

'now she liked one song, that is, Madonna's Material Girl.'

In (68), *zai* is in (68a). (68a) serves as a temporal background for the other clauses and this rhetorical relation is specified by ... *shi* 'when'. Whenever there is an indicator specifying a rhetorical relation that connects clauses together, no other information is required and the rhetorical relation specified by the indicator is the one connecting the clauses in discussion together.

To sum up, *Background*$_T$ does not require any indicator to specify it, though some indicators can do that. For those passages without any indicator, a clause with *zai* functions as a temporal background as long as there is no semantic subordination or world knowledge specifying *Elaboration*, and nor is there a shared topic, which indicates *Narration*. Given the discussion about *Elaboration*, *Narration* and *Background*$_T$, it seems that a clause with *zai* implies *Background*$_T$ by default, unless there is other information indicating *Elaboration*. If there is a shared topic and no information specifying *Elaboration*, a clause with *zai* can be attached to a non-progressive clause by *Narration*, but a non-progressive clause cannot be attached to a clause with *zai* by *Narration*.

Besides, a clause with *zai* that serves as a temporal background provides a

temporal frame when the clauses following it can happen. That is, *Background*$_T$ involves temporal overlapping. This can be observed in the examples discussed above.

3.4.4 Parallel

Parallel does not really have a syntactic indicator specifying it, but it DOES have a structural indicator spelling it out, i.e. syntactic structural parallel. Here, syntactic structural parallel means that two clauses have exactly the same syntactic structure and none of the words has a semantic subordination relation. The following examples demonstrate this.

69. a. gu shihou de ren ruhe shenghuo bingbu zhongyao
old time DE person how live not important
'It is not important how ancient people lived.'

b. zhongyao de shi
important DE be
'The important thing is:'

c. shidai **zai** bian
time PRG change
'Time is changing.'

d. huanjing **zai** bian
environment PRG change
'The environment is changing.'

e. danshi renxing he ta de jiben yaoqiu dou shi
but human nature and it DE basic requirement all be
yiyang de
same Prc
'But, human nature and its basic requirements are all the same.'

In (69), *zai* is in (69c) and (69d). Two points here determine that these two clauses are connected together by *Parallel*. First, the same verb is used in both clauses, but the subjects do not manifest semantic subordination. This means that these two clauses cannot be *Elaboration* since clauses with subjects one of which is not subtype of the other can hardly elaborate each other. Secondly, these two clauses have exactly the same structure. These two points determine that (69c) and (69d) are connected together by *Parallel*.

Exactly the same observation can be made about the following example. The same two points discussed above can also be observed.

70. a. zamen qinghua xiaoming shenghuo yu si
we Tsinghua citizen live at here
chengzhang yu si
grow up at here
'We, Tsinghua students, live here and grow up here.'

b. mei tian xinglaizouqu zhang yan bi yan dou shi
every day walk around open eye close eye all be
qinghua xiaoyuan
Tsinghua campus
'Every day, where we walk around, and where we live all day
are both the Tsinghua campus.'

c. fangzi shi women **zai** zhu
house be we PRG live
'*We* live in the houses.'

d. lu shi women **zai** zou
road be us PRG walk
'*We* walk on the roads.'

e. hu bian shi women **zai** zuo
lake side be we PRG sit
'*We* sit on the lake shore.'

f. weisheme bu ziji lai sheji yi xia taolun yi xia
why not self come design one CL discuss one CL
canyu xi xia wan yi xia ne
participate one CL play one CL Prc
'Why don't we design, discuss, participate in and have
some fun (with the campus plan)?'

In this example, *zai* appears in (70c), (70d) and (70e). These three clauses are

connected together by *Parallel* for the same reasons discussed above. First, no semantic subordination is observed in these clauses. Secondly, these three clauses share exactly the same structure. These two points support that the rhetorical relation between (70c), (70d) and (70e) is *Parallel*.

To sum up, the examples of *Parallel* share two common features. First, none of the clauses has a lexical entry that can elaborate or be elaborated by others. Secondly, the clauses must share exactly the same structure.

The examples of *Parallel* not only share exactly the same syntactic structure, but also share the same aspect, which may be called aspectual parallel. That is, a clause with *zai* can be connected by *Parallel* only to another one which also has the progressive marker *zai*. Though neither serves as a temporal frame, the clauses connected together by *Parallel* are temporally overlapping. Here, temporal overlapping does not come from the progressive marker *zai*; instead, this temporal relation is inferred from the rhetorical relation *Parallel*.

3.4.5 Contrast

Contrast requires syntactic indicators to specify it, e.g. *xiangfande* ‘on the contrary’, *danshi* ‘but’, *que* ‘but’, *quan .... wu ....* ‘the whole ...., none ....’, etc. No example of *Contrast* exists without any indicator. The typical examples of *Contrast* are presented below. In this case, the progressive marker *zai* does not contribute too much to determining which rhetorical relation connects the clauses together.

71. a. shenwei guofang buzhang de penghuaide dao gansu
as defense minister REL Peng Huaide go to Gansu
wuwei bubing xuexiao shicha faxian
Wuwei infantry school inspect find
'Pen Huaide, who worked as the Minster of Defense, went
to inspect the infantry school at Wuwei, Gansu, and found:'

b. quan xiao guan bing yiqi **zai** lian gang
whole school officer soldier together PRG temper steel
'The officers and soldiers of the whole school were doing
steel-tempering,'

c. wu yi ren **zai** gao junshi xunlian
no one person PRG do military training
'(but) nobody was doing military training.'

In this example, the indicator is *quan* ..... *wu* ..... 'the whole ....., no ....', which are in (71b) and (71c) respectively. Here, it is two on-going events that contrast each other, and (71b) and (71b) are temporally overlapping.

72. a. kongzi shuo ta tong yanhui shuo le yi tian de daoli
Confucius say he to Yanhui say PFV one day DE reason
'Confucius said that he explained to Yanhui, for one day, how to
be a good and kind person and how to treat people.'

b. yanhui bu wen wenti erqie yie bu fanbuo

Yanhui not ask question and also not argue

'Yanhui did not ask any question nor did he argue.'

c. haoxiang hen ben de yangzi

seem very stupid DE appearance

'He seemed to appear stupid.'

d. danshi ta sidixia queshi queshi **zai** shijian

bu he in private contrastively definitely PRG practice

kongzi shu guo de hua

Confucius say EXP REL words

'but, in private, he was definitely practicing what Confucius had said.'

e. yinci yanhui yidianyiebu ben ne

so Yanhui not at all stupid Prc

'So, Yanhui was not stupid at all.'

In this example, the indicator is *danshi* 'but', which is in (72d), and the progressive marker *zai* is also in (72d). Here, it is a past event that contrasts an on-going event, and (72a) to (72c) temporally precede (72d). This temporal relation does not come from *Contrast*; instead, it comes from the inference that explanation must temporally precede practicing, i.e. world knowledge about actions.

73. a. ta keyi **zai** bimian xifang chuantong huihua li
he intentionally PRG avoid west traditional painting inside
tongguo duiyu yanse yu xiantiao de yianmi kongzhi
through toward color and line DE strict control
suo qianglie biaoxian de renlei zhuguan yizhi
hence strongly express DE human subjective consciousness
'He was intentionally avoiding the human subjective consciousness strongly expressed through the strict control of colors and lines in the western traditional paintings.'

b. xiangfande ta suqiu de shi ren he ziran de heyi
on the contrary he appeal REL be human and nature DE unify
yiji renwei zaoxin de xiaojie
and artificial form DE decompose
'On the contrary, what he wanted to express was the unification of human and nature, and the decomposition of artificial forms.'

In this example, the progressive marker is in (73a), and the indicator is *xiangfande* 'on the contrary', which is in (73b). Here, there is no temporal precedence because these two clauses are about the style of a painter and are more or less generic. This temporal relation does not come from *Contrast*, either. Instead, it comes from the semantics of the clauses.

To sum up, *Contrast* requires an indicator to specify this rhetorical relation. A

progressive clause can either contrast a non-progressive one, or a progressive one. *Contrast* does not provide any hint on the temporal relation of the clauses connected together by this rhetorical relation.

3.4.6 Others

In addition to the five rhetorical relations above, there are still a few examples of other rhetorical relations and some examples where the progressive marker *zai* is in an embedded clause, which usually do not interact with the main timeline of a text.

The examples with *zai* in an embedded clause are relative clauses. Relative clauses modify nouns and usually do not have a direct interaction with the main timeline of a text. (74) is an example.

74. a. ren de xinling xuyao jingguo shidu de tiaozheng
person DE mind need experience proper DE adjustment
'Human minds need appropriate adjustment.'

b. yao zijuede faxian ziji xianzai shi gaochao huo dichao
need self-consciously find self now be up or down
'One needs to self-consciously find out whether he/she is up or down now.'

c. xianzai **zai** zuo de shi li mubiao you duoyuan
now PRG do REL thing from destination have how far
'(and find out) how far from the destination the thing that he/she is currently doing.'

d. suyi mei ge ren dou yao xunzhao ziji shenghuo de
so every CL person all need find self live REL
fangshi
way
'So, everyone needs to find out his own way of living,'

e. ran ziji zai ge fangmian you tiaoshi huanchong de jihui
allow self at all aspect have adjust buffer DE chance
'(and to) allow himself some chance to adjust and to take a break.'

In this example, the progressive marker *zai* is in (74c) and is in a relative clause. (74c) is about how far away from the destination some thing is, and this is the primary timeline of the passage. The relative clause modifying *some thing* does not have to be related to the primary timeline. When *zai* is in an embedded clause like this, it usually does not directly interact with the primary timeline of a text.

Examples of other rhetorical relations all require structural indicators that explicitly spell out which rhetorical relation connects clauses together. As repeated several times in this chapter, as long as there is an indicator specifying the rhetorical relation, other information is not required. The typical examples are presented below.

75. a. ru heluoweizi yanzou shi
for example Horwitz perform time
'For example, when Horwitz is performing,'

b. hen youqu haoxiang **zai** youxi

very interesting seem PRG play a game

'it is very interesting and he seems to be playing a game.'

c. yinwei ta tanqi qin lai bu zaihu yuanlai de xuanlü

because he play-start piano start not care original DE melody

'because when he starts playing piano, he does not care about the original melody.'

d. fanzhi xuanlu shi wei ta de ganqing er cunzai de

on the contrary melody be for he DE feelings and exist Prc

'On the contrary, melody exists for his feelings.'

In (75), *zai* is in (75b). *yingwei* 'because' in (75c) specifies that (75c) and (75d) are connected to (75a) and (75b) by *Explanation*. *Explanation* does not predict any temporal relation.

76. a. zhongguo dadi shang chuxian le shiwuqianli de jingxiang

China land on appear PFV unprecedented DE image

'In China, an unprecedented image appeared:'

b. zhiyao shi you ren de difang

as long as be have person DE place

'As long as it is a place with persons,'

c. jiu you ren **zai** daliang gangtie

then have person PRG temper steel

'then, there are persons who are tempering things into steel.'

In (76), *zai* is in (76c), which is a consequent. This is specified by *jiu* 'then (as in *if ... then*)'. Here, (76b) needs to exist before (76c).

In this section, examples of the minority are presented and discussed. When *zai* is in an embedded clause, it is not directly related to the main timeline of a text. *Explanation* does not predict any temporal relation. For *Consequence*, antecedent temporally precedes consequent.

3.5 Summary

In this chapter, it is argued that the progressive marker *zai* presents an event on-going at an instant, and that *zai* does not present the SigP of an event. Based on this aspectual property of *zai*, it is hypothesized that in a text the event time of a clause with *zai* cannot be advanced. This hypothesis is tested against the data retrieved from the Sinica Corpus. It is found that a clause with *zai* can be connected to another clause by *Contrast*, *Elaboration*, *Parallel*, *Narration*, *Background*$_{T}$, *Explanation*, *Reason*, *Result*, and *Consequence*.

Only *Elaboration*, *Narration*, and *Background*$_{T}$ do not require any indicator to specify which rhetorical relation connects clauses together. *Elaboration* needs semantic subordination between the lexical entries in the clauses, which means that the elaborated clause must have a cover term for something and the elaborating clauses must have examples of that cover term. The semantic subordination can be determined either by semantics of the lexical entries of the clauses in discussion, e.g. entailment, hypernym/hyponym, etc., or by world knowledge. *Elaboration* may or may not involve temporal inclusion, depending on what is elaborated. When an event

is elaborated, temporal inclusion surfaces. When an NP is elaborated, temporal inclusion does not necessarily occur.

Examples of *Narration* do not have words that show semantic inclusion, but the clauses of an example of *Narration* have to share a topic, either a topic that occupies a syntactic position or a topic that does not. In addition, while a clause with *zai* can be attached to a non-progressive one by *Narration*, a non-progressive clause cannot be attached to a clause with *zai* by *Narration*. This complies with the Hypothesis (55) since the event time of a progressive clause cannot be advanced. Besides, a *zai* progressive clause needs a *localizer* to locate the time of the progressive clause relative to the time of the clause that the progressive clause narrates.

An example of *Background*$_{\mathrm{T}}$ can have neither a shared topic nor words that show semantic subordination. That is, when there is no indicator to specify a rhetorical relation, and none of the features of *Elaboration* or of *Narration* exists in the clauses, a clause with *zai* serves as a temporal background for others.

Given the above discussion about passages without any indicator, it can be concluded that *zai*, by default, implies that it is *Background*$_{\mathrm{T}}$ that connects the clauses together. When a passage has a shared topic, *Backround*$_{\mathrm{T}}$ is overridden and the rhetorical relation between the clauses is *Narration*. When the clauses of a passage have words that show semantic subordination, both *Background* and *Narration* are overridden, and it is *Elaboration* that combines the clauses together. None of the three rhetorical relations implies a temporal relation violating the Hypothesis (55), which requires that the event time of a progressive clause cannot be advanced.

From the three rhetorical relations, the temporal relations can be inferred. *Narration* implies that the temporal order between two clauses match their textual order, i.e. the narrative time advances as the text goes on. *Background*$_{\mathrm{T}}$ implies temporal overlapping. *Elaboration* can imply temporal inclusion, depending on what is elaborated. If it is an event that is elaborated, temporal inclusion is involved. If it is an NP (object) that is elaborated, temporal inclusion is not necessarily involved.

The other rhetorical relations require indicators to specify them. Whenever an indicator appears, no other information is required because the indicator there can monotonically specify which rhetorical relation connects clauses together. Therefore, the progressive marker *zai* does not have much influence on this decision in these examples.

CHAPTER FOUR

The Durative Marker *zhe* and Its Role in Temporal Progression

4.1 Introduction

This chapter explores the aspectual properties of the durative marker *zhe* and discusses how the durative marker affects the temporal relations between clauses. The durative *zhe* is argued to present a homogeneous event/eventuality lasting over an interval. Evidence is provided to argue that the durative marker *zhe* does not directly determine temporal relations. Instead, it indirectly influences the temporal relations through the rhetorical relations that connect clauses together. It is also argued that which rhetorical relation can connect a clause with *zhe* to another clause is determined by the aspectual properties of the aspect marker, in addition to specific indicators, structural or syntactic, that explicitly spell out rhetorical relations.

This chapter is organized as follows. Section 4.2 critically reviews related works on the durative marker *zhe*, including Yeh (1993a), Pan (1996), and Lin (2002a). Based on the discussions in Section 4.2, Section 4.3 deals with the syntactic and semantic properties of *zhe*, and provides a semantic translation for it. Besides, in this section, a hypothesis about the role of *zhe* in temporal progression is proposed, based on its aspectual properties. Section 4.4 provides examples retrieved from the Sinica Corpus, sorted in terms of rhetorical relations, to show how the temporal relations between clauses are determined, and the hypothesis proposed in Section 4.3 is tested against these examples. Section 4.5 is a summary.

4.2 Literature Review

4.2.1 Yeh (1993a)

Yeh (1993a) first reviews Chu's (1987) work on *zhe*. Chu suggests that *zhe* is an operator which specifies positively the feature [state] for verbs of placement and of posture, which he assigns [–action, –state]. When complements such as the inchoative marker *qilai* or the progressive marker *zai* are added, the features of those verbs change to [+action, –state].

Verbs such as *zhan* 'to stand' and *chuan* 'to wear' are [–action, –state], according to Chu. The inchoative marker *qilai* and the progressive *zai* change the feature [–action] to [+action], as in (77a) and (77b), both of which have an action reading. On the other hand, *zhe* changes [–state] to [+state], as shown in (78a) and (78b), both of which have a stative reading.

77. a. ta zhan-qilai le
    he stand up Prc
    'He stood up.'
  b. ta zai chuan dayi
    he PRG wear coat
    'He is/was putting on the coat.'

78. a. ta zai menkou zhan zhe
    he at gate stand DUR
    'He is/was standing at the door.'

b. ta chuan zhe dayi

he wear DUR coat

'He is/was wearing the coat.'

Yeh points out that Chu's proposal has three problems. First, *zhe* can also go with activity verbs, so sometimes [–action] should be [+action]. But a feature matrix [+action, +stative] is contradictory. Secondly, Chu fails to notice the fact that the state presented by *zhe* is resultative. Finally, *zhe* is not compatible with some statives.

Furthermore, Yeh observes the extended use of *zhe*. She suggests that *zhe* possesses the property [+static] and focuses on the resultative state, and that this feature of *zhe* can explain the extended use of *zhe* demonstrated in (79).

Yeh claims that *zhe* marks a sentence with it as [+static] and an event marked with [+static] is no longer a complete event, which is why native speakers, hearing (79a), will find it incomplete and will request more information. (79b) is fine because there is a main event in the sentence, i.e. *shangxue* 'to go to school'. She claims that semantically *zhe* presents an event as a state and as a background frame and that syntactically *zhe* subordinates the stative frame to the main event.

79. a. ^{I}ta qi zhe jiaotache[40]

he ride DUR bike

'Riding a bike, he.....'

[40] In this dissertation, a superscripted I is used to indicate that a clause is incomplete and unacceptable while standing alone.

b. ta qi zhe jiaotache shangxue

he ride DUR bike go to school

'He went to school by (riding a) bike.'

To account for why *zhe* is not compatible with some statives, Yeh first observes that those compatible with *zhe* include *gaoxin* 'happy', *re* 'hot', *beishang* 'sad', *haipa* 'afraid', *bing* 'sick', *tong* 'painful', *mang* 'busy', etc., and that those incompatible with *zhe* include *xiang* 'to resemble', *congming* 'smart', *shanliang* 'kind', *youcaiqi* 'talented', *haoke* 'hospitable', etc. She finds that those statives compatible with *zhe* are all stage-level predicates and those incompatible are individual-level predicates.

She suggests that stage-level predicates are subject to change more frequently than individual-level ones. Since *zhe* presents a resultative state, it should go with stage-level predicates, which involves change, and does not go with individual-level ones, which do not involve change.

While Yeh is correct in that *zhe* is compatible with stage-level statives, and incompatible with individual-level ones, her conclusions suffer from the following problems. First, stage-level predicates, while involving change, do not necessarily describe a resulative state.

80. a. ta jiantian ke gaoxing zhe

he today very happy DUR

'He is (being) very happy today.'

b. chuntian de shihou manshanpianyie de
spring DE time everywhere in mountains and fields DE
hua dou hong zhe
flower all red DUR
'In spring, flowers in the mountains and fields are all (being) red.'

The predicates *gaoxin* 'to be happy' and *hong* 'to be red' are stage-level and involve change without a doubt. However, it is difficult to see why they describe a resultative state. Of what is *being red* the resultative state? *Being red* can be terminated, but it is not necessarily a resultative state. The same question can be asked about *being happy*[41].

Secondly, Yeh claims that examples like (79a) are ungrammatical because an activity marked with *zhe* becomes static, a static sentence cannot stand alone and must have a main event to make the sentence complete. This claim has two problems. First, there are a lot of static sentences that can stand alone. Secondly, with some modifiers, sentences like (79a) can stand alone and are perfectly grammatical.

81. a. hua hen piaoliang
flower very beautiful
'Flowers are very beautiful.'

[41] One may argue that good things happening can make a person happy. But, one can also feel happy for no (obvious) reason. The point here is that *being happy* and *being red* is not like verbs of posture and placement, such as *tang* 'to lie on one's back', *gua* 'to hang' or *zuo* 'to sit', all of which can denote a state resulting from an action.

b. ta gaoxingde qi zhe jiaotache

he happily ride DUR bike

‘He is riding a bike happily.’

(81a) is static. However, it can stand alone, and does not require a main event. (81b) is just (79a) plus an extra modifier *goaxingde* ‘happily’. With *gaoxingde* ‘happily’, (81b) is fine. These two counterexamples suggest that being static cannot be the reason why (79a) is incomplete.

Finally, Yeh claims that syntactically *zhe* subordinates the sative frame to the main event. But, V_1 *zhe* V_2 cannot be rephrased with a *when* clause, and *zhe* cannot occur in a *before* clause, or an *after* clause, all of which are generally regarded as subordinate clauses. See the following examples.

82. a. *dang ta qi zhe jiaotache ta shangxue

when he ride DUR bike he go to school

‘When he was riding a bike, he went to school.’

b. *zai ta chang zhe ge zhihou women jiu zou le

at he sing DUR song after we then walk Prc

‘After he was singing, we left.’

c. *zai ta chang zhe ge zhiqian women yijing hen daomei

at he sing DUR song before we already very bad luck

le

Prc

‘Before he was singing, we had already had very bad luck.’

83. a. zai ta chang le ge zhihou women jiu zou le
at he sing Pfv song after we then walk Prc
'After he sang, we left.'

b. zai ta chang ge zhiqian women yingjin hen daomei le
at he sing song before we already very bad luck Prc
'Before he sang, we had had very bad luck.'

The examples in (82) show that (79b) cannot be rephrases as (82a) since (82a) is ungrammatical. Besides, *zhe* cannot occur in an *after* clause, as in (82b), or a *before* clause, as in (82c), whereas (83a) and (83b) are fine, which are just like (82b) and (82c) except that they do not have *zhe* in them. These two examples further support the argument that the ungrammaticality of (82b) and of (82c) is due to *zhe*. That is, Yeh's claim about the syntactic function of *zhe* seems to be inaccurate.

4.2.2 Pan (1996)

In this paper, Pan examines how the durative marker *zhe* works in the locative inversion construction in Mandarin. In Mandarin, unaccusative, passivized and some transitive non-passivized verbs can undergo locative inversion, as shown below.

84. a. menkou zhan zhe yi ge ren
doorway stand DUR one CL person
'At the doorway is standing a man.'

b. zhuo shang bei ta fang le hen duo shu
desk on PASS he put PFV very many book
'He put a lot of books on the desk.'

c. qiang shang gua zhe yi fu hua

wall on hang DUR one CL picture

'A picture is hung on the wall.'

d. chuang shang tang zhe yi zhi mao

bed on lie DUR one CL cat

'A cat lies on the bed.'

e. heiban shang xie zhe yi xie zi

black board on write DUR one PL word

'A few words are written on the board.'

English and Chichewa both allow unaccusative and passivized verbs in the locative inversion construction. Mandarin is different in that some transitive non-passivized verbs, specifically placement verbs[42], can also undergo locative inversion. Pan suggests that this is done via a morphological operation, rather than transitive alternation, i.e. *zhe* deletes the agent role of a placement verb and hence renders a transitive verb unaccusative. He makes this suggestion based on the following observations.

First, the agent phrase cannot appear in *zhe* locative inversion sentences even though it can show in the *le* sentences.

[42] Actually, posture verbs, such as *zhan* 'to stand, *zuo* 'to sit', etc., can also undergo locative inversion. For some unknown reason, Pan fails to discuss posture verbs in this paper, though his analysis of placement verbs presented in this paper can be easily extended to account for posture verbs.

85. a. zhuo shang ta fan le/*zhe hen duo shu

desk on he put PFV/DUR very many book

'On the table, John put a book.'

b. heibang shang ta xie le/*zhe yi xie zi

black board on he write PFV/DUR one PL word

'On the blackboard, he wrote a few words.'

Secondly, the examples in (86) and (87) suggest the transitive alternation account does not work. The transitive alternation account suggests that place verbs such as *fang* 'to put', *xie* 'to write' can alternate between transitive and intransitive, just like *break* in English, as shown in (87). Intransitive *break* does not allow an agent phrase to be placed before it, as shown in (87c). However, in Mandarin, though (86a) seems to be an example of intransitive *xie* 'to write', it is just an illusion because as shown in (86b) an agent phrase can be restored.

86. a. xin xie le

letter write PFV

'The letter was written.'

b. ta xin xie le

he letter write PFV

'He wrote that letter.'

87. a. John broke the window.

b. The window broke.

c. *John the window broke.

Thirdly, the account that a general agent deletion rule deletes the agent role of a placement verb does not work either, because in an agentless sentence only *zhe* is grammatical but *le* is not. If a general agent deletion rule were responsible for the deletion of the agent, it would be difficult to explain the grammatical difference between (88a) and (88b).

88. a. na ben shu zai zhuo shang fan **zhe**
that CL book at desk on put DUR
'That book was placed on the table.'

b. *na ben shu zai zhuo shang fan **le**
that CL book at desk on put PFV
'That book was placed on the table.'

As shown in (85b), the agent phrase of a *le* locative inversion sentence can be restored. This suggests that *le* is not responsible for the deletion of the agent phrase because the agent phrase should not be allowed to be restored if *le* triggered its deletion. That is, a general agent deletion rule deletes the agent phrase of a *le* locative inversion sentence. Since *le* does not trigger the deletion of an agent phrase and the general agent deletion rule works for the locative inversion construction only, (88b) is not a locative inversion sentence and hence its agent phrase cannot be deleted. If the same agent deletion rule were responsible for the deletion of the agent phrase of a *zhe* locative inversion sentence, the agent phrase (88a) should not be deleted because it is not a locative inversion sentence. However, actually, the agent phrase of (88a) can be deleted and the sentence is grammatical. Therefore, the general agent deletion rule

does not work for the locative inversion construction that requires the durative marker *zhe*.

Given the three arguments discussed above, Pan proposes that *zhe* is solely responsible for the agent deletion in a locative inversion construction, as shown in (88a) and the deletion operation of *zhe* obeys the conditions specified in (89b). That is, the agent deletion in the locative inversion construction is the result of a morphological operation, instead of transitive alternation or some general agent deletion.

89. a. *zhe* operation: <agent, theme, location> → <theme, location>

b. The *zhe* operation applies if

-- the verb in question is an accomplishment verb with the argument structure: <agent, theme, location>

-- the location is predicated of the theme, and

-- the sentence in question is [–stative].

This is a nice study of how *zhe* results in a locative inversion construction, and the arguments presented are convincing. However, Pan fails to relate the agent deletion ability of *zhe* to the general aspectual aspectual properties of *zhe*. This is a minor disadvantage.

4.2.3 Lin (2002a)

Citing Zhang (1996), Lin points out that *zhe* does not occur in the following constructions: (i) constructions with an instantaneous verbs as shown in (90a), (ii)

constructions with a resultative verb compound as demonstrated in (90b), (iii) constructions with a durational or frequency phrase, as can be seen in both (90c) and (90d), and (iv) constructions with an indefinite object NP having a numeral, as illustrated in (90e).

90. a. *ta daoda zhe shanding
he arrive DUR mountain top
'He is reaching/has reached the top of the mountain[43].'

b. *ta da-po zhe beizi
he hit-broken DUR glass
'He has broken a glass.'

c. *ta shui zhe shi fenzhong
he sleep DUR ten minute
'He is sleeping/has slept ten minutes.'

d. *ta lai zhe liang ci
he come DUR two times
'He is coming/has come twice.'

e. *ta xie zhe liang pian wenzhang
he write DUR two CL article
'He is writing/has written two articles.'

Lin observes that all of the activities in (90) are telic. He further observes that

[43] Yeh (1993a), which is reviewed in Section 4.2.1, suggests that *zhe* marks the resultative state of an action. The English translations of these examples try to show that for the constructions in (90) *zhe* can neither express duration nor a resulative state.

those well-formed examples with *zhe* all seem to describe atelic situations, regardless of whether the sentence denotes an activity or a state. (91a) and (91b) describe a state and (91c) is an activity. The parts with *zhe* in these examples are all atelic, that is, they do not have a natural final endpoint.

91. a. zai shengming de guocheng zhong yongyuan you zhe
at life DE process middle always have DUR
wushude buxing
countless disaster
'It is always the case that there are countless disasters in the process of life.'

b. ta suishi baochi zhe jingjuexing
he any time keep DUR alertness
'He keeps alert all the time.'

c. ta qi zhe jiaotache daochu xianguan
he ride DUR bike everywhere loiter
'He is loitering everywhere, riding a bike.'

Lin proposes two pieces of evidence to support his analysis. First, sentences of the same type of construction might exhibit different properties when they occur with – *zhe*. For example, though the examples in (92) all have the same SVO pattern with the object being quantized, they differ in their grammatical judgments or interpretations.

92. a. zhangsan chuan zhe yi jian waitao

Zhangsan wear DUR one CL coat

'Zhangsan is wearing a coat.'

'*Zhangsan is putting on a coat.'

b. *zhangsan gai zhe yi dong fanzi

Zhangsan build DUR one CL house

'*Zhangsan is building/has built one house.'

c. ta tui zhe yi laing che[44]

he push DUR one CL car

'He is pushing a car.'

In (92a), *chuan* has two meanings, *to wear* or *to put on*. *To wear* is atelic and *to put on* is telic. Attached with *zhe*, *chuan* can only mean *to wear*, that is, the atelic meaning. In (92b), *gai yi dong fanzi* 'to build a house' is telic and hence it is not compatible with *zhe*. In (92c), *tui* 'to push' is atelic and hence is compatible with *zhe*.

Another piece of evidence comes from the quantificational properties of noun phrases. Quantificational properties of noun phrases have influence on the telicity of verbal predicates. When a verb combines with a count noun, a telic predicate is yielded. But, when the same verb combines with a mass or plural noun, an atelic predicate is produced. The previous case is not compatible with *zhe* while the latter is.

[44] According to Yeh (1993a) and other native speakers of Mandarin consulted, (92c) and (93a) are incomplete, just like (79a).

93. a. ta he zhe cha

he drink DUR tea

'He is drinking tea.'

b. *ta he zhe yi bei cha

he drink DUR one CL tea

'He is drinking a cup of tea.'

Having established that *zhe* selects an atelic predicate, Lin tries to explain why *zhe* can occur in the following two kinds of sentences. One is that *zhe* can attach to a verb marked by the progressive marker *zai*. The other is locative inversion.

94. a. ta zai hua zhe yi ge yuan

he PRG draw DUR one CL circle

'He is drawing a circle.'

b. *ta xie zhe na feng xin

he write DUR that CL letter

'He is writing that letter.'

c. ta bian xie zhe na feng xin bian huixiang zhe jintiande

he BIAN write DUR that CL letter BIAN recall DUR today's

zaoyu

encounter

'While he is writing that letter, he is simultaneously recalling his

encounter today.'

Both *zai* and *bian....bian...* mark the on-going of an activity, and *zhe* can attach

to the verbs marked by them. Both *hua yi ge yuan* 'to draw a circle' and *xie na feng xin* 'to write that letter' are telic. This seems to be contradictory to what Lin has suggested about *zhe* selecting an atelic predicate.

Citing Smith's (1991) work that suggests that an on-going event is a sub-event of the whole event, Lin proposes that the part of sub-event focused by an imperfective aspect can be regarded as a kind of atelic eventuality. This is why *zhe* can be attached to it.

The second kind of examples is the locative inversion construction. An activity verb in its accusative usage is not compatible with *zhe* as in (95a). But in its locative inversion usage, the same verb is compatible with *zhe* as in (95b).

96. a. *ta fang zhe yi ben shu zai chung shang
he put DUR one CL book on bed top
'He has put a book on the bed.'

b. chuang shang fang zhe yi ben shu
bed top put DUR one CL book
'The bed has a book put on it.'

Lin proposes that the agent role of the stative *fang* 'to put' is suppressed syntactically because it is saturated through existential closure in the lexicon[45]. That is,

[45] This analysis is similar to Pan (1996), which is reviewed in Section 4.2.2, though Pan does not utilize existential closure. But, the similarity ends there. Lin's (2002a) analysis differs from Pan's (1996) in that *zhe* is responsible for the suppression of the agent phrase of a locative inversion sentence in Pan's analysis, while Lin proposes that placement verbs are ambiguous and *zhe* is compatible with one of the two semantics of a placement verb. According to the evidence provided in Pan (1996), it seems that *zhe* is responsible for the deletion of the agent phrase. This issue will not be pursued in this

verbs like *fang* ‘to put’ are systematically ambiguous between (96) and (97):

96. $[\![\text{fang1}]\!] = \lambda x\ \lambda y\ \lambda z\ \lambda e_s\ [\text{Theme}(x) \wedge \text{Location}(y) \wedge \text{Agent}(z) \wedge \text{put'}(e)]$

97. $[\![\text{fang2}]\!] = \lambda x\ \lambda y\ \exists s_s\ \exists e_s\ \exists z\ [\text{Theme}(x) \wedge \text{Location}(y) \wedge \text{Agent}(z) \wedge \text{put'}(e) \wedge s = f_{result}(e)]$

In (96) and (97), *e* and *s* are variables over for events and states. The subscripted *s* is the semantic type of eventuality that should not be confused with the state variable. f_{result} is intended as a function mapping an event to the resultative state of that event. That is, through existential closure, *fang* ‘to put’ can be transformed from an activity verb to a stative verb denoting the resultative state of its activity counterpart. Since a stative verb is atelic, it is compatible with *zhe*.

While Lin’s proposal that *zhe* selects an atelic predicate works well on the examples discussed above, it has a problem with the following examples, where the predicates attached to *zhe* are also atelic but the sentences are ungrammatical.

98. a. *ta pao zhe bu liaotian
he run DUR race chat
‘He is jogging and chatting.’

b. ta bian paobu bian liaotian
he BIAN run BIAN chat
‘He is jogging and chatting.’

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99. a. *ta chi zhe shuiguo zuo gongke

he eat DUR fruit do homework

'He is eating fruit and doing homework.'

b. ta bian chi shuiguo bian zuo gongke

he BIAN eat fruit BIAN do homework

'He is eating fruit and doing homework.'

100. a. *ta chou zhe yan jiang dianhua

he smoke DUR cigarette talk phone

'He is smoking and talking over the phone.'

b. ta bian chouyan bian jiang dianhua

he BIAN smoke BIAN talk phone

'He is smoking and talking over the phone.'

paobu 'to jog', *chi shuiguo* 'to eat fruit' and *chouyan* 'to smoke' are all atelic. However, they are not compatible with *zhe* in the V_1 *zhe* V_2 construction, as shown in (98a), (99a) and (100a). That is, Lin's proposal will falsely predict these sentences to be grammatical while in actuality they are not.

Lin fails to notice that the V_1 *zhe* also serves as an adverbial of manner for the V_2 in the V_1 *zhe* V_2 construction. Telicity is not the only decisive factor here. This can be demonstrated by the example below.

101. a. ta qi **zhe** jiaotache shangxue

he ride DUR bike go to school

'He went/goes to school by riding a bike.'

b. ??? ta qi **zhe** jiaotache liaotian

he ride DUR bike chat

c. ??? ta qi **zhe** jiaotache kan shu

he ride DUR bike read book

While *riding a bike* is a logical way to go to school, it is not obviously related, as a manner, to *chat* and to *read books*. (101) proves that in addition to telicity the main predicate V_2 in the V_1 *zhe* V_2 construction has a selectional restriction on the V_1.

The fact that some activity predicates cannot go with *zhe* alone also refutes Lin's atelicity analysis. Lin's proposal also has trouble explaining why adverbials of manner can render compatible with *zhe* those activity predicates which cannot go with *zhe* alone.

The three papers reviewed above have two insufficiencies. All of them fail to observe that *zhe* presents a homogeneous event/eventuality lasting over an interval. This observation is also important to the two papers on locative version since this aspectual property of *zhe* can distinguish the semantics of the *zhe* locative inversion construction from that of the *le* locative inversion construction. Besides, none of the three papers notices the complicated interaction between *zhe* and some activity predicates, and therefore all of them fail to explain this interaction. These two insufficiencies are discussed in the next section.

4.3 Semantics of the Durative Marker *zhe*

4.3.1 Difference between *zhe* and *zai*

In the literature, *zhe* and *zai* are both regarded as imperfective aspect markers

and their difference lies in the classes of predicates they select (e.g. Chu 1987, Li and Thompson 1981, Yeh 1993a, Lin 2002a, 2000b, and so on). This is partially true in that *zai* is compatible with accomplishment and activity only while *zhe* is compatible with both (stage-level) state and activity, though *zhe* has a complicated interaction with activity, which will be discussed later in Section 4.3.3.

However, there is more difference between *zhe* and *zai* than the classes of predicates they select. It has been argued in Chapter Three that the progressive marker *zai* presents an event on-going at an instant. That is why *zai* needs a distributive operator, e.g. *dou* 'all', in order to be compatible with temporal phrases denoting an interval. It is in this respect that *zhe* and *zai* manifest their difference. The following examples can illustrate this difference.

102. a. ni zheng ge wanshang **dou zai** kan zhe ben shu (bu lei a)
you whole CL night all PRG read this CL book no tired Prc
'You are reading this book the whole night. (Aren't you tired?)'

b. ???ni zheng ge wanshang **zai** kan zhe ben shu (bu lei a)
you whole CL night PRG read this CL book no tired Prc
'You are reading this book the whole night.(Aren't you tired?)'

c. ni zheng ge wanshang kan **zhe** zhe ben shu (bu lei a)
you whole CL night read DUR this CL book no tired Prc
'You are reading this book the whole night. (Aren't you tired?)'

d. ta ba zheng ge fangjian nong de luanqibazao

he DISP whole CL room make DE messy

'He made the whole room messy.'

The temporal phrase *zheng ge wanshang* 'the whole night' is an interval. When *zai* is used, as in (102a), the distributive operator *dou* must appear in the sentence. If *dou* does not appear, the sentence is bad, as shown in (102b). But, for *zhe*, the distributive operator is not necessary, as in (102c). (102d) is to show that *zheng* 'whole' does not require *dou* to appear, and the grammatical contrast between (102a) and (102b) canot be explained by claiming that *zheng* requires the distributive operator[46].

The examples in (102) show that *zhe* is compatible with an interval-denoting phrase/clause while *zai* needs a distributive operator to be compatible with an interval-denoting phrase/clause. Since it has been argued that *zai* presents an event on-going at an instant, it seems reasonable to argue that *zhe* marks the duration of an event/eventuality lasting over an interval. That is, *zhe* is compatible with a temporal phrase denoting an interval because it describes the lasting of an event/eventuality over an interval. On the contrary, z*ai* describes the on-going of an event at an instant. Therefore, it needs the distributive operator *dou* to distribute the instants over an

[46] In the literature, it is well-known that a preverbal universal quantifier in Mandarin requires the distributive operator *dou* to occur in the sentence (e.g. Lin 1996). Here, though *zheng* 'whole' has a meaning similar to universal quantification, it does not require *dou* to appear. This issue will not be pursued in this dissertation.

interval[47].

It is also argued in Chapter Three that *zai* can present any point in an event other than its SigP and this is why the event time of a clause with *zai* cannot be advanced. The durative marker *zhe* goes with activity, whose SigP is undefined, and with state whose SigP is either its initial endpoint or undefined. From this observation, it can be generalized that the interval presented by *zhe* cannot include a SigP with nothing following it. Based on the discussion above, the semantics of *zhe* can be defines as (103a). The semantics of *zai* is repeated in (103b). (103c) is the compositional semantics of *zhe*. The compositional semantics of *zai* is repeated in (103d)

103. a. $[\![\text{zhe}(\varphi)]\!]$ = 1 at $<I, w>$ iff for some interval I' such that $I \subset I'$ and $[\![\varphi]\!]$ = 1 at $< I', w>$, where I does not include a SigP with nothing following it.

[47] A valid question to ask is whether *zhe* can have the distributive operator *dou* in the sentence or not, that is, whether (i) is a grammatical sentence in Mandarin.

i. ni zheng ge wanshang **dou** kan **zhe** zhe ben shu (bu lei a)
you whole CL night all look at DUR this CL book (no tired Prc)
'You are looking at this book the whole night. (Aren't you tired?)'

The answer is yes. (i) is a grammatical sentence in Mandarin. This could be explained in the following way. The distributive operator *dou* can either distribute over sub-intervals in an interval or over instants in an interval, and *dou* in (i) distributes over sub-intervals. One might suggest that *dou* in (102a) also distributes over sub-intervals and *zai* also denotes the on-going of an event during an interval. But this claim cannot explain why *dou* is obligatory for *zai* to be compatible with a temporal phrase denoting an interval. Or, one might suggest that *zai* describes the on-going of an event during an interval, but this interval is pretty restricted, that is, it must be pretty short, while *zhe* is freely compatible with longer intervals. This claim seems a little ad hoc because a limit on the length of an interval must be arbitrarily decided.

b. ⟦zai(φ)⟧ = 1 iff at <t, w> iff for some instant *t* and *t* is not a SigP

and for all *w'* there is an *i*, $t \subset i$, such that

w' ∈ Inr(<*t*,*W*>), φ is true at <*i*, *w'*>

c. ⟦zhe⟧ $=_d$ λP (λi) λx λe [(e ○ i) ∧ zhe(P(x, e))]

d. ⟦zai⟧ $=_d$ λP (λt) λx λe [(e ○ t) ∧ zai(P(x, e))]

e. ⟦dou⟧$=_d$ λP λi λx ∀t [t ∈ i → P(x)(t)]

f. ⟦T⟧ $=_d$ λP ∃t [t = T' ∧ P(t)] where *t* is an instant

e.g. ⟦five o'clock'⟧ $=_d$ λP λt [t = five o'clock' ∧ P(t)]

g. ⟦I⟧ $=_d$ λP ∃i [i = I' ∧ P(t)] where *i* is an interval

e.g. ⟦the whole night⟧ $=_d$ λP λi [i = the whole night' ∧ P(i)]

The compositional rules for *zai* and *zhe* in (103c) and (103d) do not do much except that they specify how a temporal phrase interacts with these two imperfective markers. λi in (103c), λt in (103d) and their corresponding conditions are optional because temporal phrases are optional. (103e) is the semantic translation of *dou* when it distributes over an interval. One thing to note is that *dou* requires a plural to distribute over. Hence *dou* requires an interval so that it can distribute instants over the interval. (103f) and (103g) are the semantic translations of temporal phrases.

4.3.2 Semantic Derivations of Relevant Examples

With the compositional semantics in (103), the semantics of (102a) can be derived as in (102a'). To simplify the derivation here, *zhe ben shu* 'this book' is represented as *this_book* in the derivation. All other complications related to NPs

consisting of a demonstrative and a noun are ignored. For the same reason, pronouns are treated as a constant in the derivation.

102. a'. ⟦zai kan zhe ben shu⟧

$= \lambda t\, \lambda x\, \lambda e\, [e \circ t \wedge zai'(read'(x, this\_book', e))]$

⟦dou zai kan zhe ben shu⟧

$= \lambda P\, \lambda i\, \lambda x\, \forall t\, [t \in i \rightarrow P(x)(t)]$

$(\lambda t\, \lambda x\, \lambda e\, [e \circ t \wedge zai'(read'(x, this\_book', e))])$

$= \lambda i\, \lambda x\, \lambda e\, \forall t\, [t \in i \rightarrow [e \circ t \wedge zai'(read'(x, this\_book', e))]]$

⟦zheng ge wan shang dou zai kan zhe ben shu⟧

$= \lambda P\, \exists i\, [i = the\ whole\ night' \wedge P(i)]$

$(\lambda i\, \lambda x\, \lambda e\, \forall t\, [t \in i \rightarrow [e \circ t \wedge zai'(read'(x, this\_book', e))]])$

$= \lambda x\, \lambda e\, \forall t\, \exists i\, [i = the\ whole\ night' \wedge [t \in i \rightarrow$

$[e \circ t \wedge zai'(read'(x, this\_book', e))]]$

⟦ni zheng ge wan shang dou zai kan zhe ben shu⟧

$= \lambda x\, \lambda e\, \forall t\, \exists i\, [i = the\ whole\ night' \wedge [t \in i \rightarrow$

$[e \circ t \wedge zai'(read'(x, this\_book', e))]]\ (you')$

$= \lambda e\, \forall t\, \exists i\, [i = the\ whole\ night' \wedge [t \in i \rightarrow$

$[e \circ t \wedge zai'(read'(you', this\_book', e))]]$

Existential closure:

$\exists e\, \forall t\, \exists i\, [i = the\ whole\ night' \wedge [t \in i \rightarrow$

$[e \circ t \wedge zai'(read'(you', this\_book', e))]]$

This derivation correctly captures the semantics of (102a). The progressive marker *zai* requires a distributive operator such as *dou* ‘all’ to distribute over an interval the instants at which the event presented by *zai* is on-going.

Without the distributive operator, the type of temporal phrase required by *zai* mismatches the type of the temporal phrase in the sentence, which is an interval. The derivation crashes. This is why (102b) is bad. The semantic derivation is given below.

102. b’. ⟦zai kan zhe ben shu⟧

= λt λx λe [e ○ t ∧ zai’(read’(x, this_book’, e))]

⟦zheng ge wan shang zai kan zhe ben shu⟧

= λP ∃i [i = the whole night’ ∧ P(i)]

(λt λx λe [e ○ t ∧ zai’(read’(x, this_book’, e))])

= ∃i [i = the whole night’ ∧ <u>λt</u> λx λe [e ○ t

∧ zai’(read’(x, this_book’, e))] (<u>i</u>)]

This derivation crashes because of type mismatch between λ*t* and *i*, both of which are underlined. *zai* requires an instant, but *zheng ge wanshang* ‘the whole night’ is an interval. This also correctly captures the intuition about this sentence being unacceptable.

There are a few pieces of evidence that can support this hypothesis about the distinction between *zai* and *zhe*. The first piece of evidence comes from adverbials like *yizhi* ‘all the way (temporally), continuously’. *zai* needs it to go with an interval temporal clause, but *zhe* does not, as shown in (104).

104. a. zai ni sheng zhe bing de na duan qijian *xiaomei
at you conceive DUR illness DE that period time Xiaomei
zai zhaogu ni, **zai** zhaogu nide haizi, (ni jingran
PRG take care you PRG take dare your child you surprisingly
buzhiganji)
ungrateful
While you were sick, Xiaomei was taking care of you and your child the whole time. (And you are so ungrateful!)'

b. zai ni sheng zhe bing de na duan qijian xiaomei
at you conceive DUR illness DE that period time Xiaomei
yizhi **zai** zhaogu ni **zai** zhaogu nide haizi
continuously PRG take care you PRG take dare your child
(ni jingran buzhiganji)
you surprisingly ungrateful
'While you were sick, Xiaomei was taking care of you and your child the whole time. (And you are so ungrateful!)'

The examples in (104) show that, to go with an interval-denoting temporal clause, *zai* needs an adverbial like *yizhi* 'all the way, continuously', which has a similar function as the distributive operator *dou*. On the other hand, the examples in (105) show that, while compatible with *dou* 'all' and *yizhi* 'always', *zhe* does not need them to go with an interval-denoting clause

.

105. a. zai ni sheng zhe bing de na duan qijian xiaomei
at you conceive DUR illness DE that period time Xiaomei
zhaogu **zhe** ni, zai zhaogu nide haizi, (ni jingran
take care DUR you, PRG take dare your child, you surprisingly
buzhiganji)
ungrateful
'While you were sick, Xiaomei was taking care of you and your child the whole time. (And you are so ungrateful!).'

b. zai ni sheng zhe bing de na duan qijian xiaomei
at you conceive DUR illness DE that period time Xiaomei
yizhi zhaogu **zhe** ni, zai zhaogu nide haizi,
continuously take care DUR you, PRG take dare your child,
(ni jingran buzhiganji)
you surprisingly ungrateful
'While you were sick, Xiaomei was taking care of you and your child the whole time. (And you are so ungrateful!)'

The second piece of evidence comes from the subtle distinction between *dang ...de shihou* 'at the time of' and *dang...de na liang ge xiaoshi* 'during the two hours of'. The previous phrase can denote an instant or an interval while the latter can denote an interval only. Going with these two different temporal phrases, *zai* and *zhe* behave as they are expected to.

106. a. zuotian wanshang ta jin men de shihou ta shiyou **zai**
yesterday night he enter door DE time he roommate PRG
kan dianshi
watch TV
'Last night, when he entered the door, his roommate was watching TV.'

b. zuotian wanshang ta jin men de shihou ???ta shiyou
yesterday night he enter door DE time he roommate
kan **zhe** dianshi
watch DUR TV
'Last night, when he entered the door, his roommate was watching TV.'

c. zuotian wanshang ta jin men de shihou *ta shiyou **dou**
yesterday night he enter door DE time he roommate all
zai kan dianshi
PRG watch TV
'Last night, when he entered the door, his roommate was watching TV.'

In (106), *entering the door* is instantaneous, that is, it occurs at an instant. *zai* is compatible with it, as in (106a). Because the temporal phrase denotes an instant, there is nothing for the distributive operator *dou* to distribute over and therefore the sentence with both *zai* and *dou* is ungrammatical, as in (106c). Since *zhe* describes the

lasting of an event over an interval, it does not go with a temporal phrase denoting an instant, as in (106b).

In (107), *dang...de na liang ge xiaoshi* ‘during the two hours when’ denotes an interval. Therefore, *zai* needs *dou* to go with it, as in (107a) and (107b), while *zhe* does not need the distributive operator to go with this temporal phrase, as in (107c).

107. a. zuotian wanshang ta **zai** zuo zhe gongke de na liang
yesterday night he PRG do DUR homework DE that two
ge xiaoshi ta shiyou **dou zai** kan dianshi
CL hour he roommate all PRG watch TV
‘Last night, during the two hours when he was doing homework,his roommate was watching TV (the whole two hours).’

b. zuotian wanshang ta **zai** zuo zhe gongke de na liang
yesterday night he PRG do DUR homework DE that two
ge xiaoshi *ta shiyou **zai** kan dianshi
CL hour he roommate PRG watch TV
‘Last night, during the two hours when he was doing homework,his roommate was watching TV (the whole two hours).’

c. zuotian wanshang ta **zai** zuo zhe gongke de na liang
yesterday night he PRG do DUR homework DE that two
ge xiaoshi, ta shiyou kan **zhe** dianshi (dou mei ting)
CL hour he roommate watch DUR TV (all no stop)
'Last night, during the two hours when he was doing
homework,his roommate was watching TV (without stop for
two whole hours).'

One interesting point about *dang...de shihou* 'at the time of, when' needs to be discussed. The clause led by this phrase seems to be ambiguous between an instant and an interval. The following examples demonstrate this ambiguity.

108. a. zuotiang wanshang dan ta **zai** zuo gongke de shihou/
yesterday night at he PRG do homework DE time
???na liang ge xiaoshi ta shiyou zai kan diangshi
that two CL hour he roommate PRG watch TV
'Last night, while/???during the two hours when he was doing
homework, his roommate was watching TV.'

b. zuotian wanshang dang ta zuo **zhe** gongke de shihou/
yesterday night at he do DUR homework DE time
na liang ge xiaoshi ta shiyou **dou zai** kan dianshi
that two CL hour he roommate all PRG watch TV
'Last night, while/during the two hours when he was doing
homework, his roommate was watching TV (all the time).'

c. zuotian wanshang dang ta **zai** zuo gongke de shihou/
yesterday night at he PRG do homework DE time
na liang ge xiaoshi, ta shiyou **dou zai** kan dianshi
that two CL hour he roommate all PRG watch TV
'Last night, while/during the two hours when he was doing homework, his roommate was watching TV (all the time).'

It has been argued that *zai* needs the distributive operator *dou* to go with an interval-denoting phrase/clause. With *zai* in the temporal clause marking the clause denoting an instant, the main clause does not need the distributive operator *dou*. For the same reason, the temporal phrase *dang... de na liang ge xiaoshi* 'during those two hours when', which denotes an interval, is not compatible with *zai*, as in (108a). On the contrary, in (108b), with *zhe* in the temporal clause marking the clause as an interval, *dou* is required for *zai* in the main clause to go with this temporal clause. For the same reason, *dang ... de na liang ge xiaoshi* 'during those two hours of when', which denotes an interval, is fine here.

(108c) needs a little bit more explanation. Though the main clause has *zai* in it, *dou* can be used in the main clause and the temporal phrase denoting an interval is also fine. This is because that a *when* clause can have a universal quantificational force, e.g. in generalizing sentences.

109. a. dang ta juede lei de shihou ta jiu chuqu zouyizou
when he feel tired DE time he then go out walk
'Whenever he feels tired, he goes out to take a walk.'

b. $\forall$ t [feel(he, tired, t) $\rightarrow$ [go_out(he, t) $\wedge$ take_a_walk(he, t)]]

(109a) is a generalizing sentence, and its meaning can be roughly represented by (109b). In this sentence, *dang...de shihou* 'when' has a universal quantificational interpretation. This is exactly what (108c) needs. That is, *dang...de shihou* is ambiguous between an existential quantificational interpretation and a universal quantificational interpretation, in addition to being ambiguous between an instant interpretation and an interval interpretation. The semantic translations of *when* and *during the two hours when* can be defined as follows.

110. a. ⟦during the two hours when⟧

$=_d \lambda P_1 \lambda P_2 \lambda e \exists i \forall t [i = 2 \text{ hours} \wedge [t \in i \rightarrow [e \bigcirc t \wedge P_1(e)] \wedge P_2(i)]$ (for *zai*)

or $=_d \lambda P_1 \lambda P_2 \lambda e \exists i [i = 2 \text{ hours} \wedge e \bigcirc i \wedge P_1(e) \wedge P_2(i)]$ (for *zhe*)

b. ⟦when⟧

$=_d \lambda P_1 \lambda P_2 \lambda e \exists i \forall t [[t \in i \rightarrow [e \bigcirc t \wedge P_1(e)] \wedge P_2(i)]$ ($\forall$ reading)

or $=_d \lambda P_1 \lambda P_2 \lambda e \exists t [e \bigcirc t \wedge P_1(e) \wedge P_2(t)]$ (instant reading)

or $=_d \lambda P_1 \lambda P_2 \lambda e \exists i [e \bigcirc i \wedge P_1(e) \wedge P_2(i)]$ (interval reading)

(110a) basically says that *dang .... de na liang ge xiaoshi* 'during the two hours when' is ambiguous. The evidence comes from the fact that *zai* does not (and cannot) require the distributive operator *dou* 'all' when it occurs in a clause led by this temporal phrase. (110b) also says that *dang* 'when' is ambiguous. This conjunction is three-way ambiguous because it can have a universal quantificational reading, in

addition to the interval reading brought out by *zhe* and the instant reading brought out by *zai*.

The semantic derivations of the examples in (107) and in (108) are presented below. One syntactic assumption adopted here is that temporal clauses are interpreted at the preverbal position since the preverbal position is the unmarked position for temporal phrases in Mandarin.

107. a'. ⟦ta **zai** zuo gongke de na liang ge xiaoshi⟧

'during the two hours when he was doing homework'

$=\lambda P\, \lambda e\, \exists i\, \forall t\, [i = \text{two hours}' \wedge [t \in i \rightarrow$

$[e \bigcirc t \wedge \text{zai}'(\text{do}'(\text{he}', \text{homework}', e))]] \wedge P(i)]$[48]

⟦ta shiyou **dou zai** kan dianshi⟧

'his roommate was watching TV all the time'

$= \lambda i\, \lambda e\, \forall t\, [t \in i \rightarrow [e \bigcirc t$

$\wedge \text{zai}'(\text{watch}'(\text{his\_roommate}', \text{TV}', e))]]$

⟦ta shiyou T **dou zai** kan dianshi⟧

'his roommate T was watching TV all the time'

$= \lambda P\, \lambda e\, \exists i\, \forall t\, [i = \text{two hours}' \wedge [t \in i \rightarrow$

$[e \bigcirc t \wedge \text{zai}'(\text{do}'(\text{he}', \text{homework}', e))]] \wedge P(i)]$

$(\lambda i\, \lambda e\, \forall t\, [t \in i \rightarrow [e \bigcirc t$

$\wedge \text{zai}'(\text{watch}'(\text{his\_roommate}', \text{TV}', e))]])$

[48] To simplify the already complex formula, *zuotian wanshang* 'last night' is omitted in the derivation.

$= \lambda e_1\ \lambda e_2\ \exists i\ \forall t_1\ \forall t_2\ [i = \text{two hours'} \wedge [t_1 \in i \rightarrow$

$[e_1 \bigcirc t_1 \wedge \text{zai'}(\text{do'}(\text{he'}, \text{homework'}, e_1))]] \wedge [t_2 \in i \rightarrow$

$[e_2 \bigcirc t_2 \wedge \text{zai'}(\text{watch'}(\text{his\_roommate'}, \text{TV'}, e_2))]]]$

Existential closure:

$\exists e_1\ \exists e_2\ i\ \forall t_1\ \forall t_2\ [i = \text{two hours'} \wedge [t_1 \in i \rightarrow$

$[e_1 \bigcirc t_1 \wedge \text{zai'}(\text{do'}(\text{he'}, \text{homework'}, e_1))]] \wedge [t_2 \in i \rightarrow$

$[e_2 \bigcirc t_2 \wedge \text{zai'}(\text{watch'}(\text{his\_roommate'}, \text{TV'}, e_2))]]]$

In the temporal clause of (107a), there is *zai* and hence the semantic translation for *zai* in (110a) is chosen. The derivation (107a') correctly captures the semantics of (107a). The progressive marker *zai* requires a distributive operator, such as *dou* 'all', to distribute over an interval the instants at which the event presented by *zai* is on-going.

Without the distributive operator, the type of temporal phrase required by *zai* mismatches the type of the temporal phrase in the sentence, which is an interval, and the derivation crashes. This is why (107b) is bad. This is shown below.

107. b'. ⟦ta **zai** zuo gongke de na liang ge xiaoshi⟧

'during the two hours when he was doing homework'

$= \lambda P\ \lambda e\ \exists i\ \forall t\ [i = \text{two hours'} \wedge [t \in i \rightarrow$

$[e \bigcirc t \wedge \text{za'i}(\text{do'}(\text{he'}, \text{homework'}, e))]] \wedge P(i)]$

⟦ta shiyou **zai** kan dianshi⟧

'his roommate was watching TV'

= λt λe [e ○ t ∧ zai'(watch'(he', TV', e))]

⟦ta shiyou **zai** kan dianshi⟧

'his roommate T was watching TV'

= λP λe ∃i ∀t [i = two hours' ∧ [t ∈ i →

[e○t ∧zai'(do'(he', homework', e))]]∧ P(i)]

(λt λx λe [e○t ∧ zai'(watch'(he', TV', e))])

= λe ∃i ∀t [i = two hours' ∧ [t ∈ i →

[e○t ∧zai'(do'(he', homework', e))]]

∧ <u>λt</u> λx λe [e○t ∧ zai'(watch'(he', TV', e))] (<u>i</u>)]

This derivation crashes because of type mismatch between λ*t* and *i*, both of which are underlined. *zai* requires an instant whereas the temporal clause denotes an interval. This also correctly captures the intuition about (107b) being unacceptable.

In (107c), the main clause has *zhe* and does not need the distributive operator *dou* 'all' to go with the temporal clause denoting a two-hour interval. Its semantic derivation is given below.

107. c'. ⟦ta **zai** zuo gongke de na liang ge xiaoshi⟧

'during the two hours when he was doing homework'

=λP λe ∃i ∀t [i = two hours' ∧ [t ∈ i →

[e○t ∧zai'(do'(he', homework', e))]]∧ P(i)]

⟦ta shiyou kan **zhe** dianshi⟧

'he was watching TV'

$= \lambda i\ \lambda e\ [e \bigcirc i \wedge zhe'(watch'(he', TV', e))]$

⟦ta shiyou T kan **zhe** dianshi⟧

'he was T watching TV'

$= \lambda P\ \lambda e\ \exists i\ \forall t\ [i = \text{two hours}' \wedge [t \in i \rightarrow$

$[e \bigcirc t \wedge zai'(do'(he', homework', e))]] \wedge P(i)]$

$(\lambda i\ \lambda e\ [e \bigcirc i \wedge zhe'(watch'(he', TV', e))])$

$= \lambda e_1\ \lambda e_2\ \exists i\ \forall t\ [i = \text{two hours}' \wedge [t \in i \rightarrow$

$[e_1 \bigcirc t \wedge zai'(do'(he', homework', e_1))]]$

$\wedge [e_2 \bigcirc i \wedge zhe'(watch'(he', TV', e_2))]]$

Existential Closure:

$\exists e_1\ \exists e_2\ \exists i\ \forall t\ [i = \text{two hours}' \wedge [t \in i \rightarrow$

$[e_1 \bigcirc t \wedge zai'(do'(he', homework', e_1))]]$

$\wedge [e_2 \bigcirc i \wedge zhe'(watch'(he', TV', e_2))]]$

As demonstrated in (107c'), the main clause does not need the distributive operator *dou* 'all' because it has the durative marker *zhe*, which is compatible with an interval. Unlike (107b'), there is no type mismatch. The semantic derivation can go through and the accurate semantics of (107b) can be derived.

The derivations demonstrated above are of the examples consisting of a temporal clause denoting an interval and a main clause with either *zai* or *zhe*. Below, the semantic derivations of examples with a temporal clause ambiguous between an instant and an interval are presented.

111. ⟦dang ta **zai** zuo gongke de shihou⟧

‘when he was doing homework’

= λPλe∃i∀t [t ∈ i → [e○t ∧ zai’(do’(he’, homework’, e) ∧ P(i))]

or = λPλe∃t [e○t ∧ zai’(do’(he’, homework’, e) ∧ P(t))]

or = λPλt∃i [λt [e○t ∧ zai’(do’(he’,homework’,e))](i)] ∧ P(i)]: crash

(110b) states that *when* is three-way ambiguous. The third derivation in (111a), which is for a *zhe* clause, clashes because of type mismatch between *i* and *t*, both of which are underlined. For a main clause with *zai* but no *dou* ‘all’, the second semantics in (111) is chosen, just like (108a). For a main clause with both *dou* and *zai*, the first semantics in (111) is chosen, as (108b). That is, when *dang...de shihou* ‘when’ contains the progresssive *zai*, it has either a universal quantificational reading, represented as the first semantic translation of (111), or an instant reading, represented as the second semantic translation of (111). It can never have a simple interval reading, represented by the third semantic translation of (111).

The semantic derivation of (108a) is given below. The main clause in (108a) does not have the distributive operator *dou* ‘all’. Therefore, (108a) describes two events on-going at the same time (instant).

108. a’. ⟦ta shiyou **zai** kan dianshi⟧

‘his roommate was watching TV’

= λt λe [e ○ t ∧ zai’(watch’(he’, TV’, e))]

⟦ta shiyou T **zai** kan dianshi⟧

'his roommate T was watching TV'

$= \lambda P\, \lambda e\, \exists t\, [e \bigcirc t \wedge zai'(do'(he', homework', e) \wedge P(t))]$

$(\lambda t\, \lambda e\, [e \bigcirc t \wedge zai'(watch'(he', TV', e))])$

$= \lambda e_1\, \lambda e_2\, \exists t\, [e_1 \bigcirc t \wedge zai'(do'(he', homework', e_1) \wedge [e_2 \bigcirc t$

$\wedge zai'(watch'(he', TV', e_2))]]$

Existential closure:

$\exists e_1\, \exists e_2\, \exists t\, [e_1 \bigcirc t \wedge zai'(watch'(he', TV', e_1) \wedge [e_2 \bigcirc t$

$\wedge zai'(watch'(he', TV', e_2))]]$

The semantic derivation in (108a') accurately captures the semantics of (108a), which describes two events taking place simultaneously. This is done by both e_1 and e_2 overlapping the same instant *t*.

The semantic derivation of (108b) is presented below. In this example, the *when* clause has *zhe*, which indicates that the clause has an interval interpretation. Therefore, the first semantic translation of *when* in (110) is chosen.

108. b'. ⟦ta zuo **zhe** gongke de shihou⟧

'when he was doing homework'

$= \lambda P \lambda e \exists i \forall t [t \in i \rightarrow [e \bigcirc t \wedge zhe'(do'(he', homework', e) \wedge P(i))]$

⟦ta shiyou **dou zai** kan dianshi⟧

'his roommate was watching TV all the time'

$= \lambda i\, \lambda e\, \forall t\, [t \in i \rightarrow [e \bigcirc t$

$\wedge$ zai'(watch'(his_roommate', TV', e))]]

⟦ta shiyou T **dou zai** kan dianshi⟧

'his roommate was T watching TV all the time'

$= \lambda P \lambda e \exists i \forall t [t \in i \rightarrow [e \bigcirc t \wedge zai'(do'(he', homework', e) \wedge P(i))]$

$(\lambda i \lambda e \forall t [t \in i \rightarrow [e \bigcirc t \wedge zai'(watch'(his\_roommate', TV', e))]])$

$= \lambda e_1\, \lambda e_2\, \exists i\, \forall t_1\, \forall t_2\, [t_1 \in i \rightarrow [e_1 \bigcirc t \wedge$

zai'(do'(he',homework',e_1)) $\wedge$ $t_2 \in i \rightarrow [e_2 \bigcirc t \wedge$

zai'(watch'(his_roommate', TV', e_2))]]]

Existential closure:

$\exists e_1\, \exists e_2\, \exists i\, \forall t_1\, \forall t_2\, [t_1 \in i \rightarrow [e_1 \bigcirc t \wedge zai'(do'(he', homework', e_1))$

$\wedge\, t_2 \in i \rightarrow [e_2 \bigcirc t \wedge zai'(watch'(his\_roommate', TV', e_2))]]]$

The durative marker *zhe* brings out the interval reading of the *when* clause. Since the *when* clause has an interval reading, the main clause which has the progressive marker *zai* requires the distributive operator *dou* 'all'. (108b') correctly captures the semantics of (108b).

The semantics of (108c) is derived below. The main clause of (108c) has both *dou* 'all' and *zai* and hence the first semantic translation of *when* in (111) is chosen.

108. c'. ⟦ta shiyou **dou zai** kan dianshi⟧

'his roommate was watching TV all the time'

$= \lambda i\ \lambda e\ \forall t\ [t \in i \rightarrow [e \bigcirc t$

$\wedge$ zai'(watch'(his_roommate', TV', e))]]

⟦ta shiyou T **dou zai** kan dianshi⟧

'his roommate T was watching TV all the time'

$= \lambda P\ \lambda e\ \exists i\ \forall t\ [t \in i \rightarrow [e \bigcirc t \wedge$ zai'(do'(he', homework', e))

$\wedge$ P(i))]

$(\lambda i\ \lambda e\ \forall t\ [t \in i \rightarrow [e \bigcirc t$

$\wedge$ zai'(watch'(his_roommate', TV', e))]])

$= \lambda e_1\ \lambda e_2\ \exists i\ \forall t_1\ \forall t_2\ [t_1 \in i \rightarrow [e_1 \bigcirc t_1$

$\wedge$ zai'(do'(he', homework', e)) $\wedge$ $[t_2 \in i \rightarrow [e_2 \bigcirc t_2 \wedge$

zai'(watch'(his_roommate', TV', e_2))]])

Existential Closure:

$\exists e_1\ \exists e_2\ \exists i\ \forall t_1\ \forall t_2\ [t_1 \in i \rightarrow [e_1 \bigcirc t_1$

$\wedge$ zai'(do'(he', homework', e)) $\wedge$ $[t_2 \in i \rightarrow [e_2 \bigcirc t_2 \wedge$

zai'(watch'(his_roommate', TV', e_2))]])

The semantic derivation in (108c') also correctly captures the semantics of (108). The event times of both events presented by *zai* are distributed over a longer period of time denoted by the *when* clause. This explains why a main clause with *zai* can have the distributive operator *dou* 'all' even though it is also a *zai* clause in the *when* clause.

4.3.3 Interaction between Activity and *zhe*

4.3.3.1 Non-homogeneous Activity

In the previous section, it is established that *zhe* presents an event/eventuality lasting over an interval while *zai* presents an event ongoing at an instant. Their compositional semantics are proposed. The semantics of acceptable sentences can be derived and unacceptable sentences can be blocked out in the semantic derivations. This section deals with the interaction between *zhe* and activity.

While *zhe* can go with stage-level state predicates, as proposed in Yeh (1993a), it has three different kinds of interaction with activity. First, some classes of activity can go alone with *zhe*. Secondly, some classes of activity needs an adverbial of manner, such as *happily, tightly,* etc., or an interval-denoting adverbial, such as *the whole night, quickly*, etc., to go with *zhe* when a clause with this kind of activity stands alone without a context. Thirdly, for the same kind of activity in the second point, if they occur in a clause serving as a temporal background, then they do not need any anything to go with *zhe* alone. That is, pragmatics also influences the grammaticality of activity + *zhe*. The pertinent examples are presented below.

112. a. xuezhe shequ de chengyuan banyan **zhe** xuanze
scholar community DE member play DUR choose
xin sixiang muolian xin linian de guanjian jiaose
new idea polish new idea DE key role
'The members of a scholar community are/were playing the key role of choosing new ideas and polishing new ideas.'

b. da yu xia **zhe**

big rain fall DUR

'It is/was raining heavily.'

The activity predicates[49] in (112) can go with *zhe* alone. Activity predicates that can go alone with *zhe* include: *mosuo* 'to search and explore', *bao* 'to hug', *bianshi* 'to distinguish', *ai* 'to love', *qidai* 'to look forward', *ding* 'to stare', *na* 'to hold', etc.

The examples below contain activity predicates that cannot go with *zhe* alone. They either require an adverbial of manner, as in (114b) and (115b), or an interval-denoting adverbial as in (114a) and (115a). Otherwise, they will have to serve as a temporal background for another event, as in (116).

113. a. [I]ta qi **zhe** jiaotache

he ride DUR bike

'He is riding a bike, ...'

b. [I]ta kan **zhe** shu

he read DUR book

'He is reading a book.....'

[49] In Mandarin, state is distinguished from activity by the fact that the progressive marker *zai* goes with activity, but not with state. In Mandarin, state and activity have the same behavior with respect to other tests for activity, such as the compatibility with a durational phrase such as *for three days*, and the incompatibility with a completive adverbial such as *in five hours*.

114. a. ta **zheng tian** qi **zhe** jiaotache

he whole day ride DUR bike

'He is/was riding a bike the whole day.'

b. ta **gaoxingde** qi **zhe** jiaotache

he happily ride DUR bike

'He is/was riding a bike happily.'

115. a. ta **zheng wan** kan **zhe** shu

he whole night read DUR book

'He is/was reading the whole night.'

b. ta **zhuanxinde** kan **zhe** shu

he with full attention read DUR book

'He is/was reading with full attention.'

(He is/was concentrating on reading.)

For a clause with *zhe*, there are two ways for it to serve as a temporal background. The first is the V_1 *zhe* V_2 construction. This is a special construction for the durative marker *zhe* only. The V_1 *zhe* part serves as a temporal background and behaves like an adverbial of manner for the V_2. This construction is demonstrated in (116a) and (117a). The other way is for *zhe* to occur in a temporal clause, as in (116b) and (117b).

116. a. ta qi **zhe** jiaotache shangxue

he ride DUR bike go to school

'He goes/went to school, riding a bike.'

b. zuotian zaoshang dang ta qi **zhe** jiaotache de shihou
yesterday morning when he ride DUR bike DE time
ta jiejie **dou** **zai** nianshu
he sister all PRG study
'Yesterday morning, when he was riding a bike, his sister was tudying.'

117. a. ta ku **zhe** pao chuqu
he cry DUR run out
'He ran out, crying.'

b. ta zhou **zhe** meitou zhang qilai
he frown DUR eyebrows stand up
'He stood up, with his eyebrows frowned.'

The activity predicates which cannot go with *zhe* when it stands alone or when it is not in a clause serving as a temporal background include: *wo* 'to hold (a phone)', *chongji* 'to impact ', *jinzhan* 'to progress', *xiang* 'to think about, to think of', *zou* 'to walk', *xunzhao* 'to look for', *qi* 'to ride (a bike)', *yao* 'to bite', *pao* 'to run, to jog', *ting* 'to listen to', *kan* 'to read, to see (a movie), to watch (TV)', *xiajiang* 'to lower (altitude)', *hui* 'to wave (one's hand, a flag), etc.

Little, if any, literature on the durative marker *zhe* has discussed the interaction between *zhe* and different classes of activity predicates. But, in the related literature, it is accepted that *zhe* goes with a homogeneous predicate since it can go with stage-level state predicates. Activity is generally assumed to be homogeneous.

Therefore, the most likely candidate that can tell apart the two classes of activity predicates presented above seems to be homogeneity.

A close examination of the activity predicates that cannot go with *zhe* alone reveals that these predicates involve more obvious (explicit) internal process, and/or more obvious repeated actions. In addition to those predicates which obviously contain repeated actions and internal process, such as *qi jiaotache* 'to ride a bike', *paobu* 'to jog, to run', *zou* 'to walk', *jinzhan* 'to progress', etc., other predicates have near-synonyms that involve (much) less obvious repeated actions and/or less internal process. These near-synonym pairs are presented below.

118. a. ???ta **kan** zhe shu fadai
he read DUR book appear absent-minded
b. ta **ding** zhe shu fadai
he stare DUR book appear absent-minded
'He was absent-minded, staring at the book.'

Though *kan* and *ding* both involve *looking at something*, yet *kan* involves more volitional attention of its subject and repeated actions, such as *turning pages* in *kan shu* 'to read a book'. Therefore, it cannot serve as an adverbial of manner for *fadai* 'to appear absent-minded' because *fadai* 'to appear absent-minded' is state describing a personal being motionless and not paying attention. On the contrary, *ding* does not require attention from its subject. Nor does it involve obvious repeated actions. Hence, it can serve as an adverbial of manner for *fadai* 'to appear absent-minded'. This pair of near-synonyms shows that *kan* involves process and repeated actions than *ding*.

And, *kan* cannot go with *zhe* alone while *ding* can.

The second pair of near-synonyms is *wo* ‘to hold (in one’s hand)’ and *na* ‘to hold (in one’s hand)’. The difference between these two verbs of *holding* is that *wo* involves the movement of fingers, but *na* does not. That is, to use *wo*, the agent must move his/her fingers to hold something. But, to use *na*, the movement of fingers is not required. This distinction suggests that *wo* involves process and repeated actions but *na* does not. And, *wo* cannot go with *zhe* alone, but *na* can.

The third pair of near-synonyms is *mosuo* ‘to search and explore’ and *xunzhao* ‘to look for’. The difference between these two predicates is that *mosuo* is to search and explore in an abstract way while *xunzhao* is to look for something in a physical way. This contrast is shown below.

119. a. * ta daochu mosuo
he everywhere search and explore
b. ta daochu xunzhao zhen ai/yaoshi
he everywhere look for real love/key
‘He looked everywhere for real love/keys.’

One point worth mentioning is that *mosuo* is intransitive and *xunzhao* is transitive. The adverb *daochu* ‘everywhere’ involves moving around, i.e. more (repeated) actions. It does not go with *mosuo*, as shown in (119a). But, it goes with *xunzhao*, as in (119b). This difference does not lie in that *mosuo* is to search for and to explore abstract things but *xunzhao* is to look for concrete objects. As shown in (119b), it can be either an abstract thing, *zhen ai* ‘real love’, or a concrete object,

yaoshi ‘key’, that are looked for. Therefore, the grammatical difference between (119a) and (119b) lies in the distinction that *xunzhao* involves more process and more (repeated) actions while *mosuo* does not.

The fourth pair of near-synonyms is *ting* ‘to listen to’ and *tingdao* ‘to hear’. The former involves volitional attention from its subject while the later does not. This can be shown by the fact that *ting* can occur in an imperative sentence but *tindao* cannot.

120. a. ting mama de hua
listen Mom DE words
‘Obey Mom. (Lit. Listen to Mom’s words)’.

b. *tingdao mama de hua
hear Mom DE words

This is very similar to the distinction between *kan* ‘to see (a movie), to read (a book)’ and *ding* ‘to stare’. That is, *ting* requires more volitional, active attention from its subject while *tingdao* is a passive perception. It seems that volitional active attention involves more process than a passive perception.

If the assumption is accurate that volitional active attention qualifies as involving more internal process, then *xiang* ‘to think about, to think of’ also involves more internal process because, just like *kan* and *ting*, *xiang* also requires volitional active attention from its subject.

chongji ‘to impact’ also involves repeated actions. This action meaning comes from *chong* ‘to rush to’. The repetition of actions can be explicitly brought out by phrases such as *chixude* ‘continuously’ though without it a sentence with *chongji* ‘to

impact' does not really have any semantic difference. For example,

121. da lang (chixude) chongji youyong de ren
big wave (continuously) impact swim DE person
'Big (tidal) waves (continuously) impacted swimmers.'

In sum, those activity predicates that can go with *zhe* alone do not involve repeated actions and have less obvious internal process[50]. Those activity predicates that cannot go with *zhe* alone involve repeated actions, or volitional active attention, that is, more internal process. Therefore, the activity predicates that can go with *zhe* alone are more 'homogeneous', i.e. not involving repeated actions and having less (obvious) internal process. On the other hand, those which cannot go with *zhe* alone are less 'homogeneous', that is, they contain more internal process and/or consist of repeated actions.

4.3.3.2 Bringing Out Homogeneity

Recall that there are three ways to render those activity predicates compatible with *zhe*: going with an interval-denoting adverbial, going with an adverbial of manner, and occurring in a clause serving as a temporal background. How they coerce a non-homogeneous activity predicate to a homogeneous one is discussed below.

For those 'more homogeneous' activity predicates, every part of a predicate of this kind, however small, has the property of the whole predicate. But, for those 'less homogeneous' activity predicates, which denote properties involving repeated actions

[50] Note that here it is about how an event is encoded linguistically, not about how an event actually is. In the real world, few, if any, activity events have no process. The examples discussed above are those activity events which are linguistically encoded as 'with less internal process'.

and/or process, a too small temporal slice of such process fails to posess the same kind of property as a larger temporal part. As Dowty (1979: 168) suggests, if α is an activity verb, then α(x) is true at an interval *I*, iff there is some physically definable property *P* such that the individual denoted by *x* lacks *P* at the lower bound of *I* and has *P* at the upper bound of *I*. Interval-denoting adverbials function to combine with the property *P* of a 'less homogeneous' activity predicate, which a too small part of the predicate cannot possess, and ensure that a larger temporal part is considered.

Adverbials of manner can also bring out the homogeneity of activity predicates with more internal process and/or repeated actions. Basically, an adverbial of manner lumps together the subevents of a non-homogeneous activity predicate, eliminates the distinction between the subevents, and distributes the property denoted by the adverbial over the lumped-together subevents, which provides the subinterval property. The detailed process is presented below.

Some activity predicates contain more internal process than others. For those activities with more internal process, they have a 'homogeneous' counterpart, which can be brought out by adverbials of manner (and, of course, by interval-denoting adverbials). This distinction can be represented as in (122).

122. $\forall e\ ((adv(activity(e)) \wedge \neg homo(e)) \rightarrow \exists e'(homo(e') \wedge e' \approx e \wedge adv(activity(e'))))$ where $e' \approx e$ means that *e'* is similar to *e* except for homogeneity.

Suppose that an event consists of subevents. Then accomplishment and activity

with more internal process can be represented as a series of subevents with (more or less) clear boundary, as shown below.

123. accomplishment: e_1-e_2-e_3-e_4.....- change of state

activity: e_1-e_2-e_3-e_1-e_2-e_3.....-e_1-e_2-e_3.....

What adverbials of manner do is to lump together those subevents, to eliminate the boundaries of those subevents, and to distribute the property denoted by the adverbials over this big lump. The difference between the original subevents and the lumped-together subevents is that the distinction and boundaries between the lumped-together subevents are masked (or elminated) by the adverbials. This process can be represented as:

122. a. accomplishment: ADV(homo(e_1+e_2+.....+ change of state))

b. activity: ADV(homo(e_1+e_2+e_3+e_1+e_2+e_3.....+e_1+e_2+e_3.....))

Accomplishment cannot be rendered homogeneous because it contains change of status, and then a resultative state begins. The resultative state of accomplishment is not predicated by an adverbial of manner. This is supported by the fact that (125) describes that the process of building this house is happy, but not a happy resultative state because happiness could not be overridden if it were extended to the resultative state.

125. ta gaoxingde gai le zhe dong fangzi zhihou jiu hen nanguo

he happily build PFV this CL house after then very sad

‘He built this house happily, but he was very sad afterwards.’

But, an adverbial of manner can distribute its property over all of the

lumped-together subevents of activity, and this can bring out the subinterval property. That is, $\forall e \in_+ (adv(homo(activity))) \rightarrow adv(e)$ where $\in_+$ is a membership relation in terms of +. Note that subevents connected together by + are lumped together and do not have an explicit distinction/boundary between them. Therefore, any part of adv(homo(activity)) has the property denoted by the adverbial.

The semantics of an adverbial of manner can be defined as:

126. $Adv\_of\_manner(P) = \lambda P\, \lambda x\, \lambda e'\, \exists e\, [P(x, e) \wedge adv(e) \wedge activity(e) \wedge e' \approx e \wedge P(x, e') \wedge homo(e')]$

This definition closes the event argument *e* of an activity predicate and replaces it with its homogeneous counterpart *e'* so that a non-homogeneous predicate is coerced and becomes homogeneous after the adjunction of an adverbial of manner to it. The derivation is demonstrated below:

127. $[\![\text{ride a bike}]\!] = \lambda x\, \lambda e\, \exists y\, [bike(y) \wedge ride(x, y, e) \wedge activity(e) \wedge \neg homo(e)]$

$[\![\text{happily ride a bike}]\!]$

$= \lambda P\, \lambda x\, \lambda e'\, \exists e\, [P(x, e) \wedge adv(e) \wedge e' \approx e \wedge P(x, e') \wedge homo(e')]$

$(\lambda x\, \lambda e\, \exists y\, [bike(y) \wedge ride(x, y, e) \wedge activity(e) \wedge \neg homo(e)])$

$= \lambda x\, \lambda e'\, \exists e\, \exists y\, [bike(y) \wedge ride(x, y, e) \wedge activity(e) \wedge \neg home(e) \wedge e' \approx e \wedge ride(x, y, e') \wedge homo(e')]$

Pragmatic information, such as rhetorical relations, can also influence the grammaticality of activity + *zhe*.

128. a. [I]ta qi **zhe** jiaotache

he ride DUR bike

'He was riding a bike, ...'

b. ta qi **zhe** jiaotache shangxue

he ride DUR bike go to school

'He went/goes to school, riding a bike.'

c. zuotian zaoshang dan ta qi **zhe** jiaotache de shihou

yesterday morning when he ride DUR bike DE time

ta jiejie **dou** **zai** nianshu

he sister all PRG study

'Yesterday morning, when he was riding a bike, his sister was studying.'

As noted in Yeh (1993a), (128a) alone is not complete. *qi zhe jiaotache* 'ride DUR bike' has to be either the V_1 in the V_1 *zhe* V_2 construction as in (128b) or in a *when* clause as in (128c). It is argued that *qi jiaotache* 'to ride a bike' is an activity predicate involving more internal process and is not homogeneous. Therefore, it requires an adverbial of manner that can bring out its homogeneity to go with *zhe*. But, in (128b) and (128c), though there is no phrase to bring out the homogeneity of the predicate, these two sentences are still good. These two sentences share one feature: the event presented by *zhe* serves as a temporal background for a main event. In (128b) the V_1 in the V_1 *zhe* V_2 construction serves as a temporal background for the V_2. In (128c) the *when* clause also serves as a temporal background for the main

event. A temporal background tends to be homogeneous (cf. Asher and Lascarides 2003: 207). That is, pragmatic function of an event presented by *zhe* can also help the predicate pass the homogeneity checkpoint.

That is, checking for homogeneity cannot be done at the VP level only since the pragmatic function, which is usually associated with a complete clause rather than with a VP, can help an activity event pass the check too. Therefore, the durative marker *zhe* requires checking for homogeneity at the highest level of a clause, i.e. CP. Checking for homogeneity required by *zhe* is not done at the AspP. Instead, it is delayed until the highest level of a clause. If a clause contains both a non-homogeneous activity predicate and *zhe*, then the grammaticality of the clause depends on whether it is connected to another and serves as a temporal background.

The generalization of the pragmatic influence on activity + *zhe* can be stated as in (129a) and represented as the axiom in (129b):

129. a. *zhe* is fine, standing alone, if it occurs in a temporal background for a main event.

b. $\text{Background}_T(\pi, \pi') \rightarrow \text{homo}(\text{event}(\pi'))$

c. $\forall e ((\text{Background}_T(\pi, \pi') \wedge \pi': \varphi \wedge \text{event}(\pi') = e \wedge \neg\text{homo}(e)) \rightarrow \exists e' (e \approx e' \wedge \text{homo}(e') \wedge \varphi(e')))$

Axiom (129b) says that the event denoted by $K_{\pi'}$ must be homogeneous if π' is the background of π. Axiom (129c) basically says that the event denoted by $K_{\pi'}$ can be coerced to become homogeneous if π' serves as a temporal background.

4.3.4 Semanticsof *zhe* and the Hypothesis for Its Role in Temporal Progression

Based on the above discussion on the aspectual properties of *zhe*, its semantics can be revised as in (130).

130. ⟦zhe(φ)⟧ = 1 at <*I*, *w*> iff for some interval *I'* such that $I \subset I'$ and ⟦φ⟧ = 1 at < *I'*, *w*>, where *I* does not include a SigP with nothing following it, and φ is homogeneous.

In sum, *zhe* has to go with a homogeneous predicate, that is, state and activity. In Mandarin, some activity predicates include in their semantics internal process and/or repeated actions, and are not homogeneous. An interval-denoting adverbial or an adverbial of manner can bring out the homogeneity in these activity predicates and make them grammatical with *zhe*. Pragmatic function helps too. If *zhe* stands alone with a non-homogeneous activity predicate in a clause, the clause can be rendered grammatical if it serves as a temporal background.

The durative marker *zhe* is different from the progressive marker *zai* in that the former presents a homogeneous event/eventuality lasting over an interval while the latter presents an event on-going at an instant. Since *zhe* is compatible with state and activity only, neither of which has a natural final endpoint, the Imperfective Paradox, which is about whether an on-going event will reach its natural final endpoint, is not a problem for the durative marker *zhe*. That is to say, the lasting of a homogeneous state/activity presented by *zhe* can be terminated without causing any paradox. Based on the properties of *zhe* discussed in this section, a hypothesis for the role of *zhe* in

temporal progression can be proposed as follows.

131. Hypothesis for the role of *zhe* in temporal progression:

The event time of a clause with the durative marker *zhe* can be advanced, but the advancement of the event time is not determined by the aspect marker itself, but by some embedded phrase denoting termination/completion of action.

4.4 The Role of the Durative Marker *zhe* in Temporal Progression

In this section, the hypothesis (131) is tested against the examples retrieved from the Sinica Corpus. Four genres are examined. They are Commentary, Report, Fiction and Personal Essay. The results are summarized below.

(a) Two constructions requiring *zhe* are observed in the Sinica Corpus, and they outnumber the examples of all rhetorical relations, except *Background*$_T$. The two constructions are: V_1 *zhe* V_2 and locative inversion. In these two constructions, *zhe* is required and it does not directly influence the rhetorical relation between one of the two constructions and another clause.

(b) The locative inversion construction is one kind of presentative sentences discussed in Li and Thompson (1981: 510-516). Its function is to introduce a new NP into the discourse or context. Given this function, a locative inversion clause is often connected to another clause by *Elaboration*, i.e. a clause following a locative inversion clause often elaborates the NP presented by the locative inversion clause.

(c) *Background*$_T$, *Elaboration*, and *Narration* are the only three rhetorical

relations, found in the Sinica Corpus, that do not require any indicator, syntactic or structural, to spell out the rhetorical relations.

(d) A clause with *zhe* can be connected to its adjacent clause by *Narration*. It can be either that the clause with *zhe* narrates its preceding clause, just like the examples of *Narration* for the progressive marker *zai*, or that the clause following a *zhe* clause narrates the *zhe* clause, which is impossible for a clause with *zai*.

(e) Some prepositions or verbs require *zhe* to make them grammatical, and therefore *zhe* in a clause with one of these prepositions or one of these verbs does not influence the rhetorical relation between the *zhe* clause with it and another clause.

(f) Other rhetorical relations that can connect a *zhe* clause to its adjacent clause(s) include *Explanation*, *Parallel*, *Contrast*, *Result*, etc. All of the examples of these rhetorical relations found in the Sinica Corpus have indicators that spell out these rhetorical relations.

(g) There are examples where *zhe* occurs in embedded clauses, such as relative clause or clausal complements. In those examples, *zhe* does not directly interact with the timeline of the story and has little, if any, influence on the rhetorical relations connecting together the clause with *zhe* and another one.

(h) Genres do not seem to influence whether rhetorical relations can appear or not, except for *Narration*, which occurs in Fiction and Report only. That should be because both Fiction and Report are about events, i.e. what

happens, how it happens, etc, and hence are more ‘narrative’.

Again, before the statistics of *zhe* examined is given, the notation used in Table V should be explained first. The column *context* is for the examples where the clauses with *zhe* have the potential to be connected to their adjacent clauses with rhetorical relations. On the contrary, the column *isolated* is for those examples where *zhe* occurs in an embedded clause or is requied by some prepositions or verbs, and does not directly interact with the main timeline of a text. This part is just like Table III in Chapter Three. The special point about Table V is that the two syntactic constructions requiring *zhe* are identified independently of the examples of rhetorical relations, regardless of which rhetorical relation connects them to other clauses. Take Personal Essay as an example. In the texts of Personal Essay, 69 V_1 *zhe* V_2 clauses and 10 locative inversion clauses are found. These examples are not included in the examples of rhetorical relations.

Since the two syntactic contructions are identified independently, the number of examples that are examined for rhetorical relations is the number of *context* minus the sum of the number of V_1 *zhe* V_2 and the number of locative inversion.

The column *related* is for those examples where the clauses with *zhe* are connected to their adjacent clauses by rhetorical relations. On the other hand, the column *unrelated* is for the examples where the clauses with *zhe* are not connected to their adjacent clauses by rhetorical relations.

Take Personal Essay as an example again. The number of *context* minus the sum of the number of V_1 *zhe* V_2 and the number of locative inversion is 46. This

means that 46 clauses with *zhe* are found, which have the pontential to be connected to their adjacent clauses by rhetorical relations. Since each clause can be connected to either its preceding clause or it following one, 46 clauses have 92 possible scenarios. 62 of the 92 scenarios are actually rhetorical relations that connect the clauses with *zhe* to other clauses. 30 of the 92 scenarios are those where the clauses with *zhe* are not connected to other clauses by any rhetorical relation. The sum of the number of the examples of all rhetorical relations equal the number of *related*.

The statistics of *zhe* examined is given below.

Table V: The Distribution of *ZHE* Examined

	context	isolated	related	unrelated
Personal Essay	125	73	62	30
Fiction	259	119	170	84
Report	216	47	104	52
Commentary	64	35	38	18
Total	664	274	374	184

Table V (Continued)

	V_1 zhe V_2	loc. inv.	Background	Elaboration[51]	
				reg.	loc.
Personal Essay	69	10	29	0	0
Fiction	97	35	77	10	14
Report	80	58	54	16	36
Commentary	30	6	22	6	5
Total	271	109	190	32	55

[51] In this column, loc. represents a locative inversion clause being elaborated by another clause, and reg. refers to a regular (i.e. non-locative inversion) clause being elaborated by another one.

Table V (Continued)

	Narration	others	required	embedded
Personal Essay	0	33	40	23
Fiction	7	76	73	57
Report	4	30	34	24
Commentary	0	10	27	10
Total	11	149	174	131

Table VI: Percentage of *ZHE* in the Sinica Corpus Examined

	total number examined	total number in the Sinica Corpus	Percentage
Personal Essay	198	1957	10.11%
Fiction	378	3608	10.47%
Report	263	3641	7.22%
Commentary	99	640	15.47%
Total	938	9846	9.52%

4.4.1 V_1 *zhe* V_2

In this construction, the verb marked by *zhe* is not the main verb in a clause, and hence does not directly interact with the main timeline of a story, just like *zai* in an embedded clause. Besides, it does not have influence on the rhetorical relation connecting together the clause with *zhe* and another clause.

However, as discussed in Section 4.3, the V_1 *zhe* in the V_1 *zhe* V_2 construction provides a temporal frame when the V_2 takes place, and also serves as a manner adverbial to describe how the V_2 takes place. That is, though restricted in the clausal domain, *zhe* in this construction still marks one event as a temporal background for another one, just as Hopper (1979) observes about the imperfective apsect. The following examples can demonstrate the discussion above.

132. a. na hanzi quanqu **zhe** wo zai di shang
that man curl DUR lie at ground on
'That man lied on the ground, with his body curled.'

b. yi dong yie bu dong
one move also no move
'He didn't move at all.'

c. sihu yijing si le
seem already die Prc
'He seemed to be already dead.'

There is a zero anaphor in (132b) and (132c), whose antecedent is the subject *na hanzi* 'that man' in (132a). All of the three clauses are a step-by-step observation of the status of that man. They have parallel function, and hence are most likely connected to each other by *Parallel*. In (132a), the pragmatic function of *quanchu zhe* 'curl DUR' is restricted in this clause, i.e. it serves as a temporal frame and a manner adverbial only for the main verb *wo* 'to lie on one's back' in the clause. Removing the V_1 *zhe* part of this clause does not affect the rhetorical relation that connects these clauses together. This suggests that the *zhe* in this example has no bearing on the determination of which rhetorical relation connects these clauses together.

133. a. ta liuluo dao jiangxi yi chu shangou li
he be forced to wander to Jiangxi one CL coomb inside
'He was forced to wander into a coomb in Jianxi.'

b. gei ren da duan gong mousheng

for person do temporary work make a living

'He made a living by doing temporary work for people there.'

c. ji nian hou dai **zhe** laopo haizi huilai

several year later bring DUR wife children come back

'Several years later, he came back with his wife and children.'

d. faxian liang wei xongdi zao yi esi le

find two CL brother early already hungry-die Prc

'He found that the two brothers of his had starved to death long time ago.'

In this example, (133c) narrates (133b) and the indicator is the temporal phrase *ji nian hou* 'several years later'. However, *dai zhe laopuo haizi* 'bring DUR wife children' does not advance the narrative time. It is the main verb *huilai* 'to come back' that advances the narrative time. The evidence is that removing the V_1 *zhe* part does not affect the coherence of the context. If the V_1 *zhe* part advanced the narrative time, it would render the context incoherent to remove the part. However, if the part is removed, except losing the information that he came back with his wife and children, nothing is really affected. The clause itself is still grammatical and the context is still coherent. That is, the V_1 *zhe* part serves only as a temporal frame and a manner adverbial for the main verb in the clause, and its function is restricted in the local clause where *zhe* exists.

In sum, in the V_1 *zhe* V_2 construction, *zhe* is required to present an activity verb

as a temporal frame and as an adverbial of manner for the main verb V_2. In this construction, the durative marker *zhe* does not affect which rhetorical relation can connect the clause with it to another clause. Though *zhe* still behaves as an imperfective aspect marker and presents an event as a temporal background, its function is limited in the local clause where it appears.

4.4.2 Locative Inversion

The locative inversion construction is also a construction that requires the durative marker *zhe*[52]. That is, *zhe* in this construction does not directly affect the rhetorical relation between a locative inversion clause and another clause. The locative inversion construction is categorized as one kind of presentative sentences discussed by Li and Thompson (1981: 510-516).

Li and Thompson (1981: 509) define a presentative sentence as a sentence that "performs the function of introducing into a discourse a noun phrase naming an entity." When a new NP is introduced into a discourse, it is usually the case that the newly introduced NP will be commented on and elaborated. This point is borne out by the data examined. As shown in Table V, the examples of *Elaboration* of locative inversion clauses are almost half of the examples of locative inversion. The following examples demonstrate this preference of locative inversion clauses.

[52] As a matter of fact, either the perfective marker *le* or the durative marker *zhe* is required by the locative inversion construction. Part of Lin (2002a) discusses this issue. Pan (1996) also discusses this issue. For a description of the locative inversion construction in Mandarin, please refer to Li and Thompson (1981: 510-516).

134. a. dingtong yi xie yan

Ding Tong one tilt eye

'Ding Tong looked aside.'

b. zhi jian xiao wu zhihou xi **zhe** yi pi gao tou bai

only see small house behind tie DUR one CL high head white

ma

horse

'He saw that there was a tall white horse tied behind the small house.'

c. jian tui chang zong

strong leg long mane

'It had strong legs and long mane.'

d. zheng shi bai ma li san de zuoqi

exactly be white horse Li San DE horse

'It was exactly Li San the White Horse's[53] horse.'

135. a. ta dakai damen

she open door

'She opened the door.'

[53] Li San was the name of a person and White Horse was his nickname because of the while horse he rode.

b. xiang gan le yangqun chuqu fangmu

want drive PFV sheep herd out shepherd

'She wanted to drive out the sheep herd to shepherd them.'

c. zhi jian men wai fang **zhe** yi zhang da lang pi

only see door outside put DUR one CL big wolf skin

'She saw that there was a big wolf skin put outside the door.'

d. zuocheng le dianzi de moyang

make-as PFV mat DE appearance

'The big wolf skin was made into a mat.'

In (134), (134b) is a locative inversion clause, which introduces a white horse into the discourse. (134c) and (134d), respectively, give more details about the white horse. (134c) describes the white horse and (134d) indicates the owner of the white horse.

The same hints for *Elaboration* can be observed in (135). (135c) is a locative inversion clause, which introduces into the context a wolf skin found outside the door. (135d) gives one detail about the wolf skin, that is, it was made into a mat.

The other examples of *Elaboration* of locative inversion are just like the two discussed above. One thing to note is that though *zhe* is required by the locative inversion construction, this aspect marker has no bearing on what rhetorical relation can connect a locative inversion clause to another clause. The fact that the majority of the examples of locative inversion are *Elaboration* is not due to the aspectual property of *zhe* but due to the pragmatic function of the locative inversion construction itself.

In addition to *Elaboration*, a locative inversion clause can be connected to another clause by other rhetorical relations, such as *Parallel*, *Contrast*, *Background*$_{T}$, etc. The following examples demonstrate this point.

136. a. shen shang liu **zhe** yi mei gui zhen
body on be left DUR one CL ghost needle
'A damned needle was left inside my body.'

b. zhe shier nian lai mei tian zong yao da tong
this twelve year come every day always will big hurt
liang san ci
two three times
'In these twelve years, every day, it always caused me huge pain twice or three times.'

c. zao zhi ruci
early know so
'If I had known it would be like this,'

d. haishi bu fu jieyao de hao
would rather not take antagonistic DE good
'I would rather not have taken the antagonistic.'

In this example, (136a) is a locative inversion clause. It introduces a needle into the discourse. But, the clauses following it do not elaborate the needle. Instead, (136a) serves as a temporal background. That is, during the period of the time when the needle was inside that man's body, (136b), (136c) and (136d) happen. Here, the

rhetorical relation between these clauses is *Background*$_T$.

Note that there is no indicator to spell out the rhetorical relation either in the examples of *Elaboration* or in the example of *Background*$_T$. In Chapter Three, it is argued that *Elaboration* requires semantic subordination between the lexical entries in the clauses connected together by *Elaboration*. (134) and (133) manifest this property. (134c) and (134d) are obviously the properties that a white horse can have. In (135d), a mat is one of the products a wolf skin can be made into. The semantic subordination property in these two examples determines that these clauses are connected together by *Elaboration*.

(136) does not have this property. After the needle is introduced into the discourse, the speaker starts talking about his pain caused by the needle and his regrets about having taken the antagonistic. Since there is nothing here to specify the rhetorical relation, and since the durative marker *zhe* defeasibly indicates that *Background*$_T$ connects these clauses together, it can be concluded that (136a) serves as a temporal background for the clauses following it. This conclusion matches native speaker's intuition about this context.

137. a. liang ren gong ju le shi nian
two person together live PFV ten year
'These two persons lived together for ten years.'

b. bian xiang qin yieyie he qinsheng de
just like biological grandfather and biological DE
sunniu yiban huxiang titie guanhuai
granddaughter like mutually considerate care for
'Just like a biological grandfather and a biological granddaughter, they were considerate of each other and cared for each other.'

c. keshi duifang xindi shenchu daodi xiang **zhe** xie sheme
but each other mind depth actually think DUR PL what
'But, what they were actually thinking in their minds,'

d. que shei yie bu da mingbai
but who also no really understand
'neither of them really knew.'

In this example, (137c) is a locative inversion clause. (137c) is connected to (137b) by *Contrast*, which is spelled out by the structural indicator *keshi* 'but' in (137c). Here neither the locative inversion construction nor *zhe* has any bearing on which rhetorical relation connects these two clauses together since the structural indicator *keshi* 'but' monotonically determines that *Contrast* connects (137c) and (137b) together.

138. a. limian you zheme yi ge jingtou
inside have so one CL scene
'There is a scene like this.'

b. yi qun tou dai caomao de nongming zai ge
one group head wear straw hat REL farmer PRG harvest
daozi
paddy
'One group of farmers wearing straw hats were harvesting paddy.'

c. you bian chendiandian de daosui shang sanluande
right side heavy DE rice ear on scatteringly
fang **zhe** ji zhi chawan yi zhi xianran chungman
put DUR several CL tea bowel one CL obviously full
kaishui de da mu tong
boiled water DE big wooden cask
'There were several tea bowels and a big wooden cask obviously full of boiled water which were scatteringly put on the rice ears on the right side

d. tong shang xie **zhe** liang ge da zi qing cha
cask on write DUR two CL big word please tea
'Two big words were written on the cask: Tea Here.'

This example contains two locative inversion clauses, (138c) and (138d). They were connected together by *Parallel* because they are syntactically parallel. Syntactic parallel is a syntactic indicator that spells out *Parallel*.

139. a. ta jintian shangxue chidao le

he today go to school late Prc

'He was late for school today,'

b. yinwei jintian zaoshang ta menkou tang **zhe** yi zhi da gou

because today morning he doorway lie DUR one CL big dog

'because this morning a big dog was lying on his doorway,'

c. ta bu gan chu men

he not dare go out door

'He dared not go out.'

This is an example of *Explanation*. (139b) and (139c) explain (139a). This is spelled out by the structural indicator *yinwei* 'because' in (139b). Just like the other two indicators in the two examples above, *yinwei* 'because' monotonically determines that *Explanation* connects (139a) and (139b) together.

In sum, the majority of the data of locative inversion examined are connected to another clause by *Elaboration*. This is due to the pragmatic function of the locative inversion construction. The locative inversion construction is one type of presentative sentences, which introduce a new NP in the discourse. It is reasonable that more details about a new NP are provided when it is introduced into the discourse. This is why a locative inversion clause tends to serve as an elaborated clause. However, this is not determined by the durative marker *zhe* required by the locative inversion construction. In fact, semantic subordination plays an important role in this respect.

In addition to *Elaboration*, a locative inversion clause can be connected to

another clause by *Background*$_T$, *Contrast*, *Parallel*, *Explanation*, etc. Except for *Background*$_T$, the others require an indicator, structural or syntactic, to specify which rhetorical relation connects together the clauses in discussion.

Though neither of *Elaboration* and *Background*$_T$ requires an indicator, *Elaboration* does require semantic subordination between the lexical entries in the clauses in discussion. That is, *zhe* defeasibly implies *Background*$_T$, but it can be overridden by other explicit information, such as semantic subordination, structural and syntactic indicators.

4.3.4 Background$_T$

Hopper (1979) suggests that the imperfective aspect serves as background while the perfective serves as foreground. In Chapter Three, it is argued that the progressive marker *zai*, by default, implies *Background*$_T$. This is also the case for the durative marker *zhe*. When there is no information indicating any rhetorical relation, by default, *zhe* suggests *Background*$_T$. Typical examples are given below.

140. a. dao le huang nian bu bi tai chou
arrive PFV famine yea no need too worry
'One did not have to worry too much when famine came.'

b. fanzheng mei chi de guojia bu hui kan **zhe** esi
after all no eat REL country no will watch DUR hungry-die
'If there was no food, the government would not watch one starve to death.'

c. zheyang nongming de zhurenwong gan bian diaomodaijin
so farmer DE ower sense then be worn out
le
PFV
'In this way, the sense of ownership of farmers was worn out.'

d. tonggou tongxiao de zhengce shi nongming shiqu
buy-together sell-together DE policy make farmer lose
le duo da liang chibao fan de zhiwang
PFV more buy food eat-full rice DE hope
'The policy that the government totally controlled the sale and the purchase of rice made farmers lose their hope to buy more food and to eat enough.'

e. shengchan jijixing bian yiluoqianzhang
produce enthusiasm then fall to the bottom
'Then, their enthusiasm to grow more rice fell all the way to bottom.'

In this example, *zhe* is in (140b). It serves as a temporal background when all of the situations denoted by the clauses following it occur. There is no information in the clauses indicating otherwise. By default, *zhe* indicates that $Background_T$ connects these clauses together.

141. a. na tian wanshang liwenxio fa **zhe** gaoshao

that day night Li Wenxio have DUR high fever

'That night, Li Wenxio had high fever.'

b. xiao liandanr shao de tong hong

small face burn to a degree that completely red

'Her small face was so hot that it turned red.'

c. shuo le xuduo huhua

say PFV many flapdoodle

'She murmured a lot of flapdoodle.'

The durative marker *zhe* is in (141a). Again, it serves as the temporal background when the situations denote by the other two clauses take place. Just like (140), no information indicates which rhetorical relation connects these clauses together, and *zhe* decides that it should be $Background_{T}$.

142 a. gulongan bao **zhe** zuo yi ci shengyi jiao yi ci

Gu Longan hold DUR do one time business make one time

pengyou de xintai

friend DE belief

'Gu Longan is holding the belief that every time he does

business with a person, he makes a new friend.'

b. miandui shiyongzhe de xunwen zongshi tigong ta suo zhidao
face user DE question always provide he all know
de suoyou zixun
REL all information
'Facing users' questions, he always provides all the information he knows about.'

c. ta juede shangjia yu kehu de guanxi yinggai
he feel company with customer DE relationship should
xiang pengyou yiyang
like friend the same
'He feels that the relationship between a company and customers should be like one between friends.'

d. xian jianli kehu de xinrendu
first build customer DE trust
'A company should first establish trust with customers.'

e. buyao kehu yi jinmen jiu kaishi tuixiao
no customer once enter immediately start promote
jiqi
machine
'Do not immediately start promoting the machines as soon as customers come in.'

The durative *zhe* is in (142a). Just like the two examples discussed before, no

information in the clauses in this example that has any indication about which rhetorical relation connects these clauses together. Then, by default, *zhe* decides that it should be *Background* that connects (142b), (142c), (142d) and (142e) to (142a).

To sum up, just like the progressive marker *zai*, the durative marker *zhe* defeasibly determines that a *zhe* clause is connected to its adjacent clause by $Background_T$. Other information can override this default assignment of *zhe* and can specify that another rhetorical relation does the connection.

The difference between the temporal background provided by *zai* and that provided by *zhe* lies in that the temporal background provided by *zai* is an instant at which another event is on-going, whereas the temporal background provided by *zhe* is an interval when another event takes place.

4.4.4 Elaboration

From the examples examined, it is found that a clause with *zhe* can either elaborate another clause or be elaborated by another clause. Though no indicator is necessary for *Elaboration*, semantic subordination between lexical entries in clauses in discussion is required. Typical examples of *Elaboration* are presented below.

143. a. jingji de fazhang du zhengzhi you **zhe**
economy DE development toward politics have DUR
shenzhong de yingxiang
deep-serious DE influence
'Economic development has deep and serious influence on politics.'

b. zhe ba nian lai zhengzhi bu tai anding
this eight year come politics not too stable
'In these eight years, politics has not been very stable.'

c. suoyi gao de renxinhuanghuang
so made to a degree that people panic
'So, people have been made panic.'

d. tan jingji fuxu geng shi kong tan
talk economy recover also be empty talk
'Talking about recovering economy is also useless.'

This is an example where a clause with *zhe* is elaborated by other clauses. (143a) is a general comment on the relationship between economics and politics. (143b) to (143d) are the current situations used to illustrate the relationship between economics and politics, which is presented in (143a). In (143b) to (143c), the words *zhengzhi* 'politics' and *jingji* 'economics' are repeated and this repetition suggests that more details are given about them. Therefore, it can be concluded that (143b) to (143c) are connected to (143a) by *Elaboration*. This example involves temporal overlapping since (143a) is a generic sentence, which is true at all times.

(144) is also an example where a clause with *zhe* is elaborated by other clauses. This context is about a disagreement on the definition of *recent* in 'recent Chinese architecture history'. In this example, the hint is on the verbs: *zhuzhang* 'to propose' and *renwei* 'to think', both of which are verbs of making a proposal. Having two different proposals is an example of 'disagreement'. This is one type of semantic

subordination or subtype$_D$ in Asher and Lascarides' (2003) term, which specifies that *Elaboration* connects these clauses together.

144. a. zai zhongguo jindai jianzhu shi yianjiu zhong
at China recent architecture history research inside
ruhe huading yianjiu de shijin fanwei ji jindai de
how decide research DE time domain i.e. recent DE
dingyi yizhi cunzai **zhe** fenqi
definition always exist DUR disagreement
'In the research on Chinese recent architecture literature, there has always been a disagreement on the definition of *recent*.'

b. youde xuezhe zhuzhang yi zhengzhi shi de fenqi
some scholar propose use political history DE timeline
zhuowei canzhao
as reference
'Some scholars propose to use the political timeline as reference points.'

c. youde xuezhe ze renwei kaocha jingdai
some scholars on the other hand think research recent
zhongguo jianzhu shi bubi yi zhengzhi shijian
China architecture history need not use politics event
wei jie
as border
'On the other hand, some scholars think that to do research on Chinese recent architecture history, one does not have to use political events as reference time points.

The durative marker *zhe* is in (144a), which states that there has been a disagreement on the definition of *recent* in the research on the recent Chinese architecture history. (144b) and (144c) are two different proposals on how to define *recent*. The two verbs in (144b) and (144c), *zhuzhang* 'to propose' and *renwei* 'to think' are both verbs of proposing an idea. Having two different proposals means disagreement and, hence, it is clear that (144b) and (144c) are connected to (144a) by *Elaboration*. This example also involves temporal overlapping because the disagreement has been there for a long time and no proposal is accepted by most of those scholars.

145. a. ta yimian shuo
he simultaneously say
'He was saying,'

b. you shou manmande tiqi

right hand slowly raise

'and raising his right hand slowly.'

c. muzhi shizhi zhijian wo **zhe** ji mei

thumb index finger between hold DUR several CL

du zhen

poisonous needle

'There were several poisonous needles held between his thumb and index finger.'

(145) is different from the two examples above. It is an example where a clause with *zhe* elaborates another clause. (145c), which has *zhe* in it, elaborates (145b). This hint, again, is lexical. A thumb and an index finger are both parts of a hand, right or left. That is, (145c) provides more detail about the right hand which has been introduced in (145b). It is clear that (145c) is connected to (145b) by *Elaboration*. This example obviously involves temporal overlapping since when that man was raising his right hand, several poisonous needles were held between his thumb and index finger. That is, (145b) temporally overlaps (145c).

146. a. chen shang feiqi liang zhang gao

dust sand fly up two distance unit (= 3 meters) tall

'Dust and sand flow up six meters high.'

b. liang ge ren qi ma

two CL person ride horse

‘Two persons rode horses.’

c. yi qian

one front

‘One was in the front.’

d. yi hou

one behind

‘One was in the back.’

d. ji chi er lai

fast run and come

‘The horses ran very fast and approached.’

e. qianmian shi pi gao tui chang shen de bai ma

front be CL tall leg long body DE white horse

‘In the front was a white horse with long legs and body.

f. ma shang qi **zhe** ge shaofu

horse on ride DUR CL young married woman

‘There was a young married woman riding on the horse.

g. huai zhong lou **zhe** yi ge qi ba sui de xiaogunian

arms in hug DUR one CL seven eight age DE little girl

‘There was a little girl held in her arms.’

This is also an example where a clause with *zhe* elaborates another clause.

There are two clauses with *zhe*, (146f) and (146g). (146e) elaborates the chunk from (146a) to (146d) and specifies what kind of horse one of the two horses introduced in (146b) is. (146f) provides more details about the horse, that is, a young married woman was riding on it. (146g) provides more details about the young married woman, i.e. she was holding a little girl in her arms. It is also lexical information that determines the rhetorical relation. In (146e), *bai ma* 'white horse' is one type of horse. (146f) is a locative inversion clause which specifies what was on the horse. Again, (146g) is a locative inversion clause which specifies what the woman introduced in (146g) was holding. *Elaboration* connects (146f) to (146e) and (146g) to (146f).

This example also involves temporal overlapping. That is, while the young woman was holding a little girl in her arms, she was riding a horse. And this horse is one of the two horses that ran very fast and approached.

To sum up, the examples of *Elaboration* discussed here show that the durative marker *zhe* does not determine that *Elaboration* connects those clauses together. Just like discussed in Chapter Three, semantic subordination plays a very important role in determining that these clauses are connected together by *Elaboration*. These examples also show that *Elaboration* involves temporal overlapping, i.e. a clause with *zhe* usually temporally overlaps with another clause it elaborates or a clause that elaborates it.

4.4.5 Narration

Just like the progressive marker *zai* discussed in Chapter Three, the durative marker *zhe* also allows for *Narration*. While *zai* allows only for a clause with it to

narrate other clauses, a clause with *zhe* can either narrate another clause or a clause can narrate a clause with *zhe*. There is a restriction on the cases where a clause narrates a clause with *zhe*, i.e. there must be some information that can terminate the lasting of the eventuality presented by *zhe*. Typical examples are presented below.

147. a. ta cong wahu li dao le yi wan re nailau
he from kettle inside pour PFV one bowel hot thick milk
'He poured a bowel of hot thick milk from the kettle.'

b. qiao **zhe** ta hexia le
watch DUR she drink-down PFV
'(he) watched her drink the thick milk'

c. you ti ta longhao beiwo
also for she tuck comforter
'(and he) tucked her in.'

This example demonstrates both kinds of *Narration* discussed above. The three clauses in this example describe three consecutive events, and their temporal order matches their contextual order, i.e. (147a) occurs before (147b), which in turn takes place before (147c). The durative marker *zhe* is in (147b). It narrates (147a) because the subject in (147a), first, poured a bowel of thick milk, and then he watched her drink the milk. Judged from the context, his tucking her in, (147c), should occur after his watching her drink the milk, (147b). However, as discussed in Section 4.3, *zhe* expresses the lasting of an activity/state over an interval, but does not impose a final endpoint. For a clause to narrate a clause with *zhe*, the event/eventuality presented by

zhe must be terminated so that the narrative time can be advanced. In (147b), the embedded verb *hexia* 'drink-down' contains a directional complement, i.e. *xia* 'down', and hence is a directional complement compound.

Kang (2001) suggests that directional complements in Mandarin are, in fact, perfective aspect markers, which have the same aspectual function as the perfective *le* though directional complements have richer semantics. Therefore, *hexia* 'drink-down' in (147b) is a completed event since *xia* 'down' is a directional complement. Because *zhe* presents the lasting of an activity/state over an interval, the activity *qiao* 'to watch' in (147b) can last long enough until the action *he* 'to drink' is completed, which is marked by the directional complement *xia* 'down'. These two factors together make it possible that (147c) narrates (147b), i.e. *zhe* expresses the lasting of an activity/state over an interval, and a completed or terminated event signals the termination of the durative state presented by *zhe*. Both factors are required to make sure that (147c) is connected to (147b) by *Narration*.

This requirement is borne out by the following two examples. In (147'b), the terminated event is replaced with an activity, and (147'b) and (147'c) are more like *Parallel*, that is, they are two actions that are simultaneously taking place. On the other hand, in (147''), the durative marker *zhe* is replaced with the progressive marker *zai*. In this case, the discourse in (147'') is incoherent and bad.

147'. a. ta cong wahu li dao le yi wan re nailau
he from kettle inside pour PFV one bowel hot thick milk
'He poured a bowel of hot thick milk from the kettle.'

b. qiao **zhe** ta he nailau

wathc DUR she drink thick milk

‘(he) watched her drinking the thick milk’

c. you ti ta longhao beiwo

also for she tuck comforter

‘(and) tucked her in.’

147’’. a. ta cong wahu li dao le yi wan re nailau

he from kettle inside pour PFV one bowel hot thick milk

‘He poured a bowel of hot thick milk from the kettle.’

b. !**zai** qiao ta hexia le

PRG watch she drink-down PFV

‘(he) watched her drink the thick milk’

c. you ti ta longhao beiwo

also for she tuck comforter

‘(and he) tucked her in.’

Another similar example where a clause narrates a clause with *zhe* is presented below. Just like (147), both *zhe* and a terminated/completed event are required to ensure that this kind of *Narration* can appear. And, if either of the factors is changed, the sense of narration disappears.

148. a. ta jingjingde zuo zai nar

he quietly sit at there

‘He sat there quietly.’

b. (*__zai__) ting **zhe** yianzouhui jieshu

PRG hear DUR concert end

‘(and) heard the concert end,’

c. ranhou like zhan le qilai

then immediately stand PFV up

‘(and then) he immediately stood up.’

d. ta yao zai qita ren likai qian likai

he want at other person leave before leave

‘He wanted to leave before the others left’

e. yiwei ta bu xiang kandao yi zuo kongdangdang

because he no want see one CL empty

chongman le guji de gangjue de yinyueting

full PFV solitude DE feeling DE concert hall

‘because he didn’t want to see an empty concert hall, which gave him the feeling of solitude.’

In (148), it is bad to use *zai* in (148b) because the event presented by *zai* is on-going at an instant and an instant cannot last long enough for another to continue to its final endpoint. The embedded verb *jieshu* ‘to end’ is a verb denoting the ending of an event, and hence can terminate the durative state presented by *zhe*. It is clear that (148c) occurs after (148b) and hence is connected to (148b) by *Narration*.

In addition to the examples discussed above, a clause with *zhe* can narrate another clause, just like a clause with *zai* can narrate another clause, which is

discussed in Chapter Three. Typical examples are presented below.

149. a. ji laoren mai le ding tong de shiti
Ji old man bury PFV Ding Tong DE body
'Old man Ji buried Ding Tong's body.'

b. you jiang ta chengzuo de zuoqi ye zai le
also DISP he ride REL horse also kill PFV
'(and he) also killed the horse he had ridden.'

c. ranhou zuo zai menkou
then sit at doorway
'(and) then he sat at the doorway,'

d. na **zhe** yi bing chang dao buzhushoude zai
hold DUR one CL long saber continuously at
muodaoshi shang muo **zhe**
hone on sharpen DUR
'(and) he held a long saber in his hand and sharpened it on a hone.'

In this example, *ranhou* 'then' indicates that (149c) and (149d) are connected to (149b) by *Narration*. One might suggest that (149c) are connected to (149d) by *Background*$_{T}$, that is, while he was sitting at the doorway, he was sharpening his saber on the hone, and then this bigger chunk is connected to (149b) by *Narration*. If this is so, then the clause with *zhe*, (149d), does not really narrate (149b). However, even though *zuo zai menkou* 'sitting at the doorway' is removed and (149d) is put after

ranhou ‘then’, the discourse is still coherent and makes sense. This suggests that a clause with *zhe* can indeed narrate another clause.

One thing to note about this example is that the discourse sounds bad and incoherent if the structural indicator *ranhou* ‘then’ is removed. This is because *sitting at the doorway* is not an action that normally follows *killing a horse*. To ensure that the latter narrates the former, it is helpful to use a structural indicator to enforce the sense of narration.

On the contrary, in (147), which is repeated below, *watching the person drinking milk* is an action that naturally follows *pouring a bowel of milk for the person*, and hence no structural indicator is required to enforce the sense of narration. A structural indicator, e.g. *ranhou* ‘then’, can certainly be added, though not required.

147. a. ta cong wahu li dao le yi wan re nailau
he from kettle inside pour PFV one bowel hot thick milk
‘He poured a bowel of hot thick milk from the kettle.’

b. qiao **zhe** ta hexia le
watch DUR she drink-down PFV
‘(he) watched her drink the thick milk’

c. you ti ta longhao beiwo
also for she tuck comforter
‘(and he) tucked her in.’

In sum, a clause with *zhe* can narrate another clause, just like *zai*. This means that the interval presented by *zhe* should contain the initial interval/point of the

event/eventuality it presents. With respect to *Narration*, *zhe* is different from *zai* in that a *zhe* clause can be connected to its following clause by *Narration* whereas a clause with *zai* cannot appear in such a context. This difference follows from the aspectual difference between *zhe* and *zai*. The durative marker *zhe* presents the lasting of an event/eventuality over an interval while the progressive marker *zai* expresses an event ongoing at an instant. An event/eventuality presented by *zhe* can last long enough for another event to be terminated or completed, but an event presented by *zai* cannot. Besides, since *zhe* does not include a final endpoint in its semantics, there must be another event that is terminated or completed to terminate the state presented by *zhe* so that another event can start. These two factors, *zhe* and a terminated/completed event syntactically embedded under the event presented by *zhe*, ensure that an event described by a clause with *zhe* can take place before another event described by another clause, which can be connected to the clause with *zhe* by *Narration*.

4.4.6 Required and Embedded

There are a few prepositions and verbs in Mandarin that require *zhe* to go with them. In this case, *zhe* does not really have much aspectual function[54] and hence does not really influence the temporal relation in any significant way. There are also examples where *zhe* occurs in embedded clauses, such as relative clauses, small clauses or clausal complements. These two kinds of examples share one point, i.e.

[54] There might be some historical aspectual reasons for those prepositions and verbs to require *zhe* to go with them. This issue will not be pursued in this dissertation.

they do not interact with the main timeline of a story. Representative examples are presented below.

150. a. women cong xiao gen **zhe** laoshi xuexi
we from young wioth DUR teacher learn
'Since youth, we have learned with teachers.'

b. wulun shi shenme yang de laoshi dou hui yaoqiu
no matter be what kind DE teacher all will require
women xunze shang de qu zuo
us choose good DE go do
'No matter what kind of teachers, they all will ask us to choose the good things to do.'

151. a. fengshu zhen zai zhuan hong
maple in the middle of PRG turn red
'The maples are turning red.'

b. manshangpianyie de dujuan yu mangcao yan
all over the hill DE azalea and grass with blades along
zhe shangpuo yi ceng yi ceng de wang xia kaiqu
DUR hill one layer one layer DE toward down bloom
'The azaleas and the grass with blades all over the hills are blooming downward, layer by layer.'

(150) and (151) are examples of *zhe* required by prepositions. In (150a), *gen* 'with' requires *zhe* to go with it. The durative marker in this clause does not have any

aspectual function, and hence does not interact with the main timeline of the story. So is the *zhe* in (151b). The preposition *yan* ‘along’ also requires *zhe* to go with it. If *zhe* is removed, these two clauses will become ungrammatical.

There are some verbs that require *zhe* to go with them. For those verbs, *zhe* is part of them and have neither significant aspectual function nor substantial influence on the temporal relation.

152. a. wanglu de shiyongzhe yanran chengwei yi ge shehui
internet DE user obviously become one CL society
‘The internet users obviously became a society,’

b. fazhangchu yi tau zichuang de jiufen chuli muoshi
dveleop one CL self-invent DE disagreement handle pattern
‘(they) develop a disagreement handling pattern invented by themselves.’

c. zhe yiwei **zhe** diannao wanglu guifan de jianli
this mean DUR computer internet rule DE establish
yi keburonghuan
already imminent
‘This means that it is imminent to establish the rule to govern govern the internet users.’

153. a. zhengfu you zeren gen juming tanpan
government have responsibility with resident negotiate
‘The government has duties to negotiate with the residents.’

b. buguan ruhe baucun
no matter how preserve
'No matter how to perserve (old buildings),'

c. zhengfu dou yinggai shi **zhe** chuli juming dui
government all should try DUR handle residents toward
baucun suo chi de butong kanfa ji lichang
preserve REL have REL different viewpoint and position
'The government should try to handle the different viewpoints and positions held by the residents.'

(152) and (153) both contain verbs that require *zhe* to go with them. In (152c), *yiwei* 'to mean' requires *zhe*. In (153c), *shi* 'to try' also requires *zhe*. Removing *zhe* will render these two clauses ungrammatical.

These four examples show that the *zhe* required by prepositions or verbs does not have any significant aspectual function, and does not have direct bearing on the determination on the temporal relation between the clauses.

Another kind of examples where *zhe* does not directly influence the temporal relation is those where *zhe* occurs in an embedded clause, including relative clauses, small clauses, clausal complements, etc. The durative marker *zhe* in embedded clauses does not directly influence on the main timeline of a story because it is usually the main verb in a clause that interact with the main timeline of a story. Typical examples are presented below.

154. a. san tian qian hai zai chuang shang tang **zhe** de haizi
three days ago still at bed on lie DUR DE child
zhongyu keyi qichuang le
finally can get up PFV
'The child who was still lying on the bed three days ago can get up now.'

b. ta ganggang jiu zai yiyuan de tushuguan li kan shu
he just now exactly at hospital DE library inside read book
'He was in the hospital's library just now, reading a book.'

This is an example where *zhe* appears in a relative clause. In this discourse, the main timeline of the story is present. The relative clause in (154a) is about the kid's past condition. *zhe* in the relative clause does not interact with the main timeline of the story.

155. a. youxie laoshi xiangdao yiqian zai xuexiao shi tamne de
some teachter think before at school time they DE
laoshi yizhi guanxin **zhe** tamen aihu **zhe** tamen
teacher always care DUR they love DUR they
'Some teachers think about their situations back at school where their teachers were always caring for them, and loving thme.'

b. xiangzai tamen jiu xiang ba zhe fen guanxin he ai
now they then want DISP this CL care and love
yong zai ziji de xuesheng shen shang
use at self DE student body on
'Now, they want to give love and care to their own students.'

In this example, *zhe* appears in a clausal complement, an argument of the main verb *xiangdao* 'to think about'. Neither does this *zhe* interact with the main timeline of the story.

In sum, two kinds of examples are presented in this section. One is those whose *zhe*'s are required either by prepositions or by verbs. The other is those whose *zhe*'s appear in embedded clauses. For the former kind, since *zhe* is required, it does not have a significant aspectual function, though it might have had historically, and it does not have direct bearing on the temporal relation. For the latter kind, *zhe* exists in an embedded clause, and does not directly interact with the main timeline of a story, though sometimes it may indirectly.

4.4.7 Others

The durative marker *zhe* can also appear in other rhetorical relations, such as *Contrast*, *Parallel*, *Explanation*, etc. With no exception, the examples of these rhetorical relations found all have a structural or syntactic indicator to specify which rhetorical relation connects clauses together, and hence the durative marker *zhe* does not have any influence in this respect. Typical examples are presented below.

156. a. ta xin li xiang

she mind inside think

'She thought in her mind,"

b. ziji shi yi ge tangtang de daxue biyiesheng

self be one CL glorious DE university graduate

'I am a university graduate.'

c. que laoshi zuo **zhe** disanxiasi de pao cha gongzuo

but always do DUR lower class DE make tea job

'But, I am always doing the lower-class job of making tea.'

d. yinci xin li hen bu kaixin

so mind inside very not happy

'So, in her mind, she felt unhappy.'

In this example, *zhe* is in (156c). (156c) is connected to (156b) by *Contrast* and (156d) is connected to (156c) by *Reason*. The structural indicator *que* 'but' specifies that *Contrast* connects (156b) and (156c) together. On the other hand, the structural indicator *yinci* 'so' spells out that *Reason* connects (156d) to (156c), i.e. (156c) is the reason of (156d). Here, *zhe* performs its aspectual function, that is, her doing the job of making tea lasts over an interval, and it is rather possible that her doing the job temporally overlaps with her feeling unhappy, but *zhe* has nothing to do with the determination on that *Contrast* connects (156c) to (156b) and that *Reason* connects (156d) to (156c). The two structural indicator, *que* 'but' and *yinci* 'so', are solely responsible for the decisions.

157. a. lianhua yun shi fojiao de xiangzheng

lotus originall be Buddhism DE symbol

'Lotus is originally the symbol of Buddhism.'

b. xiangzhen **zhe** xinlin de chunjing yu juexing

symbolise DUR spirit DE purity and awareness

'It symbolizes the spiritual purity and awareness.'

c. xiangpian ze shi cha ming

jasmine tea on the other hand be tea name

'On the other hand, jasmine tea is the name of one kind of tea.'

d. yuyi **zhe** shenghuo de tianmei yu fenfang

imply DUR life DE sweetness and fragrance

'It implies the sweetness and fragrance of life.'

This is an example of *Parallel*, i.e. (157a) and (157b), as a unit, are connected to (157c) and (157d), also as a unit, by *Parallel*. Two hints here provide this information. The first is the structural parallel. Both units are the form, concrete idea plus abstract metaphor. This is obviously structural parallel. The second is the indicator *ze* 'on the other hand'. This indicator also spells out *Parallel*. *zhe* here performs its aspectual duty but does not influence the determination on which rhetorical relation connects clauses together.

In sum, in addition to *Background*$_T$, *Elaboration*, *Narration*, *zhe* can also appear in examples of other rhetorical relations. In the examples of those rhetorical relations examined, there is always an indicator that specifies the rhetorical relation

between the clauses. In those examples, though the durative marker *zhe* still performs its aspectual function, it does not have influence on the determination about the rhetorical relation between the clauses in discussion.

4.5 Summary

In this chapter, it is argued that the durative marker *zhe* goes with a predicate with the property of homogeneity. State predicates are homogeneous and hence are naturally compatible with *zhe*. In Mandarin, some activity predicates contain internal process and/or repeated actions. Activity predicates of this kind cannot go with *zhe* alone. They require either an interval-denoting adverbial or an adverbial of manner to coerce them to become homogeneous. Pragmatic function can perform coercion too. If a clause contains both a non-homogeneous activity predicate and *zhe* and it serves as a temporal background, the clause is grammatical.

It is also argued that the durative marker *zhe* is different from the progressive marker *zai* in that *zhe* describes the lasting of an activity/state over an interval whereas *zai* presents an event ongoing at an instant.

This difference results in the difference in their roles in temporal progression. The progressive marker *zai* describes an event ongoing at an instant and hence cannot last long enough for another event to reach its final endpoint. This is why a clause cannot narrate a *zai* clause, which, though, can narrate another clauses. On the contrary, the eventuality presented by *zhe* can last long enough for another event to come to its final endpoint, and hence the narrative time can be advanced. This is why a *zhe* clause can be connected to its following clause by *Narration* when it can also be

connected to its preceding clause by *Narration*.

Then, the data from the Sinica Corpus are examined. There are two constructions that require *zhe*, i.e. the V_1 *zhe* V_2 construction and the locative inversion construction. For the V_1 *zhe* V_2 construction, the V_1 *zhe* part not only serves as a temporal background when the V_2 takes place, but also serves as an adverbial of manner for the V_2. The function of the V_1 *zhe* part is local, that is, it provides a temporal background for the V_2 only, and its pragmatic function does not extend to other clauses.

The locative inversion construction is one type of presentative sentences, whose function is to introduce a new NP in the discourse. When a new NP is introduced, it is natural that more details are provided for this new NP. This is why in the data examined the majority of the examples of the locative inversion construction are elaborated by the clauses following them. In this case, it involves temporal overlapping. But, this is the default pragmatic function of the locative inversion construction. With information specifying otherwise, a locative inversion clause can be connected to another clause by other rhetorical relations.

Three rhetorical relations do not require indicators to specify them. They are *Background*$_T$, *Elaboration*, and *Narration*. *Background*$_T$ is argued to be the default rhetorical relation that *zhe* implies. *Background*$_T$ involves temporal overlapping. With any information indicating otherwise, this default can be overridden. *Elaboration* requires semantic subordination between the lexical entries in the clauses in discussion. *Elaboration* also involves temporal overlapping. *Narration* requires a

shared topic. One special thing about *Narration* is that there must be a terminated or completed event that indicates the termination of the event/eventuality presented by *zhe* when a *zhe* clause is connected to its following clause by *Narration*. *Narration* involves advancement of narrative time.

Other rhetorical relations, such as *Parallel*, *Explanation*, *Reason*, *Contrast*, etc., require structural or syntactic indicators to specify the rhetorical relation between the clauses. The durative marker *zhe* performs its aspectual duty in those examples, but does not have influence on the decision about the rhetorical relation.

The durative marker *zhe* is special in that some prepositions and verbs syntactically require *zhe* to go with them, though historically there might have been semantic or aspectual reasons. *zhe* in those examples has neither significant aspectual function nor much influence on the rhetorical relation.

There are also examples where *zhe* is in an embedded clause, such as a relative clause, a small clause, or a clausal complement. In these examples, the embedded clause does not directly interact with the main timeline of a story and hence *zhe* does not provide much information about the temporal relation or rhetorical relation.

CHAPTER FIVE

The Perfective Aspect Marker *le* and Its Role in Temporal Progression

5.1 Introduction

This chapter discusses the aspectual properties of the perfective aspect marker *le*[55] and how it affects the temporal relations between clauses. The perfective *le* can either present a completed event or a terminated event. Regardless of which kind of event it presents, the perfective *le* presents it as a single whole. Evidence is provided to argue that the perfective aspect marker *le* does not directly determine the temporal relation between two clauses. Instead, it indirectly influences the temporal relation through the rhetorical relation that connects the two clauses together. Given the fact that the perfective aspect presents an event as a single whole, it is argued that the process of an event/eventuality presented by the perfective *le* is not accessible unless it is made accessible, that is, it is accessible only when the clause with *le* is connected to another clause by *Elaboration*. No other rhetorical relation can make it accessible. This means that the cases of temporal overlapping with a clause with *le* are rather restricted.

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[55] The sentential *le* is not discussed in this dissertation because it seems to involve more than change of state. For example, in the following short dialogue, the sentential *le* does not indicate change of state, as it is often assumed to express at the sentence-final position.

i. ta jueding bu lai
he decide no come
'He decided not to come.'
ii. na bu zao le
that no trouble Prc
"Then, isn't it troublesome!?'

The sentential *le* in (ii) does not describe change of state. Instead, it expresses one kind of exclamation, and shows the speakers being surprised. Since the sentential *le* does not always express aspect-related information, it is not included in the discussion in this chapter.

This chapter is organized as follows. Section 5.2 is a critical review of works on *le*, including Rohsenow (1978), Lin W. (1979), Shi (1990), Kang (1999), and Lin J. (2000a). With the criticisms on the previous works reviewed in Section 5.2, Section 5.3 proposes a new analysis for the perfective *le*, and discusses how the problems presented in Section 5.2 can be solved with the new analysis. Besides, a hypothesis about how the perfective *le* affects temporal relations is proposed in this section. Section 5.4 presents the contexts where the perfective *le* occurs, and the types of temporal relations between sentences are identified. The hypothesis proposed in Section 5.3 is tested against those data to determine its validity. Section 5.5 summarizes this chapter.

5.2 Literature Review

5.2.1 Rohsenow (1978)

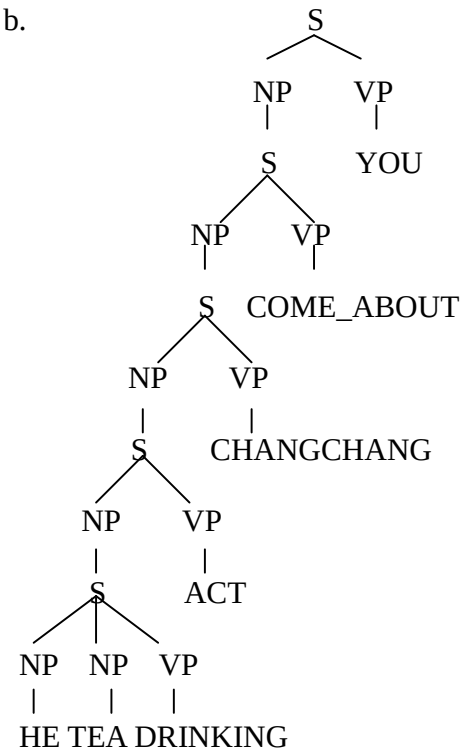
In his dissertation, Rohsenow uses generative semantics to analyze the perfective *le* and the sentential *le*. He suggests that there is only one *le* in Mandarin. It can be decomposed into two basic underlying operators: *you* 'existential predicate' and COME_ABOUT . Different syntactic positions of these two underlying operators result in different syntactic positions and different meanings of *le*. He agrees that the perfective *le* denotes completion or inception, and the sentential *le* expresses change of state. He proposes that the surface instances of *le* are in fact different surface representations of the same underlying operators, which differ in their relative height in the underlying structure. This idea is demonstrated below.

158. a. ta changchang he cha **le**

he often drink tea Prc

'He often drinks tea now.'

b.

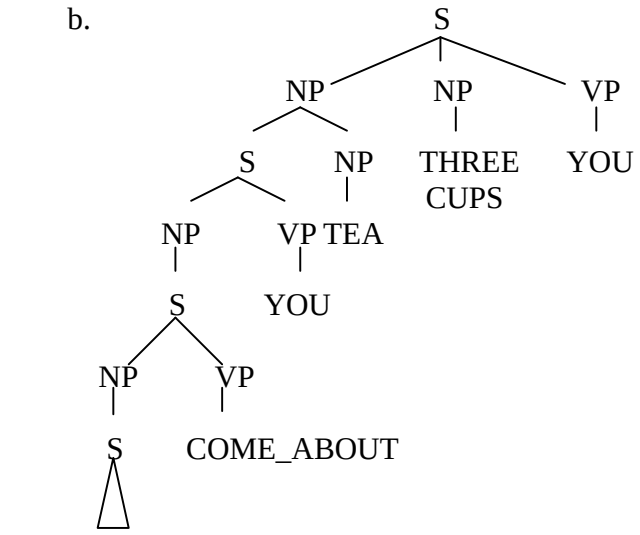


(158b) is the underlying structure for (158a). (158a) contains the sentential *le*, which indicates change of state. The verb phrase *drink tea* is decomposed into ACT(TEA-DRINKING), which means that it is a type of tea-drinking act. The effect of the existential verb *YOU* predicating over the atomic predicate COME_ABOUT, which itself commands an action or a state, is to describe that state or action as 'having come about' (Rohsenow 1978: 63) . That is, (158b) can be interpreted as *her often drinking tea has come about*, which implies that she did not often drink tea in the past but now she does. That is a change of state interpretation. This example

shows how, by positioning COME_ABOUT under the scope of the existential operator *you* in a syntactic tree, the change of state interpretation of the sentential *le* can be accurately generated.

159. a. ta he le san bei cha
he drink PFV three cup tea
'He drank three cups of tea.'

b.



The syntactic trees in (158b) and (159b) need some explanation. The S dominated by an NP is just like a clausal subject. A sentence is decomposed into atomic units, such as ACT(HE-TEA-DRINKING) for (158a). (159a) basically is interpreted as there is a three-cup-of-tea-drinking event. The quantified NP *three cups of tea* is existentially quantified by *you*. The coming about of the *drinking* event is also existentially quantified by *you*. (159b) can be interpreted as there exist three cups of tea and there exists the coming about of the *drinking the three cups of tea* event.

Rohsenow proposes that a sentence which has an inchoative reading, such as *hua hong le* 'The flower became red', can be explained along the same line. In this case, *le* expresses the coming about of the state *the flower being red*, and the coming about of a state is exactly an inception of that state. This is how Rohsenow explains the inchoative reading that *le* introduces to states.

Though he seems to provide a unified explanation of the two *le*'s in Mandarin, Rohsenow's analysis also suffers from several problems. First, he proposes an existential predicate YOU to predicate an eventuality. COME_ABOUT and YOU work together to explain for *le*. But, actually *le* can present a terminated event, that is, only part of a complet event. For example,

160. ta zuotian xie le yi feng xin keshi mei xiewan
he yesterday write PFV one CL letter but no write-finish
'He wrote a letter yesterday, but he did not finish it.'

In this case, the *writing a letter* event is not completed. Instead, the event is just terminated. It seems inaccurate to claim that an uncompleted event comes about. This problem is just like the Imperfective Paradox (Dowty 1977, 1979: 133-138): if an event is not completed, it seems incorrect to suggest that the event comes about.

The Imperfective Paradox has been discussed in Chapter Three. Basically, this paradox says that an on-going event does not necessarily leads to a completed event. This is why the semantics of progressive is modal, i.e. a completed event is always assumed to exist in possible worlds because it does not necessarily exist in the real world. Claiming that an uncompleted event comes about has the same effect as

claiming an on-going event always results in a completed event, which has been argued to be inaccurate in the literature on the Imperfective Paradox.

Secondly, Rohsenow (1978: 92) identifies a bounded amount of a state or event with the predicate COME_ABOUT, and claims that "[t]his atomic predicate predicated of a state or activity expresses the notion of a certain delimited ('bounded') amount of the state or activity taking place." However, this identification of COME_ABOUT is not precise enough to distinguish a terminated event from a completed one, because Rohsenow does not provide any mechanism to determine how long this "bounded" amount should be. When the existential predicate YOU predicates on COME_ABOUT, there is no way to guarantee that it is a completed event that is claimed to come about and to exist. Therefore, the existential predicate YOU + COME_ABOUT cannot determine whether *le* presents a terminated or a completed event, unlike what Rohsenow claims.

Thirdly, Rohsenow also notices that *le* presents a state as the inception of that state, and he also uses YOU and COME_ABOUT to explain why *le* in this case produces an inchoative reading. However, he identifies COME_ABOUT with a bounded amount of a state or an activity. The coming about of a bounded amount of a state does not indicate the inception of a state. Instead, what it describes is more like that a certain bounded amount of state existed and stops existing, i.e. a perfective interpretation. However, a sentence like *hua hong le* 'the flower became red' does not indicate a single bit of termination at all. Hence, Rohsenow's analysis does not seem to work as he plans and generates inaccurate meanings.

Fourthly, Rohsenow proposes that in Mandarin each state verb has a homophonous 'derived' change of state verb. He could claim that the third problem discussed above could be bypassed if *le* could attach to those homophonous change of state verbs only, which behave like achievement, as defined in Vendler (1957) and Smith (1997). Since achievement does not have a process component and its initial endpoint and final endpoint coincide, the bounded amount of a homophonous change of state verb is that point only, and hence the third problem could be avoided. However, this proposal suffers two problems First, it indefinitely enlarges the vocabulary of Mandarin since each state verb has to have a homophonous change of state counterpart. This is extremely redundant. A satisfactory explanation should be able to reduce this redundancy. Besides, it has been argued that not all state predicates in Mandarin are compatible with *le* to express an inchoative reading. For example, *congming* 'smart', *gao* 'tall', etc. are not compatible with the perfective *le*. Rohsenow fails to noticie this phonemonon and therefore his proposal will make false predictions.

Last, Rohsenow's trees violate endocentricity. Endocentricity is an important property of syntactic trees because it guarantees that a phrasal category of a certain syntactic type inherits the syntactic and semantic properties from a word-level category of the same syntactic type. Violating endocentricity leads to the loss of the inheritance of the important and necessary properties of a phrasal category from a word-level category. This is a disadvantage.

5.2.2 Lin W. (1979)

Lin (1979: 180-215) gives a detailed description of the distribution of both the complete (perfective) *le* and the change of state (sentential) *le*. He discusses the complete *le* first. He observes that the complete *le* is suffixed to an action verb in a simple sentence with quantified objects to indicate the actual completion of an event, which has been suggested to be the aspectual function of the perfective marker *le* since Chao (1968: 246). However, it has been a well-known fact that this is not entirely accurate since *le* can present a terminated event as well.

He further observes that the complete *le* is often suffixed immediately to a verb in a subordinate clause which serves as a time reference for the main clause. In this usage, *le* presents a completed event, or, at least, the speaker views the event marked by *le* as completed, as in (161).

161. a. zhe ge dianying wo kan le juede hen hao
this CL movie I see PFV feel very good
'I saw this movie and thought it was good.'

b. jiamu ting le bian bu yanyu
my mother hear PFV then no speak
'My mother heard about this, and didn't say anything.'

Then, he observes that *le* can be suffixed to the main verb in a sentence of passive voice to indicate actual completion of an event. Note that in (161) Lin uses a Resultative Verb Compound (for short, RVC), which lexically encodes the resultative state of an action.

162. a. ne ge daguan de haizi jiao ren dasi le
that CL high official DE child PASS person hit-die PFV
'That high official's child was killed.'

b. wang ma de zhangfu jiao diren shasi le
Wang mother DE husband PASSIVE enemy kill-die PFV
'Nanny Wang's husband was killed by the enemy.'

c. zhe feng xin zhi xie le yi ban hai mei wancheng
this CL letter only write PFV one half still not finish
'This letter is half done, not finished yet.'

Again, this observation is not necessarily so. Lin makes this observation because he uses examples with RVCs, which explicitly contain a resultative state in their lexical forms and therefore include the natural final endpoint in their lexical semantics. A sentence with a RVC presented by the complete *le* always denotes completion. (162c) can demonstrate this observation. In (162c), *write a letter* is not a RVC and hence does not lexically encode a resultative state. In this case, the complete *le* can present a terminated, but not completed, event.

Lin observes that *le* is suffixed to the main verb of a sentence in the disposal construction to indicate actual completion of an event. Again, he reaches this conclusion because he does not see the examples of terminated events.

163. a. ta ba wo de che mai le
he DISP I DE car sell PFV
'He sold my car.'

b. ta ba wo de xin shao le

he DISP I DE letter burn PFV

'He burned my letter.'

He also observes that *le* can be used in an imperative sentence to indicate the hoped/requested completion of an event. This is demonstrated in (164).

164. a. ba qiche xi le

DISP car wash PFV

'Wash the car!'

b. kan zhe xingli bie jiao ren tou le

watch DUR luggage no let person steal PFV

'Keep an eye on the luggage. Don't let others steal it!'

For the change of state *le*, Lin first observes that *le* follows a non-state verb to indicate change from a previous state/habit to a new state/habit. This is shown in (165). However, Lin fails to mention that in this case *le* should occur at the end of a sentence, though all of his examples contain the sentential *le*, because *le* immediately after a non-state verb indicates completion or termination.

165. a. ta xianzai paobu le

he now jog Prc

'Now, he jogs.'

b. laoli da gaoerfuqiu le

Laoli play golf Prc

'Laoli plays golf now.'

He also observes that *le* follows a predicate which consists of a modal or a non-stative verb to indicate that the notions or semantic features represented by the modals and by the verbs following these modals have changed from negative to positive or from positive to negative, as shown in (166).

166. a. wo yao shui le

I want sleep Prc

'I am going to sleep now. (change from *not want* to *want*)'

b. ta bu qu le

he no go Prc

'He does not go now. (change from *go* to *not go*.)'

He observes that *le* follows a state verb to indicate change from a previous state, status or situation to a new status, state or situation. This is illustrated in (167).

167. a. xianzai mei you ren le

now no have person Prc

'Now, there is nobody around.'

b. wo liaojie le

I understand Prc

'I understand now.'

He also observes that *le* in a conditional clause indicates that if change takes place, there will be such and such consequence, while *le* in a consequent clause indicates that a change will take place as a result of the conditioning by the conditional clause, as in (168).

168. a. haizi dao le jiu chufa

child arrive Prc then head off

'If the child arrives, then we can go.'

b. ni zai wang qian zou wo jiu kaiqiang le

you again toward forward walk I then fire Prc

'If you keep walking forward, I'll fire.'

This observation of Lin's is not totally convincing. *le* can occur in a conditional sentence, but *le* does not indicate an antecedent or a consequent. The antecedent or consequent interpretation of *le* in the examples above comes from compositional semantics.

He observes that *le* can follow a nominal predicate to indicate a completed change from the previous status to a new one, as in (169).

169. jinr libaitian le

today Suday Prc

'It's Sunday today.'

Lin gives a detailed description of the contexts where *le* can appear and the meanings of *le* in those contexts. To summarize Lin's discussion, *le* can either denotes completion or change of state. Lin's observation is not completely adequate because he does not notice that *le* can also present a terminated event. He also fails to note that state presented by *le* denotes inception. Besides, Lin does not try to give a unified explanation of why *le* can present different situations in different contexts and what determines the meanings of *le* in different contexts.

5.2.3 Shi (1990)

In this paper, Shi proposes that perfectivity and inception denoted by *le* should be further decomposed into two semantic features: boundedness of situation and relative anteriority, both of which are primitives and which interact with each other to yield either a perfective reading or an inchoative reading. Shi suggests that in this way there is only one *le* in Mandarin and a unified account for this confusing particle can be provided.

Shi offers three arguments for his claim that the perfective *le* and the sentential *le* are actually different syntactic realizations of the same *le*. The first argument is about negation on these two *le*'s. Wang (1965) and Huang (1988) suggest that the perfective *le* and the sentential *le* can be distinguished by negative particles they can go with. The perfective *le* is negated by the negative particle *mei* while the sentential *le* is negated by the negative particle *bu*, and they further observe that the perfective *le* is in complementary distribution with *mei* but the sentential *le* can co-occur with *bu*, as shown in (170).

170. a. Lisi da le zhangsan
Lisi hit PFV Zhangsan
'Lisi hit Zhangsan.' (perfective)

b. Lisi mei da (*le) zhangsan
Lisi no hit (PFV) Zhangsan
'Lisi didn't hit Zhangsan.' (perfective)

c. ta chi niurou le

he eat beef Prc

'He eats beef now.' (change of state)

d. ta bu chi niurou le

he no eat beef Prc

'He doesn't eat beef anymore.' (change of state)

Shi argues against this distinction based on two observations. First, (170d) is not the negation of (170c), whose negation should be (171a). (170d) is the negation of (171b). (170c) indicates a change of state, that is, he didn't eat beef but he eats beef now. The negation of this change of state should be the case where the original state remains unchanged. This is exactly what (171a) means. (170d) also indicates a change of state. In this example, the state of *his not eating beef* comes into existence after this sentence is uttered. The negation of this state should be the case where *his not eating beef* does not occur, that is, he still eats beef. This is exactly what (171b) means.

171. a. ta haishi bu chi niurou

he still no eat beef

'He still doesn't eat beef.'

b. ta haishi chi niurou

he still eat beef

'He still eats beef.'

Therefore, the distinction of which negative particle negates which *le* is not as

Wang (1965) and Huang (1988) claim. That is, negation cannot tell these two *le*'s apart, and in turn this means that the distinction between the perfective *le* and the sentential *le* is not so clear-cut as it is suggested in the literature.

In addition, Shi observes that *mei* and *bu* can both negate the sentential *le*, though they have different meanings, while the perfective *le* is negated by *bu*, which cannot co-occur with the perfective *le*, but the perfective *le* cannot be negated by *mei*. This is demonstrated in (172) below. In (172), both *bu* and *mei* can negate (172a). Negated with *bu*, (172b) means that he will not go to New York anymore. Negated with *mei*, (172c) means he didn't go to New York. (172d) has the perfective *le* in it. It can be negated by *mei*, but not by *bu*, as shown in (172e).

172. a. ta qu niuyue le
he go New York Prc
'He went to New York.'

b. ta **bu** qu niuyue le
he no go New York Prc
'He won't go to New York any more.'
'*He didn't go to New York.'

c. ta **mei** qu niuyue
he no go New York
'He didn't go to New York.'

d. ta qu le niuyue

he go PFV New York

'He went to New York.'

e. ta mei/*bu qu niuyue

he no go New York

'He didn't go to New York.'

While Shi is correct about the examples in (172), he ignores that verbs can select the negative particle that negates them. As shown in (173), *tingshuo* 'to hear about' can only be negated by *mei*, instead of *bu*. Only *mei* can negate *tingshuo* 'to hear about' + *le*, unlike what Shi claims about the negation of the perfective *le*. This fact weakens his argument.

173. a. wo tingshuo le zhe jiang shi

I hear PFV this CL thing

'I heard about this.'

b. wo **mei** tingshuo (*le) zhe jiang shi

I no hear (*PFV) this CL thing

'I didn't hear about this.'

c. *wo **bu** tingshuo zhe jiang shi

I no heard this CL thing

Shi's second argument is that the sentential *le* does not behave like other sentential particles, such as *ba* 'to indicate a suggestion', *ma* 'to indicate a question', though this *le* is usually claimed to be a sentential particle, e.g. Li and Thompson

(1981: 296-300). For example, sentential particles cannot occur at the end of a dependent clause while the sentential *le* can.

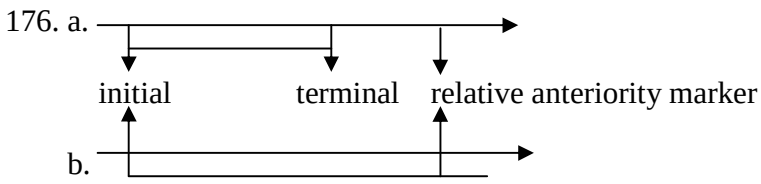
174. a. chi fan **le** yihou zai chuqu wan
eat rice Prc after then go out play
'After you eat, then you can go out to play.'
b. *chi fan **ba** yihou zai chuqu wan
eat rice Prc after then go out play
c. *chi fan ma yihou zai chuqu wan
eat rice Prc after then go out play

Shi's third argument is that sometimes the syntactic position of *le* is more related to style consideration than with meanings. For example, (175a) and (175b) have exactly the same meaning though *le* is in different positions.

175. a. tamen ba wo jiao le qilai
they DISP I call PFV up
'They woke me up.'
b. tamen ba wo jiao qilai le
they DISP I call up Prc
'They woke me up.'

Based on the three arguments discussed above, Shi suggests that the distinction between the two *le*'s is not clear and there is, in fact, only one *le*. To provide a unified semantics for both *le*'s, Shi proposes that the two realizations of *le* are attributed to the interaction between boundedness of situation and relative anteriority.

Shi defines a bounded situation as a situation with a terminal bounday and an unbounded situation as one without a terminal boundary. He suggests that if a relative anteriority marker, which seems to behave like a reference time (RT), is placed after the terminal boundary of a bounded situation, it presents a completed event, whereas if it is put after the initial boundary of an unbounded situation, it induces an inchoative interpretation. Shi's analysis is demonstrated below.



(176a) is a bounded situation. When the relative anteriority marker is placed after the terminal boundary, a completed situation is presented. (176b) is an unbounded situation. When the relative anteriority marker is placed on the time axis in (176b), it stands after the initial boundary since an unbounded situation does not have a terminal boundary. In this case, Shi claims that it has an inchoative reading.

Shi claims that *le* is a relative anteriority marker and this property of *le* interacts with boundedness of situation to produce the perfective and inchoative readings of the perfective *le* and the change of state reading of the sentential *le*, in the way demonstrated in (176a) and (176b).

This analysis is illustrated in the examples in (177). The VP in (177a), *kan zhe ben shu* 'to read this book', is a bounded situation. When *le* is placed after *kan* 'to read', a completed situation is presented, i.e. *reading this book* is completed.

On the other hand, the VP in (177b), *you yi da bi qian* 'to have a large sum of

money' is an unbounded situation. When *le* is placed after *you* 'to have', it introduces an inchoative reading.

177. a. ta kan le zhe ben shu
he read PFV this CL book
'He read this book.'

b. ta you le yi da bi qian
he have PFV one big sum money
'He has a big sum of money now.'

Shi proposes that the sentential *le* can be explained along the same line. In (178a), *chi rou* 'to eat meat' is an activity, which is unbounded. And hence *le* introduces an inchoative meaning. In (178b), *qu niuyu* 'to go to New York' is a bounded situation, and hence *le* presents it as a completed event. (178b) has also an inchoative reading. Shi explains this by suggesting that *qu niuyue* 'to go to New York' can be regarded as a habitual activity, which is unbounded. This is why it can have an inchoative interpretation.

178. a. ta chi rou le
he eat meat Prc
'He eats meat now.'

b. ta qu niuyue le
he go New York Prc
'He went to New York.' or 'Now, he goes to New York.'

Though Shi's idea can explain the examples in his paper, it suffers from several

problems. First, Shi does not provide a clear definition of the relative anteriority marker. From the way the marker is used, it behaves like an RT. But, he does not make it clear in his paper what he means by the relative anteriority marker and he does not explain why it is relative. This problem makes his account imprecise and inadequate.

Secondly, Shi suggests that *le* presents a bounded situation as a completed one. However, it is well-known that the perfective *le* can either present a completed event or a terminated event (e.g. Chan 1996, Kang 1999, etc.)[56]. Shi's theory will mistakenly rule out as ungrammatical, those grammatical examples where the perfective *le* presents a terminated event.

Thirdly, Shi's theory cannot explain (179). In (179), *kan zhe ben shu* 'to read this book' is obviously a bound situation since it has a natural final endpoint. According to Shi, (179) should have a perfective reading, which (179) does not have. Therefore, while Shi's theory might work for the perfective *le*, it is obvious that his theory does not work for the sentential *le*, at least not for all of the examples of the sentential *le*.

179. ta kan zhe ben shu le
he read this CL book Prc
'He reads this book now! (He didn't read it before.)'

Lastly, Shi's theory fails to explain why sometimes *le* occurs at the post-verbal

[56] This completed vs. terminated issue is discussed in depth when Kang (1999) and Lin (2000a) are reviewed in the next two sections.

position and sometimes *le* occurs at the sentence-final position. Especially, he cannot distinguish (180a) from (180b) even though these two examples obviously have different meanings.

180. a. ta chi **le** rou cai hui zou
he eat PFV meat CAI will go
'He won't leave until he eats meat.'

b. ta chi rou le
he eat meat Prc
'He eats meat now!'

Shi suggests that *chi rou* 'to eat meat' is an unbounded situation, and hence *le* gives it an inchoative reading. However, as shown in (180), the perfective *le* expresses more like a perfective reading while the sentential *le* denotes a change of state reading. Shi's analysis will mistakenly give (180a) an inchoative interpretation.

5.2.4 Kang (1999)

Kang (1999: 52-85) also discusses the perfective aspect marker *le*. Kang agrees that the perfective *le* presents a situation as a single whole and that it is compatible with completive and durational adverbials, as in (181). Based on this, she suggests that *le* does not focus on the terminus of a situation because *le* would be incompatible with a durational adverbial if it focused on the final endpoint of a situation, and the examples show that *le* can occur with a durational adverbial.

181. a. ta xie le liang xiaoshi de xin

he write PFV two hour DE letter

'He wrote a letter for two hours.'

b. ta liang xiaoshi xie le yi feng xin

he two hour write PFV one CL letter

'He wrote one letter in two hours.'

Next, Kang examines the interaction of *le* with situation types. She has suggested that *le* presents an event as a single whole. Therefore, when it goes with an activity, it refers to a process and an arbitrary final endpoint and does not have any implication of reaching a goal because an activity does not have a natural final endpoint or a goal, as in (182).

182. a. didi zai he li youyong le

younger brother at rive inside swim PFV

'My younger brother swam in the river.'

b. wo zaoshang san bu le

I morning take step PFV

'I took a walk in the morning.'

In these two examples of activity verbs in (182), Kang fails to distinguish the perfective *le* and the sentential *le*, which is a well-recognized distinction made in the works on *le*, e.g. Chao (1968: 246, 692), Li and Thompson (1981: 296-300), Wang (1943: 162-163), among others. While the perfective *le* has a perfective interpretation, the sentential *le* is generally said to indicate change of state (e.g. Shi 1990, Li and

Thompson 1981).

In (182a) and (182b), *le* is located at the end of the sentences and the sentences have a change of state reading. Therefore, they should be the sentential *le*. These two sentences do not have a perfective reading. So, (182a) means that my younger brother did not swim in the river for some reason before, but now he does. (182b) indicates change of habit – I take a walk in the morning now.

Actually, when *le* occurs after an activity verb, the sentence with them sounds incomplete and needs to go with anther one to serve as the first event in a series of events, as shown below.

183. a. ^{I}ta chi le fan
he eat PFV rice
'He ate rice, ...'

b. ta chi le fan jiu zou le
he eat PFV rice JIU leave PFV
'He ate and immediately left.'

c. ^{I}ta zaoshang san le bu
he morning take PFV walk
'He took a walk in the morning, ...'

d. ta zaoshang san le bu cai qu shangban
he morning take PFV walk CAI go work
'He took a walk in the morning, and then went to work.'

Accomplishment is a durative event with a natural final endpoint or goal. Kang

discusses the interaction of *le* with three kinds of accomplishments, i.e. an accomplishment verb phrase with a count NP, an accomplishment verb phrase with a definite NP, and RVCs.

For the first kind, Kang suggests that *le* presents a completed event because the countability of the NP makes bounded the temporal interval introduced by the verb, as suggested in Verkuyl (1993). This is demonstrated below.

184. a. wo mai le yi ben shu
I buy PFV one CL book
'I bought a book.'

b. wo mai le yi ben shu *keshi mei maidao
I buy PFV one CL book but no buy-get
'I bought three books, *but I didn't succeed in buying them.'

185. a. na ge dianying wo kan le liang bian
that CL movie I see PFV three time
'I watched that movie three times.'

b. na ge dianying wo kan le liang bian *keshi mei kanwan
that CL movie I see PFV two time but no see-finish
'I watched that movie twice, *but I didn't finish it.'

While Kang is correct in that (184b) is ungrammatical, an accomplishment verb with a count NP marked by *le* can, in fact, denote a terminated event, instead of a completed one, as shown in (186a) and (186b). The difference between (185b) on the one hand and (186a) and (186b) on the other is that in (186) the distributive operator

dou makes sure that each occurrence of the event is commented on.

186. a. na ge dianying wo kan le liang bian keshi liang bian dou
that CL movie I see PFV two time but two time all
mei kanwan
no see-finish
'I watched that movie twice. But I didn't finish it either time.'

b. na ge dianying wo kan le liang bian keshi yi bian
that CL movie I see PFV two time but one time
kanwan le ling yi bian mei kanwan
see-finish PFV another one time no see-finish
'I watched that movie twice. I finished it once, but did not the other time.'

The difference between *mai yi ben shu* 'to buy a book' and *kan na ge dianying* 'to watch that movie' lies in that if a person does not get the thing he bought, the action of buying does not exist since *buying a thing* involves paying and having that thing at the buyer's disposal. This should not be controversial.

On the other hand, what constitutes of *kan na ge dianying* 'to watch that movie'? Does it count as watching that movie once if someone watched the first twenty minutes and left because of some emergency? It seems so, and this is why (186a) and (186b) are grammatical.

The same question can be asked about *xie yi feng xin* 'to write a letter'. Does it count as writing a letter if someone wrote a few lines, was interrupted and didn't

finish? This seems to depend on native speakers' intuition about the phrase. Chan (1996: 227) obviously thinks so, whereas Kang (1999: 63) does not agree.

For the second kind, Kang discusses notional passives, which are passive without a passive marker and whose patient role is usually realized as an inanimate subject. Kang (1999: 64) suggests that when a verb has a definite NP as its patient role, which is realized as the subject, the perfective form of the verb will have a reading of completion or attainment of goal if the sentence is a notional passive, as shown in (187). Kang also suggests that the bare nouns in the examples in (187) can be understood as definite because Mandarin does not have a definite determiner (Kang 1999: 65).

187. a. shu chuban *(le)
book publish PFV
'The book was published.'

b. fanzi gaihao *(le)
house build-finish PFV
'The house was built.'

While Kang's intuition about the definiteness of the bare nouns is correct, how she reaches this conclusion seems questionable. It is well-known that Mandarin does not allow an indefinite NP at the sentence-initial position, and for an indefinite NP to be located at that position, it must be licensed by *you*[57], which introduces an

[57] Please refer to Li and Thompson (1981: 510-516) for a description of *you* in the existential construction.

existential quantifier to bind the indefinite NP. The bare nouns in (187) are interpreted as definite because otherwise these two sentences will be ungrammatical.

Kang further observes that the position of a definite NP affects the interpretation of the sentence with it. She claims that *le* can present a terminated, but not completed, event denoted by a VP whose definite NP object is located at the sentence-initial position, and *le* presents a completed event denoted by a VP whose definite NP object is at the object position.

188. a. ?wo kan le na ben shu keshi mei kanwan
I read PFV that CL book but no read-finish
'I read that book, but I didn't finish it.'

b. na ben shu wo kan le keshi mei kanwan
that CL book I read PFV but no read-finish
'I read that book, but I didn't finish it.'

Two points about Kang's observation about (188a) and (188b) are worth mentioning. First, Kang marks (188a) with a question mark, which means that (188a) sound a little weird, but not completely ungrammatical, which she marks with an asterisk. Secondly, she presents a similar sentence, (185b), in the discussion of an accomplishment verb phrase with a count noun, where her grammaticality judgment is inconsistent with her judgment on (188b). She seems to feel that the first part of (188b) with a frequency adverbial will have to denote completion and attainment of goal.

Since Kang does not mark (188a) as ungrammatical but only thinks that it is a

little unnatural, and her grammaticality judgment on (185b) and (188b) is inconsistent, it seems reasonable to doubt whether her conclusion is accurate.

This problem can be attributed to, again, how native speakers perceive of verb phrases, i.e. whether a resultative state is intrinsic to the verb phrases, as discussed above. For some speakers, *finishing that book* is not intrinsic to *kan na ben shu* 'to read that book' and hence they consider it *kan le na ben shu* 'read PFV that CL book' as soon as they start reading. For others, *finishing that book* is intrinsic to *kan na ben shu* 'to read that book', and therefore they will not say *kan le na ben shu* 'read PFV that CL book' until they actually finish that book. The intuition is not always clear-cut and this could be why Kang's judgment is not consistent. This intuition determines whether *le* presents a terminated or completed event, and hence the judgment also varies.

For RVCs, Kang suggests that these verbs are accomplishment and the perfective form of a RVC focuses both on a durative process and its final endpoint. She makes this suggestion based on the following examples.

189. a. wo yi ge zhongtou kanwan le na ben xiaoshuo
I one CL hour read-finish PFV that CL novel
'I finished reading that novel in one hour.'

b. wo kan le yi ge xingqi kanwan le na ben xiaoshuo
I read PFV one CL week read-finish PFV that CL novel
'I read that novel for a week and finished reading that novel.'

In (189a), *kanwan* 'to read-finish' can go with a completive adverbial *in one*

hour and this suggests that *le* focuses on the final endpoint of the RVC. In (189b), Kang suggests that the RVC can go with a durative phrase and hence *le* also presents its process. This suggestion is arguable because in (189b) the durative phrase does not really go with the RVC. Instead, it goes with the first verb of the RVC *kan* 'to read, to see'. And there is no way to attach the durative phrase to the RVC. This seems to suggest that the durative phrase does not really modify the RVC. Therefore, Kang's suggestion that *le* also presents the process of a RVC seems suspicious.

However, Kang's suggestion that *le* presents the endpoint of a RVC and hence RVC + *le* presents a completed event is correct, and this is supported by the claim about a resultative state of a verb phrase. An RVC has its resultative state explicitly spelled out, and hence the resultative state of a RVC is undoubtedly intrinsic to that RVC. As argued above, when a resultative state is intrinsic to a verb phrase, *le* presents the VP as a completed event.

Achievement includes only an instantaneous change of status. When *le* goes with achievement, it indicates the implementation of actions, as well as the attainment of goals. This seems reasonable because achievement, unlike accomplishment, does not have a process, and its initial endpoint and final endpoint coincide. The perfective marker *le* has nothing but the single point to mark. Therefore, achievement + *le* can only indicate a completed event.

When *le* goes with a stative verb, Kang suggests that *le* can either indicate change of state (inchoative) when standing alone, or termination of the state when going with a durational phrase, shown in (190a) and (190b).

190. a. hua hong le

flower red PFV

'The flower became red.'

b. hua hong le san tian

flower red PFV three day

'The flower was red for three days.'

b'. hua hong le san tian dao xianzai hai hen hong

flower red PFV three day to now still very red

'The flower has been red for three days, and is still very red now.'

While Kang is correct in that (190a) has an inchoative reading, she is incorrect to claim that for (190b) the state terminates when there is a durational phrase. She seems to ignore that fact that a durational phrase just presents the duration, and does not indicate termination. This is why (190b') is grammatical. This example proves that Kang's claim is incorrect that *le* indicates the termination of the state presented by *le* when going with a durational phrase.

For atelic situations, including activity and state, Kang observes that *le* can also present continuation, as long as it goes with a durative temporal phrase. (190b) is an example of state. (191a) and (191b) are examples of activity, both of which indicate the duration of an event.

191. a. ta jiao le shi nian de shu

he teach PFV ten year DE book

'He has taught/been teaching for ten years.'

b. ta zai zher zhu le wu niang

he at here live PFV five year

'He has lived here for five years.'

Kang's study of *le* is a good descriptive one, despite some problems that have been discussed above. However, she just focuses on the interaction between *le* and verb phrases of different situation types, but fails to provide a unified semantics of *le* so that all of the different interactions with verbs of different situation types can be explained.

5.2.5 Lin J. (2000a)

Lin (2000a) tries to explain how and why the temporal meaning of the verbal[58] *le* may fit with past, on-going and future situations, as shown in (192), (193) and (194).

192. Past situations

a. zhangsan da le lisi

Zhangsan hit PFV Lisi

'Zhangsan hit lisi.'

[58] Lin uses the term 'verbal *le*' in this paper. These two terms, the perfective *le* and the verbal *le*, are in fact identical since the function of the verbal *le* is to express perfectivity. To remain consistent, the term 'verbal *le*' is used in the review of Lin's paper, whereas the term 'the perfective *le*' is used in the other parts of this dissertation.

b. zhangsan xie le yi feng xin

Zhangsan write PFV one CL letter

'Zhangsan wrote a letter.'

193. Present situations

a. zhangsan yang le yi tiao yu

Zhangsan feed PFV one CL fish

'Zhangsan breeds a fish.'

b. menkou zuo le yi ge ren

doorway sit PFV one CL person

'A man is sitting at the doorway.'

194. Future situations

a. *zhangsan mingtian (zhege shihou) likai le nanjing

Zhangsan tomorrow (this time) leave PFV Nanjing

'Zhangsan leaves Nanking (at this moment) tomorrow.'

b. zhangsan mingtian (zhege shihou) (yinggai) yijing likai le

Zhangsan tomorrow (this time) (should) already leave PFV

nanjing

Nanjing

'Zhangsan should have already left Nanking by (this moment)

tomorrow.'

In the literature, the verbal *le* is usually treated as an aspect marker. But, Lin claims that the behavior of *le* in the above examples seems to suggest that the verbal

le has distinct functions. In order to provide a unified account of *le* for the above examples, Lin makes two assumptions. The first one is a syntactic one. Lin assumes that Chinese has a phrase structure as in (195). Lin proposes that *le* has a weak tense feature and hence will move from Asp to the head of TP to check and to eliminate this feature.

195. $[_{TP}\ldots\ldots [_{AgrSP}\ldots. [_{ModalP}\ldots [_{AspP}\ldots [_{AgroP}\ldots [_{VP}\ldots]]]]]]$

The second is a semantic assumption. Following Stump (1985), Lin assumes that sentences translate as 'temporal abstracts', that is, sets of intervals at which the sentences are true, represented as λt [...t...]. Besides, he also assumes a new semantic type *i*, representing intervals, and a recursive definition of semantic types. To close the temporal abstract, Lin assumes that a general existential closure rule introduces an existential quantifier, similar to the one in Stump (1985) and the one in Ogihara (1996). This is done by Truth Definition (196). In this Truth Definition, time is type i and the *t* in <i, <i, t>> is the regular type t.

196. Truth Definition:

An expression Φ of type <i, <i, t>> that serves as a translation of a matrix sentence is true in the context *c* iff there is a time $t \in T$ and another time $c_T \in$ {T: T is contextually salient} such that $[\![\Phi]\!]^{M,c,W,gc}(c_T)(t) = 1$.

And, last, Lin assumes that temporal adverbials, such as *yesterday*, serve as a restriction upon time variables in logical representations and denote functions from

properties of time intervals to sets of time intervals.

Provided with these assumptions, Lin suggests that *le* is used in a way similar to the deictic use of English past tense observed in Partee (1973), based on the observation that a simple sentence with *le* but without a time adverbial would seem incomplete to some speakers when these sentences are presented outside of context. And, he proposes a semantic translation of *le* as in (197).

197. $[\![le]\!] =_{def} \lambda P_{<i, t>} \lambda t' \lambda t [t < t' \wedge P(t) \wedge t \subseteq t_R]$

With this translation of *le* and the movement of *le* from Asp to the head of TP, Lin tries to demonstrate how his idea works by deriving the meanings of sentences with *le* in the past, present and future situations in (192), (193) and (194b), and by blocking the unlikely meanings of sentences in the future situation, such as (194a). (198) is the semantic derivation of a past situation.

198. LF: [le [Zhangsan xie yi feng xin]]

a. $[\![$zhangsan xie yi feng xin$]\!]$

$= \lambda t \exists x [letter'(x) \wedge write'(x) \wedge write'(x)(Zhangsan')(t)]$

b. $[\![$le zhangsan xie yi feng xin$]\!]$

$= \lambda P \lambda t' \lambda t [t < t' \wedge P(t) \wedge t \subseteq t_R]$

$(\lambda t \exists x [letter'(x) \wedge write'(x) \wedge write'(x)(Zhangsan')(t)])$

$= \lambda t' \lambda t [t < t' \wedge \exists x [letter'(x) \wedge write'(x) \wedge$

$write'(x)(Zhangsan')(t)] \wedge t \subseteq t_R]$

c. Truth Definition:

$\lambda t' \lambda t [t < t' \wedge \exists x [letter'(x) \wedge write'(x) \wedge$

$write'(x)(Zhangsan')(t)] \wedge t \subseteq t_R] (c_T)$

$= \lambda t [t < c_T \wedge \exists x [letter'(x) \wedge write'(x) \wedge$

$write'(x)(Zhangsan')(t)] \wedge t \subseteq t_R]$

d. Truth Definition:

$\exists t [t < s^* \wedge \exists x [letter'(x) \wedge write'(x) \wedge$

$write'(x)(Zhangsan')(t)] \wedge t \subseteq t_R]$

In (198c), c_T is a contextually salient point, which is assumed to be the speech time *s* if no temporal adverbial appears. In (197d), Lin suggests that the Truth Definition closes the temporal abstract, and the contextually salient time c_T is replaced with the speech time *s*. And hence this sentence receives a past tense-like interpretation.

Lin made a technical mistake in (198d). Though he suggests that the Truth Definition (196) takes care of the two free temporal variables *t'* and *t* in (198b), yet (198d) is in fact an existential closure because the Truth Definition cannot close λt existentially. Instead, after lambda abstraction, λt should be abstracted away. The same technical mistake is repeated in all of the semantic derivations below.

The case for future situations is a little complicated. (194a), which does not contain *yijing* 'already', is ungrammatical with the verbal *le*, whereas (194b) with *yijing* 'already' is grammatical. The semantic derivation of (194a) is (199).

199. [le [wo mingtian likai nanjing]]

a. ⟦wo mingtian likai nanjing⟧

$= \lambda t\ [t \subseteq \text{tomorrow'} \wedge \text{leave'(Nanjing')(I)(t)}]$

b. ⟦le wo mingtian likai nanjing⟧

$= \lambda P_{<i,\ t>}\ \lambda t'\ \lambda t\ [t < t' \wedge P(t) \wedge t \subseteq t_R]$

$(\lambda t\ [t \subseteq \text{tomorrow'} \wedge \text{leave'(Nanjing')(I)(t)}])$

$= \lambda t'\ \lambda t\ [t < t' \wedge [t \subseteq \text{tomorrow'} \wedge \text{leave'(Nanjing')(I)(t)}]$

$\wedge\ t \subseteq t_R]$

$= \lambda t\ [t < c_T \wedge [t \subseteq \text{tomorrow'} \wedge \text{leave'(Nanjing')(I)(t)}]$

$\wedge\ t \subseteq t_R]$

$= \exists t\ [t < s' \wedge [t \subseteq \text{tomorrow'} \wedge \text{leave'(Nanjing')(I)(t)}]$

$\wedge\ t \subseteq t_R]$ or

$\exists t\ [t < \text{tomorrow} \wedge [t \subseteq \text{tomorrow'} \wedge \text{leave'(Nanjing')(I)(t)}]$

$\wedge\ t \subseteq t_R]$

In the derivation (199), the contextually salient time can either be the speech time *s* or the temporal adverbial, *tomorrow,* in the sentence. Regardless of what the contextually salient point is, $t < c_T$ and $t \subseteq$ tomorrow' are contradictory. Therefore, the derivation fails and no interpretation can be derived.

To derive the meaning of (194b), Lin first observes that the relative position of the temporal adverbial in the sentence can influence its grammaticality. (194b) is repeated below as (200a), in which the temporal adverbial *mingtian* 'tomorrow'

occurs before the modal *yinggai* ‘should’, and in (200b) *mingtian* ‘tomorrow’ occurs after the modal.

200. a. zhangsan **mingtian** (zhege shihou) <u>yinggai</u> yijing likai le
Zhangsan tomorrow (this time) should already leave PFV
nanjing
Nanking
‘Zhangsan should have already left Nanking by (this moment) tomorrow.’

b. *zhangsan <u>yinggai</u> **mingtian** (zhege shihou) yijing likai le
Zhangsan should tomorrow (this time) already leave PFV
nanjing
Nanking
‘Zhangsan should have already left Nanking by (this moment) tomorrow.’

The distinction between (200a) and (200b) is not because temporal adverbials must appear before modals. In fact, temporal adverbials can appear after modals, as in (201). But, in (201), the temporal adverbial is modifying the event and locating the event at a time, but not serving as an RT.

201. zhangsan yinggai mingtian likai nanjing
Zhangsan should tomorrow leave Nanking
‘Zhangsan should leave Nanking tomorrow.’

Therefore, Lin concludes that a time adverbial must be in a position higher than

a modal when it is interpreted as a reference time. That is, *mingtian* ‘tomorrow’ in (200a) serves as anRT. Then, the translation of *tomorrow* can be an interval, rather than $\lambda P\, \lambda t\, [t \subseteq \text{tomorrow'} \wedge P(t)]$. The semantic derivation of (200a) is as the one in (202).

202. $[_{TP}$ le $[_{AgrsP}$ zhangsan$_i$ $[_{ModalP}$ mingtian $[_{AspP}$ yijing $[_{VP}$ t_i likai]]]]]

a. $[\![\text{ModalP}]\!] = \lambda t\, [t < \text{tomorrow'} \wedge \text{leave'}(\text{Nanking'})(x_i)(t)]$

b. $[\![\text{AgrsP}]\!] = \lambda t\, [t < \text{tomorrow'} \wedge \text{leave'}(\text{Nanking'})(\text{Zhangsan'})(t)]$

c. $[\![\text{TP}]\!] = \lambda t\, [t < c_T \wedge t < \text{tomorrow'} \wedge$
$\text{leave'}(\text{Nanking'})(\text{Zhangsan'})(t) \wedge t \subseteq t_R]$

d. $\exists t\, [t < s \wedge t < \text{tomorrow'} \wedge \text{leave'}(\text{Nanking'})(\text{Zhangsan'})(t)$
$\wedge t \subseteq t_R]$ or
$\exists t\, [t < \text{tomorrow'} \wedge t < \text{tomorrow'} \wedge$
$\text{leave'}(\text{Nanking'})(\text{Zhangsan'})(t) \wedge t \subseteq t_R]$

When c_T is replaced with *s*, a contradiction occurs between $t < s$ and $t <$ tomorrow’. So, *s* cannot be the contextually salient point. When the contextually salient point is *tomorrow*, there are two occurrences of $t <$ tomorrow’ in the derivation, which is, though redundant, harmless. And, the correct interpretation for (200a) (= 194b) can be derived.

Lin suggests that *le* is a relative past tense marker and hence has to move to the head of TP. If *le* is a relative past tense marker, then the following sentences with *le* need explanation because in neutral contexts they have a present tense interpretation.

193. a. zhangsan yang le yi tiao yu

Zhangsan feed PFV one CL fish

'Zhangsan breeds a fish.'

b. menkou zuo le yi ge ren

doorway sit PFV one CL person

'A man is sitting at the doorway.'

To account for the examples, Lin adopts Parsons' (1990) notion of target states and resultant states. Parsons (1990) defines the target state of the event *I threw a ball to the roof* as the state of the ball being on the roof, which may or may not last long, and the resultant state of the same event as the state of *my having thrown the ball onto the roof*.

The notion of target states can help distinguish *writing a letter* from *breeding a fish*. For *writing a letter*, the target state comes into existence as soon as a letter is written and will last for God knows how long. Namely, the target state exists after the event time. But, for *breeding a fish*, the target state comes into existence as soon as the event of breeding begins and will last until the breeding stops. That is, the target state exists as soon as the event starts.

To capture this distinction, Bennet and Partee (1978) definition of initial subintervals presented in (203) is adopted. And, based on the notion of initial subintervals, Lin refines the translation of *le* as in (204). So, (192a) can be translated as (205a) and (193a) as (205b).

203. Let I' be a member of [T]. I is a proper subinterval of I' iff I $\in$ [T], I $\subseteq$ I' and I $\neq$ I'. I is an initial subinterval of I' iff I is a proper subinterval of I' and there do not exist t' $\in$ I'– I and t $\in$ I such that t' $\prec$ t.

204. $[\![\text{le}]\!] =_{\text{def}} \lambda P\, \lambda t'\, \lambda t\, \exists t''\, \exists t'''\, [t < t' \wedge t = f_{\text{initial}}(t'') \wedge t'' = \tau(f_{\text{target}}(P)) \wedge P(t''')] \wedge t''' \subseteq t_R]$[59]

205. a. $\exists t\, \exists t'\, \exists t''\, [t < c_T \wedge t = f_{\text{initial}}(t'') \wedge t'' = \tau(\, f_{\text{target}}(\lambda t'''\, \exists x$ [letter'(x) $\wedge$ write'(x)(Zhangsan')]) (t''') $\wedge$ $\exists$x [letter'(x) $\wedge$ write'(x)(Zhangsan')(t''')] $\wedge$ t'''$\subseteq t_R$]]

b. $\exists t\, \exists t'\, \exists t''\, [t < c_T \wedge t = f_{\text{initial}}(t'') \wedge t'' = \tau(\, f_{\text{target}}(\lambda t'''\, \exists x$ [fish'(x) $\wedge$ breed'(x)(Zhangsan')]) (t''') $\wedge$ $\exists$x [fish'(x) $\wedge$ write'(x)(Zhangsan')(t''')] $\wedge$ t'''$\subseteq t_R$]]

In (205a), if c_T is the speech time, then it means that the target state of Zhangsan's writing a letter must come into existence before the speech time, which in turns entails a past tense reading for (205a), since the speech time is before the target state, which in turns is before the event time, i.e. e < target state < s.

In (205b), if c_T is the speech time, it also means that the target state must come into existence before the speech time. However, for *breeding a fish*, its target state exists as soon as the event time starts. Therefore, for (205b), the event time starts

[59] τ is a temporal trace function, which maps eventualities onto their 'running times', i.e. the time when they occur.

before now since the target state comes into existence before the speech time, and *breeding a fish* can go on for some time after the speech time. This is how (205b) (= translation of (192a)) receives a present tense interpretation.

The above demonstration suggests that the movement of *le* from AspP to the head of TP and the translation of *le* can successfully derive the correct meanings and block the semantic derivations of bad sentences. To further support the movement of *le*, Lin provides the following evidence.

First, if *le* does not move to the head of TP but stays at Asp, unwanted interpretations for ungrammatical sentences as (206) can be derived. This should be avoided.

206. *wo mingtian likai le nanjing

I tomorrow leave PFV Nanking

206'. $[_{TP}\ [_{AgsP}\ wo_i\ [_{ModalP}\ [_{AspP}\ le\ [_{VP2}\ mingtian\ [_{VP1}\ t_i\ likai\ nanjing]]]]]]$

a. $[\![VP_1]\!] = \lambda t$ leave'(Nanking')$(x_i)(t)$

b. $[\![VP_2]\!] = \lambda t\ [t \subseteq$ tomorrow' $\wedge$ leave'(Nanking')$(x_i)(t)]$

c. $[\![AspP]\!]$

$= \lambda P_{<i,\ t>}\ \lambda t'\ \lambda t\ [t < t' \wedge P(t) \wedge t \subseteq t_R]$

$(\lambda t\ [t \subseteq$ tomorrow' $\wedge$ leave'(Nanjing')$(x_i)(t)])$

$= \lambda t'\ \lambda t\ [t < t' \wedge [t \subseteq$ tomorrow' $\wedge$ leave'(Nanjing')$(x_i)(t)]$

$\wedge\ t \subseteq t_R]$

d. ⟦TP⟧ = ∃t [t < c_T ∧ t ⊆ tomorrow’ ∧

leave’(Nanking)(Zhangsan’)(t) ∧ t ⊆ t_R]

206’’. [$_{TP}$ [$_{AgsP}$ wo_i [$_{ModalP}$ mingtian [$_{AspP}$ le [$_{VP}$ t_i likai nanjing]]]]]]

a. ⟦VP⟧ = λt leave’(Nanking’)(x_i)(t)

b. ⟦AspP⟧

=$\lambda P_{<i, t>}$ λt’ λt [t < t’ ∧ P(t) ∧ t ⊆ t_R](λt leave’(Nanking’)(x_i)(t))

= λt’ λt [t < t’ ∧ leave’(Nanking’)(x_i)(t) ∧ t ⊆ t_R]

c. ⟦ModalP⟧

= λt [t < tomorrow’ ∧ leave’(Nanking’)(x_i)(t) ∧ t ⊆ t_R]

d. ⟦TP⟧

= ∃t [t < tomorrow’ ∧ leave’(Nanking’)(x_i)(t) ∧ t ⊆ t_R]

The difference between (206’) and (206’’) lies in the position of *mingtian* ‘tomorrow’. If it modifies the event, then it is attached to VP. If it serves as a reference time, it is located at <Spec, ModalP>.

When *mingtian* ‘tomorrow’ modifies the event, as in (206’), then (d) has a contradiction between t < c_T and t ⊆ tomorrow. Though the derivation (206’) fails and no interpretation is derived, the derivation (206’’) is successful and an interpretation is derived, while this is unwanted since the sentence (206) is ungrammatical and does not have an interpretation. If *le* does not move, unwanted interpretations will be derived. Therefore, *le* has to move. This is an argument for movement.

Secondly, *le* is a relative past tense marker because it is not compatible with

adverbials such as *zongshi* ‘always’, *changchang* ‘often’, *mei tian* ‘every day’, etc. These expressions induce a generic reading. Thus, the T(ense) node should contain a generic T(ense) operator. These expressions are not compatible with *le* because *le*, as a relative past tense marker, has to move to the head of TP, which a generic Tense operator has occupied in a generic sentence.

Last, *le* is not compatible with individual-level predicates, which Carlson (1977) claims ascribe permanent properties to their arguments. Chierchia (1995) proposes that individual-level predicates are inherent generic polarity items and must be licensed by a generic operator. Then, just like the second argument, *le* cannot move to the head of TP because it has been occupied by the generic operator. And since *le* cannot move to check its feature, *le* cannot occur with individual-level predicates.

Though Lin’s analysis seems to be working fine on his examples, it suffers from the following problems, in addition to the techinical mistake about existentially closing a lambda-bound variable with the Truth Definition (196). First, as noted in Chan (1996), Kang (1999), etc., the verbal *le* does not necessarily present a completed event, as shown in (207).

207. ta zuotian xie le yi feng xin keshi mei xiewan
he yesterday write PFV one CL letter but not finish
‘He tried to write a letter yesterday, but he didn’t finish it.’

In (204), Lin suggests that *le* indicates that the initial interval of the target state of an event precedes some contextually salient time. Since the target state of *writing a letter* comes into existence after the event time as Lin suggests, *le* should present a

completed event. However, (207) explicitly points out that Lin's analysis of the verbal *le* is not adequate.

Secondly, Lin suggests that *le* is not compatible with generic sentences because the head of TP has had a generic operator in it, which blocks *le* moving to it. However, in the following generic sentences, *le* can appear.

208. a. ta changchang he le niunai jiu tu
he often drink PFV milk then vomit
'He often drinks milk, and then vomits.'

b. ni zou le ta jiu ku
you leave PFV he then cry
'You leave and then he cries. (It's like this every time.)'

Both (208a) and (208b) have a generic interpretation. (208a) means that it is always the case the he drinks milk and then vomits. (208b) means that it is always the case that you leave and then he cries. The first part of the two examples, *ta he le niunai* 'he drink PFV milk', and *ni zou le* 'you leave PFV', are also licensed by a generic operator, but *le* can appear in both of them. It seems that Lin's explanation of why *le* cannot occur in generic sentences is not general enough.

Thirdly, Lin suggests that a temporal adverbial before a modal denotes an interval and serves as a reference time, while a temporal adverb after a modal modifies a VP and is <<i, t>, <i, t>>. And this suggestion plays an important role in explaining when *le* is compatible with a future situation and when *le* is not. However,

this distinction of the functions of temporal adverbials based on their syntactic positions relative to a modal is not correct. As shown in (209), regardless of the syntactic positions of *mingtian* 'tomorrow', the temporal adverbial modifies the VP *leave*, and serves as a temporal location phrase, not an RT.

209. a. ta yinggai **mingtian** likai
he should tomorrow leave
'He should leave tomorrow.'

b. ta **mingtian** yinggai likai
he tomorrow should leave
'He should leave tomorrow.'

Lin suggests that *le* cannot go with individual-level predicates. Again, this observation is not correct, as shown in (195). Lin uses *xihuan* 'to like' to illustrate his point that *xihuan le* 'like PFV' is not possible. However, it is perfectly grammatical in (210).

210. ta xihuan geju xihuan le yizhenzi
he like opera like PFV a while
'He liked opera for a while.'

Last, Lin suggests that *le* is a relative past tense marker because it has 'deictic' use, just like the past tense in English. This deictic use is, in fact, derived from the aspectual meaning of *le*. The verbal *le* marks a significant point in an event/eventuality and presents the marked part of the event/eventuality as a single whole. A cumulative point, if there is one, is the most significant point in an event.

The best candidate to be marked by *le* in an event/eventuality is the most significant point. If *le* arbitrarily marks a point in an event, there must be a reason to do so. This can be why (211a) is fine alone, but (211b) is incomplete alone.

211. a. ta chi le yi wan fan
he eat PFV one CL rice
'He ate a bowl of rice.'

b. [I]ta chi le fan[60]
he eat PFV rice
'He ate a meal, ...'

212. a. ta wu fenzhong chi yi wan fan
he five minute eat one CL rice
'He can eat a rice of bowl in five minutes.

b. *ta wu fenzhong chi fan
he five minute eat rice

In (211a), *chi yi wan fan* 'to eat a bowel of rice' is accomplishment, which has a natural final endpoint. This can be proved by (212a), where *chi yi wan fan* 'to eat a bowel of rice' is compatible with completive adverbials such as *wu fenzhong* 'in five minutes'. Unless specified otherwise, *le* marks this natural final endpoint, and hence (211a) is grammatical and *le* presents a completed event.

On the other hand, in (211b), *chi fan* 'to eat meals' is activity in Mandarin. This

[60] In Mandarin, *chi fan* is a cover term for *eat meals*.

is proved by (212b), where *chi fan* ‘to eat meals’ is incompatible with completive adverbials. An activity does not have a natural final endpoint or a cumulative point and hence does not have a significant point for *le* to mark. If *le* arbitrarily marks a point in an activity, then there must be a good reason to do so, for example, the activity serves as the first action in a series of actions. This is why (212b) sounds incomplete.

Given the discussion above, it can be argued that the deictic use of *le* directly follows from its aspectual meaning. Therefore, it seems unnecessary to propose that *le* is a relative past tense marker.

While the works reviewed in this section provide a good understanding of the syntactic and semantic behavior of the perfective *le*, none of them tries to provide semantics for the perfective *le* that can deal with terminated, but not completed, events. In the next section, it is attempted to provide the perfect *le* semantics that can deal with both completed and terminated events.

5.3 Semantics of the Perfective Marker *le*

5.3.1 The SigP Analysis and the Perfective *le*

The previous works on the perfective *le* have established two points. First, the perfective *le* presents an event as a single whole and the process of an event presented by *le* is not accessible. Secondly, the perfective *le* can either present a completed or terminated event. Given the fact that most of the works provide a description of *le* and Lin’s (2000a) suffers some problems, a new formal analysis seems to be necessary.

In Chapter Three, it has been argued that the aspectual function of the

progressive marker *zai* can be easily stated in terms of the SigP analysis, which is discussed in Section 2.2. The aspectual function of the perfective marker *le* can also be easily described in terms of the same notion. That is, from all of the discussions above, *le* can be argued to pick up a significant point (SigP) in an event/eventuality, presents as a single whole the event/eventuality from the initial endpoint up to the significant point, and locate the SigP before an RT. This analysis can explain the following examples.

213. a. zhangsan da le lisi
Zhangsan hit PFV Lisi
'Zhangsan hit Lisi.'

b. zhangsan xie le yi feng xin
Zhangsan write PFV one CL letter
'Zhangsan wrote a letter.'

c. [I]zhangsan pao le bu, ...
Zhangsan jog PFV step
'Zhangsan jogged, and .....'

c'. zhangsan pao le bu jiu qu shangxue
Zhangsan jog PFV step JIU go school
'Zhangsan jogged, and then went to school.'

d. hua hong le
flower redden PFV
'The flower becomes red.'

In (213a), *da* ‘to hit’ is achievement. Its SigP is its only point, i.e. the initial/final endpoint. The perfective *le* locates the event up to the SigP before an RT. Under a neutral context, the reference time is usually the speech time, ST. For (213a), the event up to the SigP is located before ST, and hence it gets a past tense-like interpretation[61].

In (213b), *xie yi feng xin* ‘to write a letter’ is accomplishment. The perfective *le* marks its culmination point, which is the SigP of accomplishment, and locates the event up to the SigP before an RT. Just as (213a), under a neutral context, the RT is the ST. Hence, (213b) also receives a past tense-like interpretation.

In (213c), *paobu* ‘to jog’ is activity. Only when it is necessary can a point in activity be specified as a SigP. This is why (213c) is incomplete because there is no obvious reason to identify a SigP in this example. On the other hand, (213c’) is fine because *paobu* ‘to jog’ is the first event in a series of two events. Serving as the first event in a series of two events qualifies as an obvious reason to identify a SigP for activity. Hence, the perfective *le* can appear and (213c’) is fine.

In (213d), *hong* ‘red’ is a state whose SigP is the initial endpoint. The perfective *le* marks it and locates the eventuality temporally before an RT, which is the ST under a neutral context. That is, the state of being red starts before the ST. Since there is no explicit indication stating that the state terminates, (213d) has an inchoative reading,

[61] This should not be interpreted as a relative tense marker because aspects are also related to a RT. The fact that a perfective marker locates (part of) an event/eventuality before an RT is just like that the progressive marker *zai* locates part of an event on an RT. Both need an RT to anchor the event/eventualities they present.

and hence a present tense interpretation.

5.3.2 The SigP Analysis of *le* and Lin J.'s (2000a) Problems

The advantage of the SigP analysis does not reveal itself in the above examples because Lin's (2000a) proposal can also account for all of the examples in (213) except (213c) and (213c'). The advantage of the new proposal manifests themselves in the following examples, with which Lin's (2000a) analysis has problems.

214. a. ta zuotian xie le yi feng xin keshi mei xiewang
he yesterday write PFV one CL letter but no write-finish
'He wrote a letter yesterday, but didn't finish it.'

b. ta xie yi feng xin xie le liang ge xiaoshi
he write one CL letter write PFV two CL hour
'He wrote a letter for two hours.'

c. ta xie yi feng xin xie le liang ge xiaoshi
he write one CL letter write PFV two CL hour
keshi mei xiewan
but no write-finish
'He wrote a letter for two hours, but he didn't finish it.'

Lin (2000a) will predict (214a) to be false. In his analysis the target state comes into existence after the event time of *he writing a letter*, that is, the event must be completed. Therefore, a conjunct that says otherwise will render this sentence ungrammatical and false.

However, this sentence is true, as pointed out in several parts of Section 5.2.

The new analysis discussed here can account for this. It is proposed that the SigP of an event/eventuality is defeasibly inferred from the situation type of the event/eventuality, that is, it can be overridden. Though *xie yi feng xin* 'to write a letter' is accomplishment and its SigP is its culmination point, the completion of the event is not lexically encoded and hence can be overridden, as specified in (31 II-f) in Chapter Two. Therefore, in (214a), the conjunct *keshi mei xiewan* 'but not finish' overrides the SigP inferred defeasibly[62] from the situation type of *xie yi feng xin* 'to write a letter'. Because of this, (214a) expresses an uncompleted, but terminated event[63].

In (214b), without a context saying otherwise, the endpoint of *two hours* coincides with the SigP of *xie yi feng xin* 'to write a letter', and hence (214b) denotes a completed event. Lin's (2000a) can explain this because it is a completed event that is presented in this case.

But, again, Lin's analysis fails to explain (214c), just like he cannot explain (214a), while it is not a problem for the new SigP analysis. In this example, the conjunct *keshi mei xiewan* 'but no finish' overrides the SigP defeasibly inferred from the situation type of *xie yi feng xin* 'to write a letter', and the SigP is relocated. In (214c), the SigP must be two hours away from the initial endpoint of *xie yi feng xin*

[62] Though an RVC is also an accomplishment verb, it denotes completion when presented by *le*. This is because the resultative state of an RVC is lexically encoded, i.e. intrinsic, whereas the resultative state of an accomplishment verb such as *xie yi feng xin* 'to write a letter', is inferred from the combination of a quantified NP and a verb.

[63] Where the SigP is placed does not matter here. It can be any point between the initialend point and the culmination point. A durational phrase explicitly specifies where the SigP is placed, as in (214c).

‘to write a letter’, as indicated by the durational phrase *liang ge xiaoshi* ‘two hours’.

Since a durational phrase is discussed here, a punctual (completive) phrase should also be discussed since both of them are temporal phrases. The difference between a durational phrase and a punctual phrase lies in that a durational phrase presents the duration of an event, while a punctual phrase denotes the completion of an event within the time interval denoted by the phrase. That is, a durational phrase can, but not necessarily, presents the completion of an event, whereas a punctual phrase presents the completion of an event only. Lin’s (2000a) cannot explain the different interaction of an event presented by *le* with these two kinds of temporal phrases since in his analysis the perfective *le* presents the completion of an event only. Semantically, these two kinds of phrases have different functions, too. A durational phrase identifies a SigP in an event/eventuality, which can, but does not have to, coincide with the SigP defeasibly inferred from the situation of the event/eventuality. A punctual phrase does not identify a SigP. On the other hand, it provides an RT, which is the final endpoint of the time interval denoted by the phrase, and locates the SigP of a predicate before the RT. This is why an event presented by the perfective *le* together with a punctual phrase always expresses a completed one since *le* locates the SigP before this RT, as shown in (215).

215. a. ta yi ge xiaoshi jiu xie le yi feng xin
he one CL hour JIU write PFV one CL letter
‘He wrote a letter in only one hour!’

b. ta ban ge xiaoshi jiu kan le liang ben shu
he half CL hour JIU read PFV two CL book
'He read two books in half an hour.'

For (215a), the RT is the final endpoint of *yi ge xiaoshi* 'one hour'. The perfective *le* identifies the SigP of *xie yi feng xin* 'to write a letter', and locates the SigP before the RT. Since the SigP is the culmination point, (215a) receives a completion interpretation. The same is for (215b). The RT is the endpoint of *ban ge xiaoshi* 'half an hour', *le* identifies the SigP of *kan liang ben shu* 'to read two books' and locates it before the RT. Since *kan liang ben shu* 'to read two books' is accomplishment and its SigP is its natural final endpoint, (215b) also receives a completion reading.

Before the new analysis is applied to the problems of Lin (2000a) to test whether the new analysis also works for them, the situation type *state* needs some discussion. States are generally assumed to include at least two groups of predicates in Mandarin, i.e. the psychological verbs such as *xihuan* 'to like', *ai* 'to love', *xiang* 'to think', and so on, and stative predicates such as *gao* 'to be tall', *hong* 'to be red', *xong* 'to be fierce', etc. However, these two groups have different interactions with the perfective *le*, as shown in (216).

216. a. hua hong le
flower red PFV
'Flowers become red.'

b. hua hong le hen jiu

flower red PFV very long

'Flowers were red for a long time.'

c. [I]ta xihuan le geju

he like PFV opera

'He liked operas, and....'

d. ta xihuan geju xihuan le hen jiu

he like opera like PFV very long

'He liked operas for a long time.'

While *hong* 'to be red' can either have an inchoative reading, as in (216a), or a durative reading, as in (216b), *xihuan* 'to like' can have a durative reading only, as in (216c) and (216d). Therefore, the definition of the SigP for state in (30d) seems to be over-simplified. The psychological verbs behave more like activity in terms of their interaction with the perfective *le*. In fact, in Mandarin, the psychological verbs should be categorized as activity verbs, based on the fact that they are compatible with the progressive marker *zai*, but stative verbs such as *hong* 'to be red' are not, as demonstrated below.

217. a. ta xinli zai xiang zhe bushi wo de cuo

he mind PRG think this not I POSS fault

'In his mind, he is thinking that this is not his fault.'

b. laoli zai xihuan xiaomei

Laoli PRG like Xiaomei

'Laoli is liking Xiaome[64].'

c. *hua zai hong

flower PRG red

'*Flowers are being red.'

The psychological verbs behave like an activity predicate in terms of their interaction with the perfective *le* because they ARE activity verbs. Then, the definition of the SigP for state in (30d) is not over-simplified. Instead, it works well.

Lin (2000a) intends to explain why the perfective *le* can describe past situations, present situations and future situations. He suggests that *le* is a relative past tense marker, and locates an event temporally before an RT. While his analysis is correct in that the perfective *le* needs an RT, it is inadequate in that *le* does not have to present a completed event. This is why the SigP analysis is introduced and argued to be preferable to Lin's (2000a) analysis. In addition, the SigP analysis can also explain the examples without movement, which Lin (2000a) claims need movement to account for. Below is a demonstration of how the SigP analysis applies to the problems Lin discusses.

The three situations Lin (2000a) discusses are repeated below.

[64] This English sentence is ungrammatical since English verbs such as *like, love,* etc., are not compatible with the progressive aspect. Here, to emphasize that in Mandarin *xihuan* 'to like' is compatible with the progressive aspect, an ungrammatical English sentence is used.

192. Past situations

a. zhangsan da le lisi

Zhangsan hit PFV Lisi

‘Zhangsan hit lisi.’

b. zhangsan xie le yi feng xin

Zhangsan write PFV one CL letter

‘Zhangsan wrote a letter.’

193. Present situations

a. zhangsan yang le yi tiao yu

Zhangsan feed PFV one CL fish

‘Zhangsan is breeding/has been breeding a fish.’

b. menkou zuo le yi ge ren

doorway sit PFV one CL person

‘A man is sitting at the doorway.’

194. Future situations

a. *zhangsan mingtian (zhege shihou) likai le nanjing

Zhangsan tomorrow (this time) leave PFV Nanjing

‘Zhangsan leaves Nanking (at this moment) tomorrow.’

b. zhangsan mingtian (zhege shihou) (yinggai) yijing likai le
Zhangsan tomorrow (this time) (should) already leave PFV
nanjing
Nanjing
'Zhangsan should have already left Nanking by (this moment) tomorrow.'

Before a new semantic translation of the perfective *le* is defined in terms of SigP, and before the semantic derivations of the examples in (192), (193) and (194) are provided to show how the new translation works, the examples in (193) need some discussion.

The verbs of placement, such as *diao* 'to hang', *fang* 'put', *chuan* 'to wear', and verbs of posture, such as *zuo* 'to sit', *zhan* 'to stand', *tang* 'to lie on one's back', have a special property, that is, these verbs include both an action and a state resulted from the action in their lexical semantics. Both parts can be made specific in a sentence, as shown in (218) and (219).

218. a. ta zai chuan maoyi
he PRG put on sweater
'He is putting on a sweater.'
b. ta chuan zhe maoyi
he wear DUR sweater
'He is wearing a sweater.'

219. a. ta zuo xia le

he sit down Prc

'He sat down.'

b. ta zuo zhe

he sit DUR

'He is sitting.'

The two imperfective markers *zai* and *zhe* can help here. The progressive marker *zai* can identify the action part of *chuan* 'to put on, to wear' and present it as an on-going action, as in (218a). On the other hand, *zhe* identifies the resultative state of *chuan* 'to put on, to wear' and presents it as a state lasting over an interval, as in (218b).

A similar distinction can be observed in the two examples in (219). In (219a), the adverbial *xia* 'down' brings out the action part of *zuo* 'to sit', and in (219b) the durative marker *zhe* brings out the resultative state part of the same verb.

The verbs of placement are accomplishment verbs because they are compatible with the progressive marker *zai* and hence have process, while the verbs of posture are achievement verbs because they are not compatible with the progressive marker *zai* and hence do not have process[65]. The perfective *le* identifies as the SigP the only point of an achievement verb, i.e. the initial/final endpoint, and it identifies as the

[65] Under extremely restricted circumstances, such as watching an action in slow motion, it seems fine for the verbs of posture to go with the progressive marker *zai*. In those cases, the verbs of posture might be categorized as accomplishment verbs. But, this potential change in situation types does not affect the analysis in any way, since in a way the SigP for both accomplishment and achievement is their natural final endpoint.

SigP the culmination point of accomplishment. This part is not so different from the examples in (192).

However, there is a difference between (192) and (193). The difference is that for the verbs of posture and of placement the perfective *le* also indicates the inception of their resultative states. That is, for the verbs of posture and of placement, a sentence like (193b) not only expresses the completion of the event, but also indicates the beginning of the state resulted from the action. For these two kinds of verbs the perfective *le* locates both the completion of the event and the beginning of the resultative state before the RT, which is the ST in a neutral context like this one. This is why (193b) does not receive a past tense reading, but a present tense reading. Unless the context specifically points out the termination of the resultative state, the resultative state can last.

In (193a), though *yang yi tiao yu* '(literally) to feed a fish, (semantically) to keep a fish as a pet' is not a verb of posture or of placement, the predicate has a property similar to these two kinds of verbs. As soon as the action of feeding a fish is completed when marked by the perfective *le*, the resultative state of a fish being kept as a pet starts and continues until the context indicates its termination.

(193a) is different from (192a) and (192b) in that *da* 'to hit' and *xie* 'to write' do not include the resultative state in their lexical semantics. This difference can also be brought out by the imperfective markers *zai* and *zhe*, as demonstrated in (220) and (221).

It has been argued in Chapters Three and Four that the progressive marker *zai*

goes with action verbs only and the durative marker *zhe* can bring out the resultative state of placement verbs and of posture verbs. This distinction in the aspectual functions of the two imperfective markers are used to support the argument that verbs such as *da* 'to hit' do not include a resultative state in their lexical semantics while verbs such as *yang* 'to feed, to keep (a pet)' do.

220. a. ta **zai** yang ta de yu
he PRG feed he POSS fish
'He is feeding his fish.'

b. ta yang **zhe** yi tiao yu
he feed DUR one CL fish
'He keeps a fish as his pet[66].'

221. a. zhangsan **zai** da lisi
Zhangsan PRG hit Lisi
'Zhangsan is hitting Lisi.'

[66] These two examples are not really a minimal pair because (221a) has a definite object while (221b) has an indefinite object. It seems that for verbs that contain both an action and its resultative state in their lexical semantics they do not allow for an indefinite object when going with the progressive marker *zai*. For example, *chuan* 'to wear, to put on' has a similar syntactic behavior.

i. a. ta zai chuan ta de yifu
he PRG put on he POSS clothes
'He is putting on his clothes.'
b. *ta zai chuan yi jian yifu
he PRG put on one CL clothes
'*He is putting on a piece of clothing.'
c. ta chuan zhe ta de /yi jian yifu
he wear DUR he POSS/one CL clothes
'He is wearing his/a piece of clothing.'

But, the (in)compatibility with an indefinite object does not affect the property of *chuan* 'to wear, to put on' to contain both an action and a resultative state in its lexical semantics. The issue of why it is so will not be pursued in this dissertation.

b. zhangsan *(yunglide) da **zhe** lisi

Zhangsan forcibly hit DUR Lisi

‘Zhangsan is hitting Lisi forcibly.’

While both in (220a) and (221a) the progressive marker *zai* brings out the action parts of the two verbs, the durative marker *zhe* does not have this uniform function. (220b) describes the lasting of the resultative state of *feed a fish* over an interval, whereas (221b) presents the lasting of an activity over an interval. That is, as an activity, when *da lisi* ‘to hit Lisi’ is presented by *zhe*, it is still an on-going event. However, when *yang yi tiao yu* ‘to feed a fish, to keep a fish as one’s pet’ is presented by *zhe*, the sentence is not an on-going event. Instead, the sentence denotes that the resultative state obtains. That is, *yang yi tiao yu* ‘to feed a fish, to keep a fish as one’s pet’ is not activity. Instead, it behaves more like the verbs of posture in that *zhe* brings out their resultative states.

5.3.3 Semantics of *le* and the Hypothesis for Its Role in Temporal Progression

In the last section, it is argued that *yang yi tiao yu* ‘(literally) to feed a fish, (semantically) to keep a fish as a pet’ contains both an action and a resultative state in its lexical semantics, just like the verbs of posture and verbs of placement, it seems unnecessary to utilize the idea of a target state (Parsons 1990), and the semantic translation for the perfective *le* can be significantly simplified since it becomes unnecessary to utilize the idea of subinternvals. The semantic translation of the perfective *le* is defined as (222a). The semantic derivation of (192a) is demonstrated in (223a) and the one of (193) is shown in (223b).

222. a. $[\![le]\!] =_d \lambda P\ (\lambda t')\ \lambda x\ \lambda t''\ \exists e\ \exists t\ [P(x, e) \wedge SigP(e) = t \wedge (t \subseteq t')$
$\wedge\ t \prec t']$ if the context says consistent that $\exists e\ \exists t$
$[P(x, e) \wedge SigP(e) = t \wedge t \prec t'']$; otherwise,
$\lambda P\ (\lambda t')\ \lambda x\ \lambda t''\ \exists e\ \exists t\ [\varphi_p(x, e) \wedge \forall e, x\ [[\varphi_p(x, e)] >$
$\exists e', P\ [e \prec e' \wedge P(x, e')]] \wedge SigP(e') = t$
$\wedge$ final_endpoint(e) = t $\wedge$ (t $\subseteq$t') $\wedge$ t $\prec$ t'']

b. $[\![$Temporal Location Phrase$]\!] =_d \lambda P\ \exists t\ [P(t) \wedge t =$ TMP_LOC']

e.g. $[\![$yesterday$]\!] = \lambda P\ \exists t\ [P(t) \wedge t =$ yesterday']

c. Truth Definition (revised):

An expression Φ of type <i, t> that serves as a translation of a matrix sentence is true in the context *c* iff there is a time t_R is an RT such that $[\![\Phi]\!]^{M,c,W,gc}\ (t_R) = 1$.

The perfective *le* has a complicated semantics. (222a) basically says that the event *e* presented by *le* can be claimed to exist ($\exists$e) if the context does not indicate that the event is not completed. Otherwise, the event presented by *le*, $\varphi_P(x)$, is part of a completed event P(x) and if $\varphi_P(x)$ then normally P(x) that occurs after $\varphi_P(x)$. In this case, the problem can be avoided that an uncompleted event *e* is claimed to exist.

There are three different temporal variables in the semantics of *le*. *t'* is for a temporal location phrase. It is optional because a temporal location phrase is syntactically optional. *t''* is an RT. *t* is the time of the SigP of the event presented by the perfective *le*.

(222b) is a general semantic translation for a temporal location phrase, such as *mingtian* ‘tomorrow’, *zuotian* ‘yesterday’, *jingtian* ‘today’, etc. The Truth Definition (222c) offers a contextually salient time as an RT.

The semantic derivations are presented below. One point to note about the semantic derivations below is that the semantics of *le* that deals with completed events is used because all of the examples below stand alone and nothing in the context indicates that the events are not completed.

223. a. ⟦xie le yi feng xin⟧

$= \lambda P\, \lambda x\, \lambda t''\, \exists e\, \exists t\, \exists y\, [P(x, e) \wedge SigP(e) = t \wedge t \prec t'']$

$(\lambda x\, \lambda e\, \exists y\, [letter'(y) \wedge write'(x, y, e)])$

$= \lambda x\, \lambda t''\, \exists e\, \exists t\, \exists y\, [letter'(y) \wedge write'(x, y, e) \wedge SigP(e) = t$

$\wedge t \prec t'']$

⟦Zhangsan xie le yi feng xin⟧

$= \lambda t''\, \exists e\, \exists t\, \exists y\, [letter'(y) \wedge write'(Zhangsan', y, e) \wedge$

$SigP(e) = t \wedge t \prec t'']$

Truth Definition:

$\lambda t''\, \exists e\, \exists t\, \exists y\, [letter'(y) \wedge write'(Zhangsan', y, e) \wedge SigP(e) = t$

$\wedge t \prec t'']\ (t_R)$

$= \exists e\, \exists t\, \exists y\, [letter'(y) \wedge write'(Zhangsan', y, e) \wedge SigP(e) = t$

$\wedge t \prec t_R]$

b. ⟦yang le yi tiao yu⟧

= λx λt'' ∃e ∃t ∃y [fish'(y) ∧ feed'(x, y, e) ∧ SigP(e) = t

∧ t ≺ t'']

⟦Zhangsan yang le yi tiao yu⟧

= λt'' ∃e ∃t ∃y [fish'(y) ∧ feed'(Zhangsan', y, e) ∧ SigP(e)= t

∧t ≺ t'']

Truth Definition:

∃e ∃t ∃y [fish'(y) ∧ feed'(Zhangsan', y, e) ∧ SigP(e) = t

∧ t ≺ t_R]

(223a) (= 192b) receives a past tense reading because under a neutral context the SigP of *xie yi feng xin* 'to write a letter' is its natural final endpoint, and the time of the SigP (= the natural final endpoint here) is located before an RT (= c_T in the derivation). Since the completed event is before the ST, the sentence has a past tense reading.

In (223b) (= 193a), the SigP of *yang yi tiao yu* '(literally) to feed a fish, (semantically) to keep a fish as a pet' is the natural final endpoint of the action *feeding* and the beginning of the resultative state of *a fish being kept as a pet*. Though the action ends before the ST, the resultative state starts before the ST and obtains. Since no information in the context indicates the termination of the resultative state, the resultative state continues. This is how this sentence receives a present tense interpretation.

As for the future situations, the semantic derivation of (194a) can be blocked and hence it cannot get a reading. The semantic derivation clashes because of the Truth Definition. When the Truth Definition provides an RT, *t'* is replaced by t_R, which is either the ST if the sentence stands alone, or a time passed on by a previous sentence if the sentence is in a context. Here, the sentence stands alone, and therefore t_R is the ST. There is a clash because *t'* cannot be part of *tomorrow* and simultaneously precedes the ST. This is why (194a) is ungrammatical. The derivation is given in (224).

224. ⟦likai le Nanjing⟧

$= \lambda t' \, \lambda x \, \lambda t'' \, \exists e \, \exists t \, [leave'(x, Nanjing', e) \wedge SigP(e) = t \wedge t \subseteq t'$

$\wedge \, t \prec t'']$

⟦mingtian likai le Nanjing⟧

$= \lambda x \, \lambda t'' \, \exists e \, \exists t \, \exists t' \, [leave'(x, Nanjing', e) \wedge SigP(e) = t \wedge t \subseteq t'$

$\wedge \, t \subseteq t' \wedge t' = tomorrow' \wedge t \prec t'']$

⟦Zhangsan mingtian likai le Nanjing⟧

$= \lambda t'' \, \exists e \, \exists t \, \exists t' \, [leave'(Zhangsan', Nanjing', e) \wedge SigP(e) = t$

$\wedge \, t \subseteq t' \wedge t \subseteq t' \wedge t' = tomorrow' \wedge t \prec t'']$

Truth Definition:

$\exists e \, \exists t \, \exists t' \, [leave'(Zhangsan', Nanjing', e) \wedge SigP(e) = t$

$\wedge \, t \subseteq t' \wedge t \subseteq t' \wedge \mathbf{t' = tomorrow'} \wedge \mathbf{t \prec t_R}]$

Before (194b) is discussed, some discussion about *yijing* 'already' is necessary

since the grammatical difference between (194a) and (194b) lies in that (194b) has this adverbial but (194a) does not. The adverbial *yijing* 'already' describes a situation where an event/eventuality occurs before an RT. It requires that the temporal phrase serving as the RT occur before it and that any temporal adverbial between *yijing* and a verb, which needs to be marked by *zai* 'at', is the time when the event/eventuality denoted by the verb exists. These two points are demonstrated in (225a) and (225b). The fact that *yijing* 'already' syntactically requires a temporal phrase serving as its RT is very different from the behavior of the perfective *le* with respect to an RT because any temporal adverbial in a clause with *le* is always a temporal location phrase, i.e. it locates an event at a time, rather than serving as an RT. This point is shown in (225c).

225. a. ta zuotian xiawu yijing likai *(le) nanjing
he yesterday afternoon already leave PFV Nanjing
'He had already left Nanjing by yesterday afternoon.'

b. ta yijing *(zai) zuotian xiawu likai *(le) nanjing
he already *(at) yesterday afternoon leave PFV Nanjing
'He already left Nanjing yesterday afternoon.'

c. ta zuotian likai le nanjin
he yesterday leave PFV Nanjing
'He left Nanjing yesterday.'
'*He had left Nanjing by yesterday.'

The three examples above show that *yijing* 'already' syntactically requires an RT, which may be syntactically underspecified, and the perfective *le* contextually

require an RT, which can never be syntactically specified. *yijing* 'already' does not really do anything except that it syntactically requires an RT. This generalization is borne out by the fact that *yijing* 'already' must go with *le*, as shown in (225a) and (225b). If *yijing* 'already' also could place a SigP before an RT, it would not require *le* to go with it. Based on this observation, the semantic translation of *yijing* 'already' can be defined as (226). It is clear that (226) does not do anything except shifting the position of the variable for RT to the pre-*yijing* position. The semantic derivation of (194b), repeated as (227a), is (227b). Here, it is also assumed that temporal adverbials are ambiguous, following Lin (2000a).

226. $[\![\text{yijing}]\!] =_d \lambda P\, \lambda t\, \lambda x\, [P(x)(t)]$

227. a. zhangsan mingtian yijing likai le nanjing
Zhangsan tomorrow already leave PFV Nanjing
'Zhangsan will have left Nanjing by tomorrow.'

b. $[\![\text{likai le Nanjing}]\!]$
$= \lambda x\, \lambda t'\, \exists e\, \exists t\, [\text{leave}'(x, \text{Nanjing}', e) \wedge \text{SigP}(e) = t \wedge t \prec t']$
$[\![\text{yijing likai le Nanjing}]\!]$
$= \lambda t'\, \lambda x\, \exists e\, \exists t\, [\text{leave}'(x, \text{Nanjing}', e) \wedge \text{SigP}(e) = t \wedge t \prec t']$
$[\![\text{mingtian yijing likai le Nanjing}]\!]$
$= \lambda x\, \exists e\, \exists t\, [\text{leave}'(x, \text{Nanjing}', e) \wedge \text{SigP}(e) = t \wedge t \prec \text{tomorrow}']$

⟦zhangsan mingtian yijing likai le Nanjing⟧

= ∃e ∃t [leave'(Zhangsan', Nanjing', e) ∧ SigP(e) = t

∧ t ≺ tomorrow']

One thing worth noting about *yijing* 'already' is that the temporal phrase serving as an RT syntactically required by *yijing* 'already' can be left unspecified. In this case, the RT can either be the ST or another time specified in context. The following examples demonstrate this syntactic underspecification.

228. a. ta yijing zai **zuotian** xiawu likai le nanjing

he already at **yesterday** afternoon leave PFV Nanjing

'He already left Nanjing yesterday afternoon.'

b. *ta yijing zai **mingtian** xiawu likai le nanjing

he already at **tomorrow** afternoon leave PFV Nanjing

'*He already left Nanjing by tomorrow afternoon.'

c. * ta yijing zai **xianzai** likai le nanjing

he already at **now** leave PFV Nanjing

'*He already left Nanjing by now.'

229. A: zuotian wo dadianhua gei laoli keshi ta bu zai

yesterday I telephone to Laoli but he no at

'Yesterday I called him, but he wasn't home.'

B: ta *xianzai/*mingtian/(zuotian) yijing zou le

he now / tomorrow/yesterday already leave PFV

'He had already left (by yesterday).'

Under a neutral context, the RT for *yijing* 'already' is the ST. This is why (228b) and (228c) are ungrammatical. Recall that the temporal phrase between *yijing* 'already' and a verb is a temporal location phrase, which locates an event at a time. Since under a neutral context the RT for *yijing* 'already' is the ST, the event cannot occur at the ST or after the ST. In (228b), the event occurs in tomorrow, but the default RT places the event before the ST. This is where a temporal clash takes place. A similar situation can be observed about (228c). In (228c), the event occurs at the present, but the default RT places the event before the ST, and hence a temporal clash occurs.

On the other hand, if an RT is contextually specified, as in the small dialogue (229), the specified RT also serves as an RT for *yijing* 'already'. Person A complains about that he could not reach Laoli by phone yesterday. Person B explains that Laoli had left and that is why he could not reach him. Under this context, the RT for *yijing* 'already' in (229B) is *zuotian* 'yesterday'. Therefore, it is ungrammatical to supply any RT other than the contextually specified one, *zuotian* 'yesterday'. This observation suggests that the RT required by *yijing* 'already' is anaphoric.

Lin (2000a) proposes that the perfective *le* is a relative past tense marker based on the suggestion that *le* has to move to the head of T from AspP. He offers three arguments to support his claim. The first is that (194a) will receive an interpretation if

le does not move, which is demonstrated in (206’’). But, (194a) is ungrammatical and hence should not have a reading. Hence, Lin claims that *le* must move.

However, it is demonstrated in (224) that *le* does not have to move, but the derivation of the sentence is blocked because of a clash of the location of the event time *t* in the Truth Definition, i.e. t $\subseteq$ tomorrow’ and t < t_R (= ST). In Lin’s analysis, the same sentence can get a reading because he assumes that *mingtian* ‘tomorrow’ is freely ambiguous between serving as a temporal location and as a reference time. This assumption is intuitively wrong because in Mandarin a temporal adverbial before a verb always denotes a temporal location for the event/eventuality denoted by the verb, unless there is an adverb, such as *yijing* ‘already’, intervening in between. Therefore, though a temporal adverb is ambiguous, it is not freely ambiguous, i.e. the two readings of a temporal phrase are in fact in complementary distribution, the reference time reading occurs only when a reference time is required. For (194a), since there is no indication that a reference time is required, *mingtian* ‘tomorrow’ can only serve as a temporal location, and hence the semantic derivation is blocked. No movement is necessary.

Secondly, Lin proposes that *le* cannot occur with adverbials, such as *zongshi* ‘always’, *changchang* ‘often’, *meitian* ‘every day’, etc., because these adverbs introduce a generic tense operator in T, and hence *le* cannot move to T. He further suggests that *le* does not occur in a generic/generalizing sentence because the T of a generic sentence also has a generic tense operator, just like what the adverbs

mentioned above do. This proposal has been argued to be inaccurate because of (230) (= (208)).

230. a. ta changchang he le niunai jiu tu
he often drink PFV milk then vomit
'He often drinks milk, and then vomits.'

b. ni zo le ta jiu ku
you leave PFV he then cry
'You leave and then he cries. (It's like this every time)'

Both (230a) and (230b) are generalizing sentences, and both are perfectly fine with the perfective *le* in them. The new analysis argued for in this section can explain both of them. In (230a), *he niunai* 'to drink milk' is an activity. A SigP is arbitrarily identified because it serves as the first event in a series of two events here. And, the SigP denotes the completion of the activity. The perfective *le* does not have move at all. For (230b), *zo* 'to leave' is an achievement. Its SigP is its initial/final endpoint since no context suggests otherwise. In this case, the perfective *le* also marks the first event in a series of two events. And, again, the perfective *le* does not have to move.

Thirdly, Lin claims that *le* is incompatible with individual-level predicates, such as *xihuan* 'to like', because these predicates are inherently generic and hence introduce a generic tense operator in T, which blocks *le* moving to T. This claim is also argued to be not accurate due to the examples in (231) (= (210)).

231. a. ta xihuan geju xihuan le yizhenzi

he like opera like PFV a while

'He liked opera for a while.'

b. [I]ta xihuan le geju

he like PFV opera

'He liked operas, and....'

(231b) is incomplete because psychological verbs have been argued to be activity verbs, and an activity verb needs a reason for its SigP to be identified. A durational adverb can identify the SigP for an activity verb. Hence, (231a) describes that his liking operas lasted for a while. When no context indicates otherwise, it can be nonmonotonically inferred that he stops liking operas now. Again, no movement is necessary.

Before the summary of this section, how a default SigP is overridden should be discussed. Overriding a default SigP is done by rhetorical relations in SDRT because it takes a context to override a default SigP, as shown in (232).

232. a. zhangsan xie le yi feng xin

Zhangsan write PFV one CL letter

'Zhangsan wrote a letter.'

b. keshi mei xiewan

but no write-finish

'But, he did not finish it.'

(232a) alone still describes a completed event. But, once (232b) is added into

the discourse, the completion sense is overridden and the termination sense surfaces. (232a) and (232b) are connected together by *Contrast*, which is monotonically determined by *keshi* 'but'. Since (232a) is contrasted with (232b), these two clauses must have some contrastive part. It cannot be the two NP's, *Zhangsan* and *yi feng xin* 'one letter', because they are the antecedents for the two zero anaphors in (232b), which are the subject and the object respectively. Therefore, the contrastive part must be the VPs. The VP in (232a) describes a completed event by default because of the semantics of the perfective *le*. However, the VP in (232b) clearly says that the *writing-a-letter* event is not completed. Since there are two pieces of contradicted information, the default one is overridden. That is, the SigP of the *writing-a-letter* event in (232a) is no longer the default value because it is overridden. One might ask where the significant point is located after its default value is overridden. This information is not specified in either in (232a) or (232b) because it is not clear at all how much of the letter *Zhangsan* wrote. The only thing known is that the letter is not finished and the significant point is not the natural final endpoint of a *writing-a-letter* event.

To sum up, the perfective *le* presents as a single whole an event/eventuality from its initial point to its SigP. The SigP for an event/eventuality is defeasibly inferred from the situation type of the event/eventuality. The SigP analysis is preferable to Lin's (2000a) analysis because Lin fails to consider the fact that the perfective *le* can also present a terminated situation. Besides, Lin observes three phenomena to support his claim that *le* must move to T and hence is a relative past

tense marker. However, it has been demonstrated that Lin's observation is not adequate and flawed. The SigP can account for the same phenomena without moving *le* and the past tense interpretation of *le* is argued to follow from the perfective aspectual property of *le*.

The SigP analysis is preferable to Shi's (1990) proposal because the new analysis is more intuitive and precise. Shi (1990) proposes that *le* is a relative anteriority marker, which is located after the terminal boundary of a bounded event, and after the initial boundary of an unbounded eventuality. This analysis is counterintuitive and imprecise because *le* presents neither any point *after* the terminal boundary of a bounded event, nor the initial boundary of an unbounded eventuality. Instead, it identifies *the* natural final endpoint for accomplishment or achievement, and *the* initial point of state with an initial endpoint. The SigP analysis can eliminate this imprecision and provides a more intuitive account for the semantic behavior of the perfective *le*.

Though the literature does not agree on how the perfective *le* should be treated, they all agree that the perfective *le* presents an event/eventuality as a single whole. Given the fact that the event/eventuality presented by the perfective *le* is presented as a single complete whole and hence its process is inaccessible to others unless it is made accessible by *Elaboration*, a hypothesis about the role of *le* in temporal progression is proposed below:

233. Hypothesis for the Role of *le* in Temporal Progression:

The internal process of an event/eventuality presented by *le* is inaccessible to other eventualities, unless it is made accessible by *Elaboration*.

According to this hypothesis, the process of an event/eventuality presented by *le* is accessible only when it is in a clause connected by *Elaboration* to another clause because the pragmatic function of *Elaboration* is to provide further details about an event/eventuality and hence it is required to access the internal process of the event/eventuality elaborated. Except for this rhetorical relation, the internal process of an event/eventuality presented by *le* cannot be accessed when it is a clause in other rhetorical relations to another clause.

5.4 The Role of the Perfective Marker *le* in Temporal Progression

In this section, the hypothesis (233) is tested against the examples retrieved from the Sinica Corpus. After the examples of four genres, i.e. Personal Essay, Fiction, Report and Commentary, are examined, the results are summarized below.

(a) A clause with the perfective *le* can be connected by any rhetorical relation to another clause, for example, *Narration*, *Elaboration*, *Background*$_{T}$, *Parallel*, *Explanation*, *Result*, *Contrast*, etc.

(b) Three of the rhetorical relations listed in (a) do not require an explicit indicator to spell out which rhetorical relation connects clauses together. They are *Narration*, *Elaboration*, and *Background*$_{T}$.

(c) The other rhetorical relations require indicators to specify the rhetorical

relation. They can be either structural or syntactic indicators.

(d) Among the rhetorical relations observed, *Narration* and *Elaboration* significantly outnumber the other relations.

(e) *Narration* outnumbers the other rhetorical relations in Fiction, and *Elaboration* dominates in Report.

(f) There are a few prepositions that require *le* to go with them, such as *wei* 'in order to'. In examples of this kind, *le* does not perform its aspectual function, just like the durative marker *zhe* required by some prepositions and verbs.

(g) The perfective *le* also occurs in embedded clauses, such as relative clauses, clausal complements, small clauses, etc. In those examples, *le* does not interact with the main timeline of a story.

Before the statistics of *le* examined is given, the notation used in Table VII needs explanation. Again, under the column *context* is the number of *le* in the examples where the perfective marker can interact with the main timeline of a story. On the contrary, under the column *isolated* is the number of *le* in the examples where the perfective marker does not interact with the main timeline of a story, such as those required by prepositions and those in embedded clauses.

Under the column *related* is the number of *le* in the examples where the clauses with *le* are connected to adjacent clauses with rhetorical relations. Under the column *unrelated* is the number of *le* in the examples where the clauses with *le* are not connected to adjacent clauses by rhetorical relations, e.g. the first clause in a new

paragraph is not connected to the last clause of its previous paragraph.

Since each clause can be connected to its preceding clause and its following clause, the number of *related* plus *unrelated* is twice as much as the number of *context*. Take Personal Essay as an example. There are 350 *le*'s under the column *context*. Since each clause with *le* can be connected to its preceding clause and its following clauses, there should be 700 possible scenarios, i.e. these 350 clauses can be either connected to their previous clauses, to their following clauses, to both, or are unrelated to either/neither of them. If they are connected to their adjacent clauses, they are listed under *related*. If they are not connected to their adjacent clauses, they are listed under *unrelated*. The number of *related* plus *unrelated* is 700, which is exactly twice as much as the number of *context*. In this notation, the total number of the examples of all rhetorical relations is the total number of *related*.

The statistics of the perfective *le* examined is given below.

Table VII: The Distribution of *LE* Examined

	context	isolated	related	unrelated
Personal Essay	350	62	446	254
Fiction	610	116	748	472
Report	856	344	1020	692
Commentary	254	54	324	184
Total	2070	576	2538	1602

Table VII (continued)

	Elaboration	Narration	Parallel	Background	Result
Personal Essay	86	80	30	70	82
Fiction	40	372	58	24	16
Report	272	68	204	68	120
Commentary	74	62	42	16	48
Total	472	582	334	178	266

Table VII (continued)

	others	embedded	Required
Personal Essay	98	22	40
Fiction	238	98	18
Report	288	84	260
Commentary	82	26	28
Total	706	230	346

Table VIII: The Percentage of *LE* in the Sinica Corpus Examined

	total number examined	total number in the Sinica Corpus	Percentage
Personal Essay	412	4119	10.00%
Fiction	726	7224	10.04%
Report	1200	11996	10.00%
Commentary	308	3082	9.99%
Total	2646	26421	10.01%

5.4.1 Narration

The examples of *Narration* outnumber the examples of the other rhetorical relations. This seems natural because the perfective *le* presents a completed or terminated event as a whole, that is, both the initial and final endpoint, natural or not, are presented. Because the initial endpoint is presented, it can narrate another clause and advance the narrative time. Because the finial endpoint is presented, its event time can be advanced and another clause can narrate it.

Just like the discussion about *Narration* in Chapter Three and Chapter Four, this rhetorical relation does not require any indicator to spell it out, though there are some indicators that can do this, such as *ranhou* ‘and then’. However, the examples of *Narration* require a shared topic, which can be either a theme which does not have a syntactic realization and on which several clauses comment, or a syntactic topic such as zero anaphora in Mandarin. This feature of *Narration* is also observed here. Typical examples are presented below.

234. a. ta bu neng zai ting supu zheban kujiao
she not can again hear Supu so cry
‘She couldn’t stand hearing Supu crying like this any more.’

b. yushi huidao **le** ji laoren jia zhong
so return PFV Ji old man home inside
‘So, she returned to Old man Ji’s place.’

c. cong beiru dixia nachu na zhang langpi lai
from bed sheet under take out that CL wolf skin come
‘She took out the wolf skin from under her bed sheet.’

d. kan **le** hen jiu hen jiu
look PFV very long very long
‘(and) she looked at it for a long time.’

This example has two *le*’s in it. One is in (234b) and the other in (234d). (234b) is connected to (234a) by *Result*, which is specified by the indicator *yushi* ‘so’. (234c) is connected to (234b) by *Narration*, and in turn (234d) is connected to (234c) by

Narration since these actions occur in sequence. In (234b), *le* marks the completion of returning home and hence its event time is ready to be advanced. Though there is no *le* in (234c), *na chulai* 'to take out' is a directional verb compound, which Kang (2001) argues to denote perfectiveness. Therefore, just like (234b), the event time of (234c) is also ready to be advanced. In (234d), *kan* 'to look at' is activity and hence has no SigP. The durational phrase *hen jiu* 'very long' provides a SigP for the activity predicate so that the perfective *le* can identify that SigP and can present the event from the initial endpoint to the SigP as a single whole. Since the initial endpoint is presented, this event can also advance the event time, and hence can narrate (234c).

In this example, it can be seen that the narrative time goes along as the text progresses, and the temporal order matches the textual order, that is, temporally, (234b) < (234c) < (234d).

235. a. mao ting **le** li de huibao
Mao hear PFV Li DE report
'Chair Mao heard Li's report.'
b. renwei nongcun ganbu hunao
think rural village official do nonsense
'(and he) though that the officials at rural villages were doing nonsense.'

c. wei ci hai gei hebei diyi shuji xie **le** xin

for this even to Hebei first secretary write PFV letter

'For this, he even wrote a letter to the First Provincial Secretary of Hebei Province.'

This is also an example where a clause narrates another clause with *le*. There are also two *le*'s in this example. One is in (235a), and the other in (235c). (235c) is connected to the previous clause by *Result*, which is specified by the indicator *wei* 'because of'. (235b) is connected to (235a) by *Narration* because they are two actions taking place in sequence. *le* presents an event as a single whole, and its event time is ready to be advanced. The temporal order between (235a) and (235b) also matches the textual order, i.e. temporally (235a) < (235b).

As for the examples where a clause with *le* narrates another clause, (234) also demonstrates this kind of narration. (234d), which has *le* in it, narrates (234c), and (234c) temporally precedes (234d). It has been suggested that the fact that the initial endpoint of an event is also presented by *le* makes it possible that a clause with *le* narrates another clause. Below is another example of this kind.

236. a. ta jiechu **le** makesizhuyi

he touch PFV Marxism

'He learned Marxism.'

b. juede ziji zuo **le** tuotaihuangu de gaizao

feel self make PFV make over DE reformation

‘(and he) felt that he had a makeover-like reformation.’

c. cheng **le** chedi de weiwuzhuyizhe

become PFV thorough DE materialist

‘(and he) became an absolute materialist.’

In this example, all of the three clauses have *le* in them. (236b) narrates (236a) and in turn (236c) narrates (236b). Just as discussed above, both the initial endpoint and the final endpoint, natural or not, are presented by *le*, and this property makes it possible for a clause with *le* to narrate another clause or for a clause to narrate a clause with *le*.

It can be seen that all of the examples discussed above involve zero anaphora. As discussed in Chapter Three, zero anaphora is a way to indicate that several clauses comment on the same entity. The entity commented on is realized as a full NP in the first clause and as zero anaphors in the clauses following it. This is one kind of topic chain, which indicates that there is a shared syntactic topic. This complies with Asher and Lascarides’ observation that *Narration* involves a shared topic, though the topic they discuss is more like a theme, which does not have a syntactic realization and on which several clauses comment.

But, the perfective *le* has some special examples of *Narration*. Those examples do not seem to have an explicit shared topic, either a theme with no syntactic realization or a syntactic topic. However, the clauses are connected to each other by

Narration. The example below can demonstrate this.

237. a. dao le disan tian zaoshang zhongyu guqi
to PFV third day morning finally gather up
yongqi zo dao ji laoren jia zhong
courage walk to Ji old man home inside
'Supu waited until the morning of the third day and he finally encouraged up to walk to Old man Ji's place.'

b. liwenxio chulai kai men
Li Wenxio come out open door
'Li Wenxio came and opened the door.'

c. yi jian shi ta shudao
one see be he say
'As soon as she saw that it was him, she said,'

d. wo cong ci bu yao jian ni
I since now no want see you
'I don't want to see you any more!'

e. pa de yi sheng bian ba banmen guanshang **le**
pa DE one sound then DISP door close PFV
'"Pa!" she closed the door.'

f. supu dai **le** banshang
Su Pu blankly PFV awhile
'Supu stood there blankly for a while.'

g. muomingqimaode huidao jia li

puzzled return home inside

‘He returned home, puzzled.’

In (237), there are two antecedents for different zero anaphors. The zero anaphors in (237c) and (237e) are Li Wenxio, the subject of (237b). The zero anaphor in (237g) has Supu, the subject of (237f), as its antecedent. Though these two sets of clauses do not share the same topic, they are still connected to each other by *Narration* since their temporal order also matches the textual order. Especially, though there is a transition of subjects between (237e) and (237f), (237f) still temporally follows (237e). That is, (237f) is connected to (237e) by *Narration*. This example seems to suggest that by default the perfective *le* specifies that *Narration* connects a clause with *le* with another clause if there is no other explicit information indicating otherwise.

To sum up, a clause with *le* can narrate another clause and a clause can narrate a clause with *le*. This is because *le* presents both the initial endpoint and the final endpoint (= SigP), natural or not, of an event and the event time of the event presented by *le* is ready to be advance or to advance another event time. The examples of *Narration* examined involve a shared topic, which can either be a theme without a syntactic realization, or a syntactic topic, such as zero anaphora. This respect is shared by the perfective *le* and the two imperfective aspect markers *zai* and *zhe*. However, *le* is unique in that it does not really need a shared topic to indicate *Narration*. It appears that the aspectual properties of the perfective *le* make it default

that a clause with *le* is connected to another clause with *Narration*. It is default because explicit information, such as lexical information or indicators, can override it.

5.4.2 Elaboration

Though *Elaboration* does not require a completed or terminated event, a completed or terminated event can certainly be elaborated. In Chapter Three and Chapter Four, it has been demonstrated that the examples of *Elaboration* need to have 'semantic subordination' between the lexical entries. That is, an elaborated clause must contain lexical entries that are hypernyms or general terms, and an elaborating clause should contain lexical entries that are hyponyms or specific terms. This semantic subordination can be either determined by the semantics of the lexical entries involved or by world knowledge about words and events. Typical examples are presented below.

238. a. wangjiwanglu zhe xiang gaibian renlei zixun chaoliu de
internet this CL change human information trend DE
jiagou yijing zai taiwan xianqi yi gu xuanfeng
structure already at Taiwan cause one CL whirlwind
'The internet, the structure that changes the trend of human information, already became very very popular in Taiwan.'

b. touguo xuni de wanglu yukong internet kaiqi **le** yi zhong
through virtual DE network world internet start PFV one CL
xin de zixun liudong fangshi yiji xin de jiaoyi xingtai
new DE information flow method and new DE trade style
'Through the virtual network world, the internet started a new way of information flow and a new trade style.'

In this example, (238b) elaborates (238a). It elaborates the new functions of the internet. It is *Elaboration* because the term *internet* is repeated twice and this repetition suggests that the second time it is mentioned it is likely to be elaborated. The function of something is semantically subordinated to that thing, and this verifies that it is *Elaboration*.

239. a. zhe xiang jihua houlai dedao guofangbu gaodeng
this CL project later receive Dept. of Defense advanced
yanjiu jihua zhongxin de zanzhu
research project center DE support
'Later, this project received support from the Center for Advanced Research Project of the Dept. of Defense.'

b. yiner deyi jiashe zui zao de yi tiao wangji
so can build most early DE one CL internet
wanglu ARPAnet
network ARPAnet
'Therefore, they could build the first inetnet: ARPAnet.'

c. ta lianxi **le** shidanfo yanjiusuo jiada luoshanji fenxiao
it connect PFV Stanford research center UC LA campus
jiada shengtababablа fenxiao youta daxue deng xiaoyuan
UC St. Barbara campus Utah Univ. etc. campus
'It connected campuses, such as the Research Center at
Stanford University, UCLA, UCSB, Univ. of Utah, etc.'

This is also an example where a clause with *le* elaborates another clause. Here, the hint comes from the verb in (239c) *lianxi* 'to connect', which is the function of the internet. The function of something is semantically subordinated to that thing, and hence it can specify that it is *Elaboration* that connects these two clauses together.

240. a. jing zhengzhiju pizhun deng zihui ji qi fushou
through Dept of Politics approval Deng Zihui and his associate
qianshu le jiesan dayue liangwan ge hezuoshe de
sign PFV dismiss about twenty thousand CL artel DE
baogao
report
'Approved by the Dept. of Politics, Deng Zihui and his
associate signed a report to dismiss around twenty thousand
artels.'

b. zhonggong zhongyang hai wei ci xia le wen

Chinese Communist authorities even for this issue PFV order

'The Chinese Communist Authorities even issued an order for this matter.'

c. danshi doa le wuyue mao yu deng zihui zhijian

but to PFV May Mao and Deng Zihui between

fasheng **le** jilie de zhenglun

happen PFV serious DE argument

'But, in May, a serious argument happened between Chair Mao and Deng Zihui.'

d. yijiuwuliu nian yingdang fazhan duoshao hezuoshe

1956 year should develop how many artels

'How many more artels should be created in 1956?'

e. deng zhuzhang fan banfan

Deng propose create half

'Deng proposed that only half more of the current number of the artels should be created.'

f. mao zhuzhang fan yifan

Mao propose create one

'Chair Mao proposed that the same number of the artels that currently existed should be created.'

This is an example where a clause with *le* is elaborated. The clause in

discussion is (240c). (240d) to (240f) elaborates (240c). (240e) and (240f) describe that Deng Zihui and Chair Mao have different ideas about how many more artels to create in 1956. This is an example of an argument. That is why (240d) to (240f) are connected to (240c) by *Elaboration*.

The three examples above do not involve temporal inclusion because the elaborating clauses elaborate NP's, i.e. the internet, and the argument. As argued in Chapter Three, elaborating NP's does not necessarily involve temporal inclusion. However, there are also examples that involve temporal inclusion. Especially when it is an event that is elaborated, it must involve temporal inclusion, as discussed in Chapter Three and Chapter Four. An example of this kind is presented below.

241. a. hushi yuanzhang zai kaimushi de zhici zhong tandao **le**
Hushi dean at opening DE speech inside talk PFV
bushao ling ren shen si de hua
a lot make person deep think DE words
'In his speech at the opening, Dean Hushi talked about a lot of things that made people think profoundly.'

b. ta tandao kexue shi yi zhong fangfa mingzhu shi yi
he talk science be one CL method democracy be one
zhong shenghuo fangshi
CL life style
'He said that science was a way (of exploring the unknown) and democracy was a lifestyle.'

In this example, the relationship between *tandao* ‘to talk about’ and *zhici* ‘speech’ provides a hint that it should be *Elaboration*. (241b) is part of the content of Dean Hushi’s speech and hence is semantically subordinated to *zhici* ‘speech’. This example involves temporal inclusion since obviously (241b) must have occurred during the time when Hushi gave the speech.

The hypothesis (233) says that the internal process of an event presented by *le* is inaccessible unless it is made accessible. *Elaboration* is the only rhetorical relation that has to access the internal process of an elaborated event. Therefore, being connected by *Elaboration* makes accessible the internal process of an event presented by *le*. The internal process of an event presented by *le* is accessible only when another clause is connected to it by *Elaboration*. Since the internal process is accessible, temporal inclusion is also possible, just like (241).

In sum, a clause with *le* can either elaborate another clause or can be elaborated. The examples of *Elaboration* require semantic subordination between the lexical entries in the clauses in discussion. *Elaboration* can involve temporal inclusion. Since *Elaboration* requires access to the internal process of an elaborated event so that elaboration is possible, being connected by *Elaboration* makes accessible to anther event the internal process of an event presented by *le*, just as hypothesized in (233).

5.4.3 Background$_{T}$

A clause with *le* can also serve as a temporal background for other events and provides a temporal frame for them to occur. But, unlike the two imperfective aspect markers *zai* and *zhe*, the perfective *le* provides as a temporal frame the time after an

event is terminated or completed since the process of an event presented by *le* is inaccessible unless it is made accessible by *Elaboration*, as stated in the hypothesis (233). *Background*$_{T}$ requires a period of time to serve as a temporal frame, but does not specify which part of event time it requires. Therefore, unlike *Elaboration*, *Background*$_{T}$ does not make accessible the internal process of an event presented by *le*. The following examples clearly show this point.

242. a. zuijing dui sushe qingjie you le xin de guiding
recently to dorm cleaning have PFV new DE rule
'Recently, these are new rules about dorm cleaning.'

b. mei jian qinshi xu zai wanshang wu dian dao qi
every CL room must at evening five o'clock to seven
dian jian ba ziji de lese dabaohao fangdao sushe
o'clock between DISP self DE trash pack put-to dorm
men wai de zhifang dingdian
door outside DE put designated spot
'The trash of every room must be packed and must be put at the designated spot outside the dorm gate between 5 PM to 7 PM.'

c. guo **le** qi dian
pass PFV seven o'clock
'When 7 o'clock passes (= after 7 o'clock),'

d. lese bian bu neng xichu qinshi

trast then no can carry-out room

‘trash cannot be carried out of the rooms.’

In this example, (242c) is a temporal background for (242d) because the former provides a temporal frame for the latter. Note that the time provided is the time after the event presented by *le*, and this is why (242c) can be translated as *after* 7 o’clock.

243. a. mei nian dao **le** jinma guoji yingzhang reji

every year arrive PFV Jinma international movie show season

‘Every year, when the season of the Jinma International Movies Exhibition comes ,’

b. xuduo daxusheng chen ci jihui dao yingzhan

many university student use this chance go to show

gongzuo danwei dagong

work unit work part-time

‘Many university students go and work part-time at the organization responsible for the International Movies Show.’

c. chule keyi zhuan waikuai hai keyi mianfei xinshang

besides can earn money also can free of charge watch

dianying

movie

‘In addition to making some money, they can also watch free movies.’

(243a) is a temporal background for (243b) and (243c). It is the time when college students can make some extra money and at the same time see free movies. This is why (243a) is still translated as *when* even though there is no Mandarin counterpart of *when* in (243a).

The examples of *Background*$_{T}$ have one shared feature, that is, they all involve time. It is *seven o'clock* in (242c) and *season* in (243a). This suggests that it is rather restricted that a clause with *le* can serve as a temporal background, and an explicit time phrase is required so that a clause with *le* can be connected to by *Background*$_{T}$, in addition to the fact that the temporal frame provided is not the time for the process of an event presented by *le*, but the time after the event is terminated or completed.

5.4.4 Result

A clause with *le* can also be connected to another clause by *Result*. In the data examined, all the examples of *Result* have indicators, such as *zhe yang zuo* 'by doing so', *yinci* 'for this reason', etc. Typical examples are presented below.

244. a. ta yixiang zhuiqiu wanmei
she always pursue perfect
'She always pursues perfection,'

b. bu pa hua qian
not afraid spend money
'(and she) is not afraid of spending money.'

c. suyi zhe ci banzhang guangshi zao zui hao de
so this CL class exhibition alone find most good DE
dian biaoquang jiu hua **le** wu qian duo kuai
story frame then cost PFV five thousand more dollar
'So, for this class exhibition, finding the best store to frame her work alone cost five thousand something dollars.'

In this example, (244c) is the result of (244a) and (244b). This is determined by the indicator *yinci* 'for this reason'. Nothing else is needed to determine the rhetorical relation.

245. a. suowei jingyan faze jiushi yong mucai chengshou
so-called experience principle be use wood mature
dao keyi kanfa liyong de jingyan lai jueding
to can cut use DE experience to decide
lunfaqi de changduan
cutting season DE length
'The so-called experience principle is to decide when people can come back to cut the trees again, using the experience about how long it takes for trees to become mature enough to be cut and to be used.'

b. zhe yang zuo
this way do
'by doing so,'

c. hulue **le** senlin ziyuan de qita haochu

ignore PFV forest resource DE other advantage

'the other advantages of the forest resources are ignored.'

In this example, (245c) is the result of (245a), which is determined by the indicator *zhe yang zuo* 'by doing so'. Note that (245c) is not an event that has occurred even though it is presented by *le*. This example is more like a generic situation, that is, generally, the result of (245a) is (245c), but that does not mean that both of them have taken place.

In sum, in the examples of *Result*, the perfective *le* does not have too much influence on the determination about which rhetorical relation connects the clauses together and it is always indicators that make the decision. According to the temporal nature of *Result*, a resultative clause temporally follows a causal clause.

5.4.5 Required and Embedded

Some prepositions in Mandarin requires *le* to go with it, e.g., *wei* 'in order to'. When *le* goes with this preposition, it does not perform its aspectual function and hence does not interact with the main timeline of a story. When *le* occurs in a embedded clause, it does not directly interact with the main timeline of a story, either. A few examples are presented below.

246. a. wei **le** jiang canquebuqi de taiwan dianying shi buqi

for PFV DISP incomplete DE Taiwan movie history complete

'In order to make the incomplete research on the Taiwanese movie history complete,'

b. guojia dianying ziliao guan zhengzai zuo
national movie information museum in the middle of do
ji xiang taiwan dianying shi de yanjiu
several CL Taiwan movie history DE research
'the National Taiwan Movie Museum is doing several research on the Taiwan movie history.'

(246) is an example where the perfective *le* is required by the preposition *wei*. Because it is required, *le* in this example does not perform its aspectual function[67] and does not interact with the timeline of the story in any way. Nor does *le* has any influence on which rhetorical relation connects these two clauses together. It is the preposition *wei* that makes this decision.

247. a. xiaogui gei xingzheng danwei hen da de cailiangquan
school rule give administrative unit very big DE judgment
'The school rules give the administration much room to make judgments.'

[67] Just as the discussion in Chapter Four that the durative marker *zhe* is also required by some prepositions, there might be a historical reason for this requirement. This issue will not be pursued further in this dissertation.

b. xuesheng shifou fan **le** zuyi tuixue de zhongda
student whether make PFV enough expell DE seious
guoshi bian chengwei xingzheng danwei ke ziyou fanhui de
mistake then become administrate unit can free decide DE
bufen
part
'Therefore, whether a student makes a mistake serious to be expelled is the part that the administration can freely decide.'

In this example, the perfective *le* is in a relative clause in (247b). Though it performs its aspectual function here, i.e. identifying the SigP of the achievement verb *fan* 'to make (a mistake)', it does not have any influence on the decision of which rhetorical relation connects these clauses together and hence does not directly interact with the timeline of the story.

In sum, while the perfective *le* required by *wei* 'in order to' does not have any aspectual function, it still performs its aspectual function when occurring in an embedded clause. But, these two kinds of examples share a feature, that is, the perfective *le* in these two kinds of examples do not have influence on the rhetorical relation and do not interact with the main timeline of a story.

4.4.6 Others

There are other rhetorical relations that do not occur as much as those discussed above in the data examined, such as *Explanation, Contrast, Consequence,* etc. The examples of those rhetorical relations all have indicators that specify which rhetorical

relation connects these clauses together. One thing to note is that perfective *le* does not occur in a clause which serves as a reason for others, though it occurs in clauses which serve as an explanation and result. The examples are presented below.

248. a. weile yingde ***le*** ci ci bisai de guanjun
in order to win PFV this CL competition DE championship
'In order to win the championship of this competition[68],

b. chuan ban tongxue dou hen renzhende lainxi
whole class classmates all very diligently practice
'the whole class practiced diligently.'

249. a. chuan ban tongxue dou hen renzhende lainxi
whole class classmates all very diligently practice
'the whole class practiced diligently.'

b. ! weile yingde ***le*** ci ci bisai de guanjun
in order to win PFV this CL competition DE championship
'In order to win the championship of this competition.'

As shown in (248), the perfective *le* cannot occur in a *weile* 'in order to' clause no matter where the clause is located. One might suggest that the context order of clauses with *le* should match the temporal order since *le* indicates *Narration* by

[68] One might suggest that *weile* 'in order to' requires the verb following it to be infinitival and this is why perfective *le* cannot occur here. However, Hu, Pan and Xu (2001) examine all methods of determining the finite vs. infinitival distinction found in related literature and find that none of the methods found in the literature can make this distinction. Therefore, they conclude that there is no finite vs. infinitival distinction in Mandarin. Therefore, the finite vs. infinitival distinction cannot be the reason why perfective *le* cannot occur here.

default and the contextual order of (248a) and (248b) does not match the temporal order of that example since it is obvious that *practicing diligently* temporally precedes *winning the championship*. However, if the contextual order of (248a) and (248b) is switched, as in (249), the context becomes incoherent, indicated by the exclamation mark on (249b). That is, the perfective *le* cannot occur in a clause serving as a reason. Changing the contextual order to match the temporal order of that context cannot allow the perfective *le* to occur in caluse serving as a reason, either.

250. quan ban tongxue dou hen renzhende lianxi shi weile
whole class classmate all very diligently practice be in order to
yingde ***le*** ci ci bisai de guanjun
win PFV this CL competition DE championship
'The reason why they practiced diligently was to win the championship of this competition.'

(250) is just like (251) except that the reason is embedded under the copula *be*. The contextual order of *practicing diligently* and *winning the championship* now matches the temporal order, but *le* still cannot occur in the reason. This example further support that it is the rhetorical relation, not the match between the contextual order and the temporal order, that is responsible for the fact that the perfective *le* cannot occur in certain clauses.

251. a. quan ban tongxue dou hen renzhende lainxi
whole class classmates all very diligently practice
'The whole class practiced diligently.'

b. * (suoyi) yingde **le** ci ci bisai de guanjun

so win PFV this CL competition DE championship

'So, they won the championship of this competition.'

(251) shows that the perfective *le* can occur in a clause serving as a result. The indicator *suoyi* 'so' is obligatory for *Result* to connect these two clauses together. In this case, the contextual order matches the temporal order.

(248) and (249) can be used to describe the same past event. But, they focus on different parts of the same event. When (248) is uttered, the speaker focuses on the process of *practicing diligently* and chooses to treat the *winning the championship* event as a 'future' (yet-to-complete) event. This is why the perfective *le* cannot occur in a clause serving as a reason. On the contrary, when (248) is uttered, the speaker chooses to look at the whole event, which consists of *practicing diligently* and *winning the championship*. Since the speaker chooses to look at the whole event, which occurred in the past, the perfective *le* can be used. That is, *Reason* and *Result* are the speaker's different points of view on the same event, and the different viewpoints on the same event can influence whether the perfective *le* can be used or not.

The perfective *le* can also occur in a clause serving as an explanation. In this case, an indicator is required and it does not matter whether the contextual order matches the temporal order. This is demonstrated in (252).

252. a. zhihua jintian bu neng lai shangke

Zhihua today not can come class

‘Zhihua cannot come to class today.’

b. *(yiwei) ta zuotian chu **le** yianzhong de chehuo

because he yesterday occur PFV serious DE car accident

‘Because he had a serious car accident yesterday.’

The asterisk on the left parenthesis in (252b) indicates that the indicator *yinwei* ‘because’ is not optional. This example suggests that the perfective *le* DOES indicate *Narration* by default if there is no indicator to override its default function. If there is no *yinwei* ‘because’ to override the default temporal order indicated by the perfective *le*, the contextual order of a *le* clause and its adjacent clauses should match the temporal order between these clauses. That is, the perfective *le* alone without any indicator does not like temporal reversal.

(253) is an example of *Contrast*. The indicator here is *dan* ‘but’. Just like the two examples above, this indicator alone decides that *Contrast* connects these clauses together and the perfective *le* does not have any influence on this matter. In addition to the indicator *dan* ‘but’, the two contrastive adjectives *ku* ‘cool’ and *yijiejing* ‘easy-going’, further strengthen the contrast between these two clauses.

253. a. qiu chang shang de guo jiancheng na he dazhe duijue
ball field on DE Guo Jiancheng that with hitter encounter
de ku lian jihu yi cheng **le** ta de zhucehangbiao
DE cool face almost already become PFV he DE trademark
'The cool face of Guo Jiancheng, when he was encountering with a hitter on the baseball field, has almost already become his trademark.'

b. dan huanxia quiyi de guo jiancheng que xiangde
but take off sports suit DE Guo Jiancheng but appear
chengken er yijiejin
sincere and easy-going
'But, after he takes off his sports suit, Guo Jiancheng appears sincere and easy-going.'

In sum, in addition to *Narration*, *Elaboration*, *Background*$_T$, the examples of the other rhetorical relations all require indicators to specify which rhetorical relation connects the clauses together. In those examples, the perfective *le* does not have direct influence on the decision on this matter though *le* cannot occur in a clause connected to another one by a rhetorical relation whose aspectual function contradicts with the aspectual property of the perfective *le*.

5.5 Summary

In this chapter, it is argued that the perfective *le* identifies the SigP of an event/eventuality and places it before an RT. The SigP of an event/eventuality is

defeasibly determined by the situation types of the event/eventuality. It is defeasible because it can be overridden if necessary. The perfective *le* presents as a single whole the part of an eventuality from the initial endpoint to its SigP. Since *le* presents an event/eventuality as a single whole, it is hypothesized that the internal process of an event/eventuality presented by *le* is inaccessible unless it is made accessible. This hypothesis is tested against the data extracted from the Sinica Corpus.

The result shows that the perfective *le* can be connected to another clause by any rhetorical relation as long as there is no aspectual clash. However, only three rhetorical relations do not require indicators, that is, *Narration*, *Elaboration*, and *Background*$_{\mathrm{T}}$.

It is argued that *Narration* is the default rhetorical relation assigned by the perfective *le*. That is, if no other information indicates otherwise, a clause with *le* is connected to another clause by *Narration*. In the example of *Narration*, the event time goes as the text progresses.

Elaboration requires semantic subordination between an elaborated clause and an elaborating clause. Due to the nature of *Elaboration*, the examples of *Elaboration* are the only kind where the internal process of a clause with *le* is made accessible to another clause. The examples of *Elaboration* can involve temporal overlapping as long as it is an elaboration on events. Elabroation on objects do not necessarily involve temporal overlapping.

The examples of *Background*$_{\mathrm{T}}$ require temporal phrases to indicate that they serve as a temporal background for other clauses. Though the examples of

Background$_{T}$ also involve temporal overlapping, the temporal frame provided here is the time after the event is completed or terminated, instead of the time for the internal process of an event.

The other rhetorical relations all require indicators to specify which rhetorical relation connects the clauses together, and the perfective aspect marker *le* does not directly affect this matter.

CHAPTER SIX

The Experiential Aspect Marker *guo* and Its Role in Temporal Progression

6.1 Introduction

This chapter discusses the aspectual properties of the experiential aspect marker *guo*[69] and how it affects the temporal relations between clauses. The experiential aspect marker *guo* has been known to express a 'class' meaning of an event that occurred at indefinite past and it has also been known to obey the condition of recurrence.

The experiential *guo* is argued to predicate on an event type, which is realized at indefinite past and which is repeatable. The class meaning of *guo* and the condition of recurrence come from the event token set of an event type. It is argued that there are two kinds of event tokens, individual tokens and spatio-temporal tokens. Individual tokens are event tokens where the same action acts upon different individuals of the same kind. Spatio-temporal tokens are tokens where the same event occurs at different points of the space-time continuum. Whether the resultative state caused by an event presented by *guo* discontinues depends on which kind of token is presented. The semantics of *guo* does not contain a temporal variable and an event variable and this is why the event time of a *guo* clause is unknown. A temporal location phrase can coerce and introduce a temporal variable into the semantics of

[69] There are two different *guo*s discussed in the literature. One is named the phase complement *guo*, the other the experiential aspect marker *guo*. In this dissertation, only the experiential *guo* is discussed though in the literature review the part about phase complement *guo* in the works reviewed is also presented.

guo. That is, when a *guo* clause contains a temporal location phrase, its event time is specified and known. Otherwise, its event time is unknown.

Based on its aspectual properties, *guo* is argued to indicate a special kind of *Background* by default. The *Background* indicated by the experiential *guo* is an informational background, based on which some assumption can be made or with the knowledge of which another event can be predicted to take place. It provides as a temporal frame the time for the (discontinued) resultative state caused by the event marked by *guo*. This kind of background is called $Background_{I}$. In contrast, the two imperfective markers provide their event time as a temporal frame, represented as $Background_{T}$.

Due to its undetermined event time, a clause with *guo* cannot be connected to the clause following it by *Narration* because there is no specific event time to be advanced. However, if a specific time is provided, the event time of a clause with *guo* can be narrowed down to that specific time, which makes *Narration* possible. These two points naturally following from the aspectual properties of *guo* is tested against the data extracted from the Sinica Corpus and is verified.

This chapter is organized as follows. Section 6.2 is literature review, where Lin (1979), Li and Thompson (1981), Wang (1943), and Yeh (1993b) are critically reviewed. Section 6.3 provides a new analysis for the semantics of *guo* and a hypothesis about its role in temporal progression. Section 6.4 presents the examples with *guo*, which are retrieved from the Sinica Corpus, sorted in terms of the rhetorical relations between the clauses identified. Besides, in Section 6.4, the hypothesis

proposed in Section 6.3 is tested against those examples to determine its validity. Section 6.5 is a summary of this chapter.

6.2 Literature Review

6.2.1 Wang (1943)

Wang has a brief discussion about *guo*. There are two usages of *guo*. One is to express 'past'. *guo* of this usage can go with the *le* that expresses perfectivity. But, in a negative sentence, it cannot occur with *le*.

254. a. tamen yinyin xu guo (le) wenhan
they sincerely discuss PC (PFV) warm-cold
'They sincerely greeted each other.'

b. zhe jian dayi ta yi ci ye mei chuan guo (*le)
this CL coat he one time even no wear PC (PFV)
'He didn't wear this coat even once.'

The other usage of *guo* is to indicate experience. *guo* of this usage cannot occur with the perfective *le*, regardless of whether it is a positive or negative sentence, as shown in (255).

255. a. ta ceng pandeng guo wu yue
he ever climb EXP five mountain
'He has climbed the Five Mountains before.'

b. ta ceng pandeng guo *le wu yue
he ever climb EXP PFV five mountain

The first usage is just like the phase complement *guo*, which expresses "the

phase of an action in the first verb rather than some result in the action or goal", as stated in Chao (1968: 446). The second is just like the experiential *guo*.

One little problem with Wang's description is about (254b). It is difficult to see why Wang classifies it as expressing 'past', instead of expressing 'experience'. In this respect, the distinction between the phase complement *guo* and the experiential *guo* seems to blur.

6.2.2 Lin (1979)

Lin (1979: 215) claims that *guo* is attached to an action verb and is usually followed by *le* and that it has two major interpretations: to indicate the completion of an event in the recent past or to indicate the completion of an event in the indefinite past. He observes that *guo* can appear in the following contexts.

First, guo_p[70] is suffixed to an action verb in a simplex sentence to express that an event was completed in the recent past, as demonstrated in (256a) and (256b). The adverbial *gangcai* 'just now' explicitly points out that it is a recent past.

256. a. wo gangcai chi guo fan le
I just now eat guo_p rice Prc
'I just had my meal.'

b. ta gangcai shuo guo ta yao lai
he just now say guo_p he want come
'He just said that he would come.'

[70] Lin labels the phase complement *guo* as guo_p and the experiential *guo* as guo_e. In this section, to be faithful to the work reviewed here and to avoid confusion, the same notations are adopted.

Though he suggests that *guo* indicates completion, which he also suggests *le* expresses, he DOES observe a difference between *guo* and *le*. That is, *guo* involves discontinuity, while *le* does not. This contrast is shown in (257). (257a) means that the subject has come and is still here. On the contrary, (257b) says that the subject came and is no longer present here. Though Lin does not label this contrast as discontinuity, obviously he observes this contrast.

257. a. ta lai le
he come Prc
'He has come.'

b. ta lai guo
he come guo_p
'He came and left.'

He tries to explain the contrast between (255a) and (255b) by suggesting that while both guo_p and *le* express completion, *le* also denotes current relevance but guo_p does not.

Secondly, he observes that if guo_p is attached to a verb in a subordinate clause or complex sentence, the clause with *guo* serves as a time reference for the main clause, as demonstrated below.

258. a. ta chi guo fan mashang jiu zo le
he eat guo_p meal immediately JIU go Prc
'After he had his meal, he left immediately.'

b. ni chi guo fan jiu qu zuo gongke

you eat guo_p meal JIU go do homework

'After you eat your meal, go to do your homework.'

Lin also discusses the experiential *guo*, which he labels as guo_e. He suggests that guo_e can be suffixed to an action verb in a simplex clause to express 'the class meaning of "[something] happened at least once in the past"' (Chao 1968: 251).

Lin summarizes his discussion of *guo* with the following tableaus. (259a) demonstrates the difference between guo_p and guo_e. They are different in that guo_p does not describe completion in indefinite past while guo_e does. (259b) shows the difference between *le* and *guo*, i.e. *le* also denotes current relevance while *guo* does not.

259. a.

	guo_p	guo_e
completion in **recent** past	+	+
completion in **indefinite** past	–	+

b.

	guo	le
completion	+	+
current relevance	–	+

Lin's analysis is a good description of *guo* while he also misses some points, just like Li and Thompson (1981), which is reviewed next. For example, he does not make the concept *discontinuity* clear and fails to observe that not all guo_p involves this property. Besides, he suggests that discontinuity is related to guo_p, which does not describe completion in indefinite past. However, as suggested in Yeh (1993b), Li and Thompson (1981) and other literature on *guo*, discontinuity is associated with the experiential *guo*, which roughly equals guo_e in Lin's discussion. Lin's distinction between guo_p and guo_e is not clear and hence his generalization is somewhat vague and confusing. Though, Lin's study is still a valuable descriptive one, based on which a unified explanation can be developed.

6.2.3 Li and Thompson (1981)

Li and Thompson (1981: 226) suggest that *guo* can indicate that "an event has been experienced with respect to some reference time." If the reference time is not contextually specified, then *guo* indicates that "the event has been experienced at least once at some indefinite time" (ibid). Negating *guo* is to negate that the event marked by *guo* is experienced. This 'being experienced' property of *guo* distinguishes it from the perfective *le* because the perfective *le* typically conveys the meaning that the event marked by it took place, whereas *guo* signals the event being experienced at least once at indefinite past. This contrast is shown in (260).

260. a. ta ying le zhe ge jiangjin
he win PFV this CL prize
'He won a prize.'

b. ta ying guo zhe ge jiangjin

he win EXP this CL prize

'He has the experience of winning this prize.'

Li and Thompson also observe that *guo* expresses discontinuity. They suggest that discontinuity can be inferred from the 'being experienced' property of *guo*, that is, "if something is experienced, it is over" (ibid: 229).

They also suggest that the following restrictions on *guo* also follow from the 'being experienced' property of *guo*. First, *guo* does not go with non-repeatable events because events marked by *guo* must be 'repeatedly experienceable'. Secondly, *guo* does not occur in imperative sentences because an experience cannot be ordered. Thirdly, *guo* does not mark an event in a context of a series of events because *guo* is about being experienced, not about taking place, and hence cannot advance the temporal reference in a series of events.

Li and Thompson provide a nice description of *guo*, though they miss some points, such as *guo* can either involve or not involve discontinuity, which is discussed in Section 6.2.4 where Yeh (1993b) is reviewed, or they fail to explain why they claim an event is over if it is experienced. Though they do not attempt to provide a general theory of *guo* to explain all of the syntactic and semantic phenomena they observe, this study still provides a good foundation, based on which a general theory can be developed.

6.2.4 Yeh (1993b)

In her dissertation, Yeh proposes that an experiential marker, such as *guo* in

Mandarin, is a temporal quantifier. Before she provides her proposal, she reviews seven semantic properties of the experiential marker *guo*.

First, Chao (1968) notices that *guo* is not associated with a situation that happened in the past, but expresses a class meaning. For example, (261a) does not refer to any specific occurrence of (261b). Instead, (261a) expresses that the class of (261b) has at least one occurrence. Yeh proposes that the definition of 'class' can be made clear in her quantificational approach to the experiential aspect.

261. a. ta xie guo xiaoshu
he write EXP novel
'He wrote novesl (before).'
b. <he-write-novels>

Secondly, Ma (1977) first suggests that *guo* expresses 'experience'. Following Iljic (1990) and Smith (1991), Yeh points out that while the thematic role experiencer is usually realized as an animate entity, *guo* does not have to go with an animate entity, as shown below.

262. zhe ge guojia fasheng guo neizhan
this CL country happen EXP civil war
'Civil wars have happened in this country before.'

Though *experiential* is still used to refer to *guo*, it should be remembered that while the lexical meaning of *experience* is always related to an animate entity, *guo* is not restricted in this respect.

Thirdly, the experiential marker obeys the constraint of recurrence, i.e. a situation presented by the experiential marker should be repeatable. Unrepeatable predicates cannot occur with the experiential marker, as in (261).

263. a. *ta si guo
he die EXP
'He died (before).'

b. *ta lao guo he old EXP
'He was old (before).'

But, (264a) is a counterexample, because *be young* can occur with *guo* but the predicate is unrepeatable. Yeh suggests that this phrase is an idiom because other similar state predicates do not occur with *guo*, such as (264b) and (264c).

264. a. wo nianqing guo
I young EXP
'I was young once.'

b. *ta ai guo
he short EXP
'He was short once.'

c. *zhen jian maoyi da guo
this CL sweater big EXP
'This sweater was once big.'

Fourthly, Yeh discusses whether the experiential marker involves discontinuity or not. Some sentences involve discontinuity, while others remain neutral with respect

to discontinuity. For example, (265a) describes subject's experience of breaking a dog's leg, but it says nothing about whether the dog's leg heals or not. A sentence like (265a) is neutral with respect to discontinuity. (265b) expresses subject's experience of breaking his own leg, and it also indicates that his leg has healed and he is no longer crippled. Sentences like (265b) involve discontinuity.

265. a. ta daduan guo yi zhi gou de tui
he hit-broken EXP one CL dog DE leg
'He broke one dog's leg.' (may or may not heal)

b. ta shuaiduan guo tui
he fall-broken EXP leg
'He broke his leg once.' (it has healed since.)

Fifthly, *guo* has been observed that it does not occur in a context of a series of events (Li and Thompson 1981: 231). Hence, it seems that *guo* implies a breaking up of temporal order. That is, several events marked with *guo* do not imply any linear temporal order between them. In (266a), *guo* cannot be used in a series of events. In (266b), there is no temporal order implied between those events marked by *guo*.

266. a. wo zuowan kan le/*guo dianshi fen le/*guo liang
I last night watch PFV/*EXP TV sew PFV/*EXP two
shuang wazi jiu qu shuijiao
pair socks then go sleep
'Last night, I watched TV, sewed two pairs of socks, and went to bed.'

b. qunian wo zuo guo shengyi xue guo diannow shang
last year I do EXP business learn EXP computer attend
guo yeda
EXP night university
'Last year, I did some business, learned to use a computer,
and attended night university.'

Sixthly, in the literature, *guo* has been suggested to present a situation in an indefinite and remote past. For example, Huang and David (1989) suggest that *le* presents a 'recent' past while *guo* denotes a 'remote' past, as shown below.

267. ta qunian/ shang ge yue/ ?shang ge xingqi/*zuotian cengjing
he last year/last month /last week /yesterday ever
kan guo na chu dianying
see EXP that CL movie
'He watched that movie last year/last month/[?]last week/[*]yesterday.'

Yeh suggests that the indefinite past of *guo* is related to the class meaning, and that in an experiential sentence the focus is on the class of occurrences, rather than a specific and definite one.

Lastly, in Mandarin, the experiential aspect does not occur in a habitual sentence, as (268a). But, in Japanese, the experiential aspect can occur in a habitual sentence, as in (268b). Yeh also explains this difference from the quantificational perspective.

268. a. *ta changchang he guo pijiu

he often drink EXP beer

‘*He often drank beer before.’

b. John-wa tabaco-o yoku sutte - i -ta koto

John-TOP tobaco-ACC often smoke-HABITUAL-PFV koto

ga aru

SUBJ exist

‘John smoked often before.’

To account for the behavior of the experiential *guo*, Yeh suggests that the experiential *guo* is a temporal quantifier, based on the fact that a *guo* sentence behaves similarly to temporally quantified sentences, i.e. they are both associated with a set of situations and neither of the two kinds of sentences is temporally ordered with other clauses. These two properties of temporally quantified sentences are demonstrated in (269). (269a) does not describe any specific single occurrence of eating strawberries causing a rash. Instead, it describes a set of occurrences. In (269b), e_4 is not temporally quantified, and hence it is temporally ordered with other events, i.e. $e_2 < e_3 < e_4 < e_5$. In (269c), e_4 is temporally quantified by *always*, and hence both e_3 and e_4 cannot be temporally ordered with other events. The relation $e_2 < e_3 < e_4 < e_5$ does not exist. Both e_3 and e_4 are temporally independent of other events, though they are temporally related to each other.

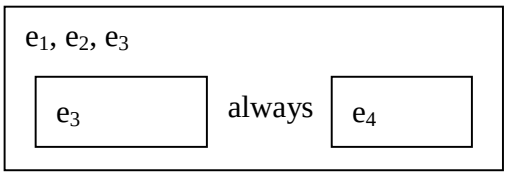
269. a. When Mary ate strawberries, she always broke out in a rash.

b. (e_1) John invited Mary over for dinner. (e_2) He served a strawberry cake for dessert. (e_3) When Mary finished the cake, (e_4) she broke into a rash. (e_5) She got so sick that (e_6) John had to took her to the ER.

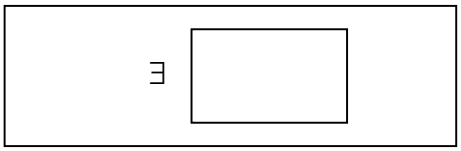
c. (e_1) John invited Mary over for dinner. (e_2) He served a strawberry cake for dessert. (e_3) When Mary ate strawberries, (e_4) she always broke into a rash. (e_5) She decided not to touch the cake.

Partee (1973, 1984) proposes that a temporally quantified sentence projects two sub-DRSs, similar to a conditional or a quantified NP. Since these two sub-DRSs are embedded in the matrix DRS, where the DRSs for other events are located, the discourse referents in the sub-DRSs, including temporal referents, are not accessible to those other events. (269c) can be briefly represented as (270) below.

270.



Yeh proposes that the experiential *guo* also introduces an embedded sub-DRS, though it does not have an antecedent. She further proposes that to capture the reading of at least one occurrence of a class of an event, there is an existential quantifier that quantifies over the sub-DRS introduced by *guo*. So, a sentence with the experiential *guo* will have a DRS as (271).

271. 

The evidence for this analysis comes from so-called temporal subordination (Yeh 1993b: 256). This is a phenomenon similar to modal subordination (Roberts 1987). A sentence independent of a conditional can access the discourse referents in the DRS's of the condition as long as it contains modals. (272a) is a conditional. In (272b), *it* can be co-referential with *a book* in (272a) because the sentence contains a modal. On the other hand, *it* in (272c) cannot be co-referential with *a book* in (272a) because (272a) does not have a modal.

272. a. If John bought a book, he would be home reading it by now.

b. It would be a murder mystery.

c. *It is a murder mystery.

There are also examples of anaphoric relations where the subordination is induced by quantifying adverbs rather than modal operators. In (273c), *the girl* can be co-referential with to *a girl* in (273a) because of temporal quantifiers (Kartunnen 1976).

273. a. Harvey courts a girl at every convention.

b. She always comes to the banquet with him.

c. The girl is usually very pretty.

Yeh claims that the experiential *guo* demonstrates the same phenomenon, as shown in (274). The events under the scope of *zongshi* 'always' are temporally

subordinated to the experiential clause. Yeh claims that the discourse in (274) suggests that the experiential *guo* is really a temporal quantifier.

274. a. ta qu nar diao guo yu
he go there angle EXP fish
'He went there to fish (before), '
b. zongshi diao dao banye cai hui jia
always angle to midnight then go home
'and he always fished until midnight and then went home.'

Given this analysis, the semantic properties of *guo* discussed above can be satisfactorily explained. de Swart (1991) proposes the plurality condition on quantification, which basically says that a quantifier cannot quantify over a set that has only one or even zero member. Since *guo* is proposed to be a temporal quantifier, it has to obey the plurality condition on quantification. This is where the class meaning of the experiential *guo* comes from. Chao (1968: 251) suggests that the experiential *guo* has a class meaning, but he does not define it. Since *guo* needs to obey the plurality condition on quantification, the class meaning refers to the set of situations it quantifies over.

The constraint of recurrence also follows from this condition. The once-only predicates and the individual-level predicates produce a singleton set, which contains a unique spatio-temporal location. These predicates cannot go with the experiential *guo* because *guo* needs to quantify over a set containing more than one element.

It has been mentioned that in Mandarin the experiential *guo* does not occur in a

habitual sentence, while in Japanese it can. The relevant examples are repeated below as (275).

275. a. *ta changchang he guo pijiu
he often drink EXP beer
'*He often drank beer before.'

b. John-wa tabaco-o yoku sutte - i -ta koto
John-TOP tobaco-ACC often smoke-HABITUAL-PFV koto
ga aru
SUBJ exist
'John smoked often before.'

Yeh suggests that the ungrammaticality of (275a) is due to a scopal clash since both *guo* and *changchang* 'often' have the same scope and functions, i.e. they quantify over the same sets of situations. Yeh (1993b: 129) further claims that "[i]n Japanese habitual situations are presented in an embedded clause. The adverb *often* has the scope of the clause, while *ta koto ga aru* quantifies over the whole sentence. [....] The past habitual situation is simply viewed as a type of situation under the scope of *ta koto ga aru* in the matrix sentence", and hence no scopal clash occurs.

According to Yeh, the observation that *guo* presents an event in an indefinite past also follows from its quantificational meaning. Because *guo* has to quantify over a set which has to contain more than one member, there must be at least two occurrences of an event. But exactly when each occurrence takes place is not specified in any way. This is why the indefiniteness of event times follows from the

quantificational meaning of experiential *guo*.

As for the remoteness constraint, Yeh (1993b: 194) suggests that "when a situation is specified by a temporal adverbial closer to the speech time, it is more likely to be interpreted as a unique situation, and to be related to the main chain of events in a story", but *guo* must quantify over a set of situations and is temporally independent of the timeline of a story. This is why the experiential *guo* prefers a remote temporal adverbial.

Though Yeh's analysis works for her data, it still has a few problems. First, Yeh suggests that sentences marked with the experiential *guo* are temporally independent of and are not temporally ordered with other sentences. However, this suggestion seems to be overgeneralizing. As the small paragraph in (276) shows, the experiential *guo* is not so temporally independent as Yeh claims it to be.

276. a. zai taida de si nian li
at Taiwan University DE four year inside
'During the four years I studied at NTU,'

b. wo zhi ting **guo** qian xiaozhang gei huaxue xi
I only hear EXP Qian president for chemistry department
tongxuemen zuo de youguan fenxi huaxue de yanshuo
classmates make DE about analytic chemistry DE speech
'I only heard once the speech on analytic chemistry that
President Qian delivered to the chemistry majors.'

c. ta yuzhongxinchangde mianli tongxue yi fan hua
he sincerely encourage classmates one CL words
'He sincerely encouraged the students he addressed to.'

d. zhi jin hai jiyiyouxin
to now still memory-fresh
'The memory is still fresh so far.'

The *guo* in (276b) expresses subject's experience and hence is definitely experiential. However, (276c) is obviously temporally overlapped with (276b) because *President Qian encouraging the students to whom he addressed* occurs while the speaker was listening to the speech. Besides, (276b) also serves as a temporal reference point for (276d). In (276d), *zhi jin* 'so far' indicates from a past time point to the speech time, and this past time point cannot be arbitrarily selected in the past. Obviously, the past reference time must be the time when the speech was delivered, i.e. the memory remains fresh from the time when the speech was delivered to the time when the speaker utters this sentence.

The above example is *Elaboration*, i.e. (276c) elaborates (276b). *Elaboration* is special in that an elaborating event must access the internal process of its elaborated event. Therefore, *Elaboration* can make accessible the otherwise inaccessible internal process of an event, just as argued in Chapter Five.

There are examples where a clause with *guo* is connected to its following clauses by *Narration*. The clauses in an example of *Narration* are not independent of each other. Instead, the clauses in an example of *Narration* are temporally dependent

on each other. An example is presented below.

277. a. baozhi baodao zhe ze xinwen shi
newspaper report this CL news time
'When the newspaper reported this news,'

b. sihu bingwei xiang **guo** zhe ge shuzi cheng
seemingly not think EXP this CL number multiplied
yi sanbailiushiwu dayue jiu shi dangshi quanguo de
by 365 about exactly be then whole country DE
meitan chanliang le
coal product quantity Prc
'They did not seem to have thought about the fact that the number multiplied by 365 roughly equaled the quantity of coal dug out nationwide at that time.'

c. wang hou niupi jiu chuei de yue
toward latter brag then make to a degree more
buchengyangzi
unbelievably exaggerating
'As time went on, they bragged more and more unbelievably and exaggeratingly.'

In (277), the experiential marker *guo* is in (277b). The phrase *wang hou* 'later, as time goes on' in (277c) specifically indicates that (277c) is connected to (277b) by *Narration*. This example can firmly refute Yeh's generalization about the temporal

independence of a clause with *guo*. *Elaboration* is not so strong a counterexample to Yeh's proposal as *Narration* because *Elaboration* can force accessible an internal process which is inaccessible otherwise. *Narration* cannot force an event time to advance if the event time cannot be advanced, e.g. the event time of an event presented by *zai*. Therefore, the fact that a *guo* clause can be connected to the clause following it by *Narration* proves that *guo* is not intrinsically incompatible with temporally dependence.

Secondly, Yeh claims that the experiential *guo* quantifies over a set of situations, which must have more than one member. This seems to be contradictory to sentences such as (278a), where only one occurrence of that type of event is experienced. The plurality condition on quantification that Yeh claims the experiential *guo* obeys does not seem to be abided by in (278a), which is about a single experience.

278. a. wo kan guo zhe chu dianying yi ci
I see EXP this CL movie one time
'I have seen this movie once.'

b. wo congwei kan guo ta
I never see EXP he
'I have never seen him.'

In addition, a negated experience, such as (278b), also poses a problem for the plurality condition on quantification. A negated experience is something that has never happened. It is not even a single occurrence of an event, much less a plural occurrences.

Lastly, there is a technical problem with Yeh's proposal that the experiential *guo* introduces an existential quantifier to quantify over a sub-DRS. *guo* is veridical because the anaphor in a *guo* clause can be accessed by other clauses even though these clauses do not contain a quantifying adverb, as in (277). (277c) contains a zero anaphor, that is, the subject of *chuei* 'to brag'. It is very clear from the context that the antecedent of this zero anaphor is the zero anaphor in (277b), whose antecedent in turn is *baozhi* 'newspaper' in (277a). If Yeh were accurate in that *guo* created a sub-DRS, the anaphor in a *guo* clause would be inaccessible, i.e. it could not serve as an antecedent for an anaphor in another clause which cannot be represented by or embedded in the sub-DRS created by *guo*. But, the anaphor in a *guo* clause can serve as an antecedent for an anaphor in another clause. Therefore, Yeh's (1993b) proposal that *guo* creates a sub-DRS is not correct.

Besides, it is redundant to have an existential quantifier quantifying over a sub-DRS because a sub-DRS exists as soon as it is introduced. Even though Yeh's observation were accurate that a *guo* clause were temporally independent, she probably would like for an existential quantifier to quantify over the intension of a proposition, which represents the class meaning of *guo*, and then to locate the intension of the proposition in the sub-DRS introduced by *guo*.

6.3 Semantics of the Experiential Marker *guo*

6.3.1 Event Type vs. Event Token

Yeh (1993b) proposes that *guo* is a temporal quantifier because she observes that clauses with *guo* are temporally independent of other clauses in the same text.

However, this observation has been proven inadequate because in the Sinica Corpus counterexamples are found, where a clause with *guo* is temporally dependent on other clauses in the same text. Yeh claims that *guo* is a temporal quantifier because of its temporal independence and hence behaves just like other quantifiers, that is, creating a sub-DRS in a main DRS and any variable in the sub-DRS is inaccessible to any variables outside that sub-DRS. However, this observation has also been proven inaccurate because an anaphor in a *guo* clause can serve as an antecedent for an anaphor in another clause, that is, it is accessible. Since a *guo* clause is not really temporally independent and an anaphor in a *guo* clause is actually accessible, Yeh's proposal that *guo* is a temporal quantifier can also be argued to be inaccurate.

The special behavior of *guo* which is different from the behavior of the perfective *le* results from the fact that *guo* predicates on event *types*, rather than event *tokens*. This is similar to what Landman (1992) proposes about the progressive. Landman (1992: 8) proposes that the progressive creates an intensional context. That is, the progressive presents an event *type*, which Landman assume to be a set of event *tokens*. Though *guo* does not create an intensional context, it has to predicate on an event **type** and maps it to an event **token**, as shown below.

279. a.*ta gai guo zhe san dong fangzi
he build EXP this three CL house
'*He has the experience of building these three houses.'

b. *ta zuo guo na wu shou quzi

he compose EXP that five CL song

‘*He has the experience of composing those five songs.’

280. a. ta gai guo san dong fanzi

he build EXP three CL house

‘He has the experience of building three houses.’

b. ta zuo guo wu shou quzi

he compose EXP five CL song

‘He has the experience of composing five songs.’

In (279), *gai zhe san dong fanzi* ‘to build these three houses’ and *zuo na wu shou quzi* ‘to compose those five songs’ can have only one spatio-temporal realization. That is, once these three houses were built, the same three houses cannot be built again. Even though they are torn down and rebuilt, it will not be the same three houses. The same is true for *to compose those five songs*. Once those five songs are composed, it is impossible to compose them again. Events like these two, which have only one spatio-temporal realization, are more like event **tokens** than event **types** because it seems vacuous to distinguish an event type from an event token when there is one-to-one mapping between an event type and its event token.

On the contrary, *gai san dong fanzi* ‘to build three houses’ in (280a) can have multiple spatio-temporal realizations, i.e. it can be realized as *three houses were built at time A, three houses were built at time B, three houses were built at time C*, etc. The event *gai san dong fanzi* ‘to build three houses’ has different spatio-temporal

realizations, which suggests that *gai san dong fanzi* 'to build three houses' can be regarded as an event type since the mapping between *gai san dong fanzi* 'to build three houses' and its spatio-temporal realizations is not one-to-one, i.e. not vacuous. The same reasoning applies to *zuo wu shou quzi* 'to compose five songs' in (280b).

The grammatical contrast between (279) and (280) suggests that *guo* cannot predicate on an event token, which is why the two examples in (279) are ungrammatical. The contrast also suggests that *guo* has to predicate on an event type, which is why the examples in (280) are grammatical.

Two of the properties of the experiential *guo* reviewed in Yeh (1993b) follow naturally from this event type-token distinction. Chao (1968) proposes that the experiential *guo* has a 'class' meaning. Yeh (1993b) suggests that this class meaning refers to the plural set quantified over by a quantifier and *guo* is a temporal quantifier. However, it has been argued that *guo* is not a temporal quantifier and therefore it does not have to obey the plurality condition on quantification. In the new analysis proposed here, this 'class' meaning refers to an event type. An event type is a set of event tokens, as Landman (1992: 20) proposes, and hence has a 'class' meaning.

The condition of recurrence also follows from this event type-token distinction. For example, *gai zhe san dong fanzi* 'to build these three houses' has only one spatio-temporal realization and therefore it cannot recur. On the contrary, *gai san dong fanzi* 'to build three houses' has multiple spatio-temporal realizations and hence it can recur.

Predicates such as *lao* 'old', *si* 'to die' do not go with *guo* due to the same fact

that they are event tokens, not types. The verb *si* 'to die' does not have multiple spatio-temporal realizations. Instead, just like *gai zhe san dong fanzi* 'to build these three houses', *si* 'to die' can have only one spatio-temporal realization, i.e. it cannot recur. This is why *si* 'to die' is not compatible with the experiential *guo*. The same reasoning works for *lao* 'to be old'.

For the grammatical contrast between (279) and (280), one might suggest that it can be explained by recurrence. However, the discussion above clearly suggests that the condition of recurrence follows from the event type-token distinction.

Given the discussion above, it can be concluded that the 'class' meaning and the condition of recurrence of the experiential *guo* both follow from a deeper semantic reason, i.e. the event type-token distinction[71].

6.3.2 Individual Token vs. Spatio-temporal Token

The condition of discontinuity is related to different kinds of event tokens. Yeh (1993b) suggests that discontinuity follows from the plurality condition on quantification. Yet, it has been argued that the experiential *guo* is not a temporal quantifier, and hence discontinuity cannot be explained by that condition. The examples below can demonstrate that discontinuity come from the different kinds of event tokens.

[71] Yeh (1993b) suggests that *wo yie nianqing guo* 'I also young EXP' is an exception. This suggestion is adopted in this dissertation because it is really an exception to the event type-token distinction discussed in this section.

281. a. ta die-duan guo tui

he fall-break EXP leg

'He fell and had a broken leg (before).' (healed)

b. ta da-duan guo yi zhi gou de tui

he hit-break EXP one CL dog DE leg

'He broke a dog's leg (before).' (healed or not healed)

282. a. ta dang guo zhe zhi shoubiao

he pawn EXP this CL watch

'He pawned this watch (before).' (redeemed)

b. ta dang guo (yi zhi) shoubiao

he pawn EXP (one CL) watch

'He pawned a watch (before).' (redeemed or not)

The condition on the recurrence of *ta die-duan tui* 'he fall-break leg' in (281a) is that the broken leg must heal because a broken leg cannot be broken again. That is, for *ta die-duan tui* 'he fall-break leg' to have multiple spatio-temporal realizations, the broken leg must heal first. This is why (281a) must have a discontinuous reading.

On the contrary, for *ta da-duan yi zhi gou de gui* 'he hit-break one dog DE leg' in (281b) to recur, the broken leg does not have to heal because it can by different dog's leg (or any dog's leg) that is broken. This is why (281b) does not necessarily have a discontinuous reading.

The same reasoning can be applied to the examples in (282). For *dang zhe zhi shoubiao* 'to pawn this watch' in (282a) to recur, the watch must be redeemed and

back to the owner's possession first. This is where the discontinuous reading of (282a) comes from. On the other hand, for *dang yi zhi shoubiao* 'to pawn a watch' in (282b) to recur, it can be a different watch (or maybe any watch) that is pawned. This is why (282b) can, but not necessarily, have a discontinuous reading.

For event types such as *dieduan tui* 'to fall-break one's leg' and *dang zhe zhi shoubiao* 'to pawn this watch' to recur, the resultative state caused by the event must discontinue, that is, a broken leg must heal before it can be broken again and a pawned watch must be redeemed before it can be pawned again. Because it is the same leg that was broken at different times and it is the same watch that was pawned at different time, this kind of event token, where the same action acts upon the same entity at different times, can be named as 'spatio-temporal token'.

For event types such as *daduan yi zhi gou de tui* 'to break one CL dog DE leg' and *dang yi zhi shoubiao* 'to pawn a watch' to recur, the resultative state caused by the event does not necessarily have to discontinue. That is, it can either be the case where the same action acts upon the same entity, just like a 'spatio-temporal token', or the case where the same action acts upon different entities, that is, different dogs' legs being broken and different watches being pawned. Because in the latter case it is different individuals that are acted upon, this kind of event token is named as 'individual token'.

The contrast between (281a) and (281b) or between (282a) and (282b) can be explained in the following way. When an event type consists of spatio-temporal tokens only, e.g. *dieduan tui* 'to fall down and break one's own leg', *diu pijia* 'to lose

one's own wallet', *qu zhe ge dongwuyuan* 'to go to this zoo', etc., the resultative state caused by an event of this kind must discontinue. On the other hand, when an event type consists of individual tokens only, e.g. *gai san dong fanzi* 'to build three houses', *mai yixie xiaoshuo* 'to buy several novels', *chi niupai* 'to eat steak', etc., the resultative state caused by an event of this kind cannot discontinue and must hold. Therefore, two preconditions on these two kinds of event types can be proposed:

283. a. If *e* is a spatio-temporal token, ∃e, s, s', t [precondition(e, s, t) → resultative(e, s') ∧ (holds(s, t) ↔ ¬ holds(s', t))].

b. If *e* is an individual token, ∃e, s, t [precondition(e, s, t) → resultative(e, s) ∧ holds(s, t)].

(283a) basically says that for a spatio-temporal token *e*, the precondition on the state of *e* at a time *t* is that the resultative state caused by *e* does not hold at *t*, i.e. resultative(e, s') ∧ (holds(s, t) ↔ ¬ holds(s', t))[72]. That is, the resultative state caused by *e* discontinues.

(283b) says that for an individual token *e*, the precondition on the resultative state of *e* at a time *t* is that the resultative state caused by the token *e* holds at *t*, i.e. resultative(e, s) ∧ holds(s, t). That is, the resultative state caused by *e* continues.

As for those event types consisting of both spatio-temporal tokens and individual tokens, such as *daduan yi zhi gou de tui* 'to break a dog's leg', *dang yi zhi shoubiao* 'to pawn a watch', the resultative state caused by an event of this kind can

[72] The predicate *hold* is taken from Lascarides and Asher (1993b), who propose hold(s,t) to mean that the state *s* holds at the time *t*.

either continue or discontinue, depending on which kind of token is chosen.

6.3.3 Semantics *guo* and the Hypothesis for Its Role in Temporal Progression

Given the discussions above, it can be concluded that the experiential *guo* predicates on an event type, which must be realized at indefinite past and which must be repeatable. In the semantics of *guo*, to capture the fact that a *guo* clause occurred (was realized) at indefinite past, Realized(^P(x)) introduces neither event variable nor temporal variable. Repeatable(^P(x), t) says that an event type ^P is repeatable at an RT *t* if ^P is realized at some indefinite past, and it is possible in the future that ^P has a token *e*, Realized(^P) occurs before *e* and *e* is temporally included in the RT. The semantics of *guo* is defined as in (284a). Repeatable(^P, t) is defined in (284b). (284c) says that Realized(^P(x)) is satisfied in a model *M* if and only the following is also satisfied in *M*: the event type ^P(x) is realized as an event token *e* and the SigP of *e* occurs before some RT *t*'.

284. a. $[\![\text{guo}]\!] =_d \lambda P\, \lambda x\, \lambda t\, [\text{Realized}(\hat{}P(x)) \wedge \text{Repeatable}(\hat{}P(x), t)]$

b. $\text{Repeatable}(\hat{}P, t) \rightarrow (\text{Realized}(\hat{}P) \wedge \Diamond_F \exists e\, (\text{token}(\hat{}P, e) \wedge (\text{Realized}(\hat{}P) \prec e) \wedge \text{precondition}(\text{Realized}(\hat{}P), s, t) \wedge (e \subseteq t))$

c. $M \vDash \text{Realized}(\hat{}P(x))$ iff $M \vDash [\text{token}(\hat{}P(x), e) \wedge \text{SigP}(e) = t \wedge t \prec t']$

It has been observed that the event time of a *guo* clause is unknown unless there is a temporal location phrase in the clause to specify its event time. Since the semantics of *guo* does not include a temporal variable, a temporal location phrase

must coerce the semantics of *guo* to include a temporal variable and an event variable when it combines with a *guo* clause. This coercion is defined in (285b).

285. a. ⟦TMP⟧ (guo(φ))

$= \lambda P\, \exists t\, [P(t) \wedge T = TMP]\, (\lambda x\, \lambda t\, [Realized(\hat{}P(x)) \wedge Repeatable(\hat{}P(x), t)])$

$= \exists t\, [\underline{\lambda x}\, \lambda t'\, [Realized(\hat{}P(x)) \wedge Repeatable(\hat{}P(x), t')]\, (\underline{t}) \wedge T = TMP]$

$\rightarrow$ clash due to type mismatch

b. Coercion rule:

$(\lambda P\, \exists t\, [P(t) \wedge T = TMP]\, (\lambda x\, \lambda t\, [Realized(\hat{}P(x)) \wedge Repeatable(\hat{}P(x), t)])) \rightarrow$

$(\lambda P\, \exists t\, [P(t) \wedge T = TMP]\, (\mathbf{\lambda t}\, \lambda x\, \lambda t'\, \mathbf{\exists e\, \exists t''} [Realized(\hat{}P(x)) \wedge Repeatable(\hat{}P(x), t')] \wedge \mathbf{token(\hat{}P(x), e) \wedge SigP(e) = t'' \wedge t'' \subseteq t \wedge t'' \prec t'}]))$

A temporal location phrase provides a temporal variable *t* and an event variable *e* for a *guo* clause. *t''* in the semantics is the time for the SigP of the event presented by *guo* and *t''* must be temporally included in *t*, the time denoted by the temporal location phrase.

Before how (284a) and (285b) works is illustrated, the difference between the perfective *le* and the experiential *guo* should be discussed. Their difference lies in the

fact that the semantics of *le* contains a temporal variable, which is optional, and an event variable, while the semantics of *guo* does not include a temporal variable and an event variable. This difference means that the event time of a *le* clause is considered 'known' even though it is not always specified. On the contrary, the event time of a *guo* clause is simply 'unknown'. This difference leads to the different behavior of the perfective *le* and the experiential *guo* with respect to *Narration*. Because the event time of a *guo* clause is unknown, it cannot be advanced unless it is made known, which is the function of a temporal location phrase.

Now, the semantic derivations of several typical *guo* clauses are presented to demonstrate how (284a) and (285b) work to generate accurate readings and to block inaccurate readings.

286. a. *ta gai guo zhe san dong fanzi
he build EXP this three CL house
'*He has the experience of building these three houses.'

b. ⟦gai zhe san dong fanzi⟧
= λx [build'(x, these_three_houses')][73]
⟦gai guo zhe san dong fanzi⟧
= λP λx λt [Realized(^P(x)) ∧ Repeatable(^P(x), t)]
(λx [build'(x, these_three_houses')])

[73] To keep the semantic derivations simple and readable, definite NPs are represented this way. Other complications about definite NPs are ignored here.

= λx λt [Realized(^build'(x, these_three_houses')) ∧

Repeatable(^build'(x, these_three_houses'), t)

This derivation clashes because *to build these three houses* is not repeatable. It has been argued above that *gai zhe san dong fanzi* 'to build these three houses' has only one spatio-temporal realization and should be considered as an event token. (284b) specifically says that if an event type *P* is repeatable, then it must have an realization at indefinite past and it is possible in the future that another event token *e'*, and the precondition on the resultative state of *e* holds at *t*. Since *gai zhe san dong fanzi* 'to build these three houses' has only one spatio-temporal realization, it is not possible that there is a future token *e'* of *gai zhe san dong fanzi* 'to build these three houses'. Therefore, repeatable(^build(x, these_three_houses), t) does not hold. This is why the derivation (286b) clashes.

287. a. ta die-duan guo tui

he fall-break EXP leg

'He fell and had a broken leg (before).'

b. ⟦dieduan tui⟧

= λx [fall_break'(x, x's_leg')]

⟦dieduan guo tui⟧

= λP λx λt [Realized(^P(x)) ∧ Repeatable(^P(x), t)]

(λx [fall_break'(x, x's_leg')])

= λx λt [Realized(^fall_break'(x, x's_leg')]) ∧

Repeatable(^fall_break'(x, x's_leg')], t)]

⟦ta dieduan guo tui⟧

= λt [Realized(^fall_break'(he, his_leg')]) ∧

Repeatable(^fall_break'(he, his_leg')], t)]

Truth Definition:

[Realized(^fall_break'(he, his_leg')]) ∧

Repeatable(^fall_break'(he, his_leg')], c_T)]

The derivation (287b) works. Unlike *gai zhe sang dong fanzi* 'to build these three houses', *dieduan tui* 'to fall and break one's leg' can have multiple spatio-temporal realizations, i.e. this event type consists of spatio-temporal tokens. This is why it is compatible with *repeatable*. As stated in (283a), the precondition on the resultative state *s* of a spatio-temporal token *e* requires that the resultative state *s'* caused by *e* does not hold at an RT, i.e. resultative(e, s')∧(holds(s, t) ↔(¬holds(s', t)). This information is represented by the condition *precondition*(*e*, *s*, *t*) in the meaning postulate for *repeatable*. This is how (287a) receive a discontinuous reading.

288. a. ta gai guo san dong fanzi

he build EXP three CL house

'He has the experience of building three houses.'

b. ⟦gai san dong fanzi⟧

= λx ∃y [house'(y) ∧ number(y) = 3 ∧ build'(x,y)]

⟦gai guo san dong fanzi⟧

= λP λx λt [Realized(^P(x)) ∧ Repeatable(^P(x), t)]

(λx ∃y [house'(y) ∧ number(y) = 3 ∧ build'(x,y)])

= λx λt [Realized(^∃y [house'(y)∧number(y)=3∧build'(x,y)])

∧ Repeatable(^∃y [house'(y)∧number(y)=3∧build'(x,y)], t)]

⟦ta gai guo san dong fanzi⟧

= λt [Realized(^∃y [house'(y)∧number(y)=3∧build'(he',y)])

∧Repeatable(^∃y[house'(y)∧number(y)=3∧build'(he',y)], t)]

Truth Definition:

[Realized(^∃y [house'(y)∧number(y)=3∧build'(he',y)])

∧Repeatable(^∃y[house'(y)∧number(y)=3∧build'(he',y)], c_T)]

The event type *gai san dong fanzi* 'to build three houses' is argued to consist of individual tokens. As stated in (283b), the precondition on the resultative state *s* of an individual token *e* requires that the resultative state *s* caused by *e* hold at an RT, i.e. the resultative state continues. This is why (288a) does not have a discontinuous reading.

In both of the derivations above, the Truth Definition proposed in Chapter Five provides an RT. This part of derivation is identical to that of a *le* clause. This RT is set to the ST by default, but can be overridden by other RT explicitly specified in the context.

At this point, two questions presented in Yeh (1993b) can be discussed. One is

that *guo* is not compatible with generic clauses. The other is that a *guo* clause is temporally independent of other clauses. The relevant examples are repeated below.

289. a. *ta changchang he guo pijiu
he often drink EXP beer
'*He often drank beer before.'

b. wo zuowan kan le/*guo dianshi feng le/*guo liang
I last night watch PFV/*EXP TV sew PFV/*EXP two
shuang wazi jiu qu shuijiao
pair socks then go sleep
'Last night, I watched TV, sewed two pairs of socks, and went to bed.'

c. qunian wo zuo guo shengyi xue guo diannow shang
last year I do EXP business learn EXP computer attend
guo yeda
EXP night university
'Last year, I did some business, learned to use a computer, and attended night university.'

In (289a), *changchang* 'often' indicates that it is a generic sentence, but with *guo* (289a) is ungrammatical. (289b) shows that to describe a series of events, only *le* can be used. All of the verbs in (289c) are marked by *guo* and they are temporally independent of each other.

The reason why *guo* is incompatible with a generic sentence is that an event

presented by *guo* must be realized at indefinite past while a generic sentence must be true at all times, i.e. must be realized at all times. This is a conflict because no event can be realized at indefinite past and, simultaneously, is realized at all times.

Yeh's (1993b) observation is not entirely accurate that a clause with *guo* is temporally independent of other clauses. But, this generalization is correct if slightly revised and rephrased. That is, the event time of a *guo* clause cannot be advanced if no specific temporal frame is provided.

This is because the semantics of *guo* does not contain a temporal variable, which means that the event time of a *guo* clause is unknown. Since its event time is unknown, a *guo* clause cannot be temporally related to other events.

A temporal location phrase, such as *qu nian* 'last year', *shang ge yue* 'last month', etc., can coerce the semantics of *guo* to include a temporal variable, as proposed in (285b). This coercion can be shown in the semantic derivation below.

290. a. ta qu nian qu guo na ge dongwuyuan
he last year go EXP that CL zoo
'He has the experience of going to the zoo last year.'

b. ⟦qu nian qu guo na ge dongwuyuan⟧
= λx λt' ∃e ∃t'' ∃t [Realized(^go_to'(x, that_zoo')) ∧
Repeatable(^go_to'(x, that_zoo'), t'') ∧
token(^go_to'(x, that_zoo'), e) ∧ SigP(e) = t'' ∧ t'' ⊆ t ∧
t = last year' ∧ t'' ≺ t']

⟦ta qu nian qu guo na ge dongwuyuan⟧

= λt’ ∃e ∃t’’ ∃t [Realized(^go_to’(he’, that_zoo’)) ∧

Repeatable(^go_to’(he’, that_zoo’), t’’) ∧

token(^go_to’(he’, that_zoo’), e) ∧ SigP(e) = t’’ ∧ t’’ ⊆ t ∧

t = last year’ ∧ t’’ ≺ t’]

Truth Definition:

∃e ∃t’’ ∃t [Realized(^go_to’(he’, that_zoo’)) ∧

Repeatable(^go_to’(he’, that_zoo’), t’’) ∧

token(^go_to’(he’, that_zoo’), e) ∧ SigP(e) = t’’ ∧ t’’ ⊆ t ∧

t = last year’ ∧ t’’ ≺ c_T]

In this derivation, the temporal location phrase introduces a temporal variable and an event variable into the semantics of *guo*. *t*’ is an RT. *t*’’ is the time of the SigP of the event token *e*. *t* is the time denoted by the temporal location. The time of the SigP is before the RT, and is temporally included in the time denoted by the temporal location phrase.

For a *le* clause, even though it does not contain a temporal location phrase, its event time is still considered known though not specified. On the contrary, when a *guo* clause does not contain a temporal location, its event time is considered unknown because the semantics of *guo* does not contain a temporal variable. This is why the event time of a *le* clause can be advanced with or without a temporal location phrase, but the event time of a *guo* clause cannot be advanced without a temporal location

phrase.

The last issue about Yeh (1993b) is her example about the interaction between temporal quantifiers, such as *always*, and *guo*. She claims that a *guo* sentence cannot be temporally related to others without the assistance of a temporal quantifier. The example is repeated below.

291. a. ta qu nar diao guo yu
he go there angle EXP fish
'He went there to fish (before), '

b. *(zongshi) diao dao banye cai hui jia
always angle to midnight then go home
'and he always fished until midnight and then went home.'

Yeh claims that the phenomenon is similar to modal subordination. However, this is not correct. It is more related to how many event tokens are selected than to modal subordination. (292) can demonstrate this point.

292. a. ta qu nar diao guo yi ci yu
he go there angle EXP one time fish
'He went there to fish once.'

b. !zongshi diao dao banye cai hui jia
always angle to midnight then go home
'He always fished until midnight and then went home.'

In (292a), it is specified that that is a one-time experience though nothing is mentioned about when this experience happened. (292b) is a bad continuation even

though there is a temporal quantifier in it. It is bad because there is only one event token in (292a), and *zongshi* 'always' has nothing to distribute over[74].

One might argue that a one-time experience just cannot be temporally related to another event and that this is why (292b) is not a good continuation to (292a). However, this is not accurate, as shown in (293). (293a) is just (292a), but it can be temporally related to another event, (293b). (293b) is an elaboration on (293a), i.e. (293b) provides more detail about what happened at the subject's first fishing trip. Since it is an elaboration on another event, (293b) is temporally included in (293a). That is, (293a) is temporally related to (293b), and no temporal quantifier is required though they do not help too much in this case anyway.

293. a. ta cai qu nar diao guo yi ci yu
he only go there angle EXP one time fish
'He went there fishing only once.'

b. jiu diao dao banye cai hui jia
JIU angle to midnight CAI return home
'He didn't come home until midnight.'

'(Lit. a and b) Even though he went there fishing just once, he was already so indulged that he didn't come home until midnight.'

[74] A *guo* clause without a frequency phrase usually refers to a one-time experience. If this is so, (291a) does not have anything to be distributed over by *zhongshi* 'always'. Actually some native speakers do not like (291). For them, a *guo* clause without a frequency phrase refers to a one-time experience. For those who like (291), a *guo* clause without a frequency phrase can refer to multi-time experience.

c. chang qu hai deliao

often go still big deal

'What would happen if he went often?'

The two sets of examples[75] above further support the argument that *guo* is not a temporal quantifier since it does not behave similarly to temporal quantifiers, unlike what Yeh (1993b) claims.

To summarize the discussion above, *guo* is not a temporal quantifier. Instead, it is a perfective aspect marker that predicates on an event type, rather than an event token. Its special properties, i.e. its class meaning, recurrence, incompatibility with habitual sentences, incompatibility with event time advancement without a temporal location phrases, etc., all naturally follow from the event type-token distinction. Discontinuity is related to the different kinds of event tokens. Based on the aspectual properties of the experiential *guo*, its role in temporal progression can be proposed as follows.

294. Hypothesis for the Role of *guo* in Temporal Progression:

The event time of a *guo* clause cannot be advanced unless the event time is explicitly specified.

[75] One question can be asked about the two sets of examples is why these two *guo* clauses can be temporally related to another event even though they do not have a temporal location phrase. This is related to the distinction between *Elaboration* and *Narration*. The two sets of examples above are both examples of *Elaboration*. An elaborating clause is always temporally related to its elaborated clause for an event elaboration. No temporal location phrase is required. On the contrary, for a clause to narrate a *guo* clause, a temporal location phrase is required because the information about the time of the SigP of an event is required for *Narration*. This is discussed in Section 6.4.1 and 6.4.3.

6.4 The Role of the Experiential Marker *guo* in Temporal Progression

In this section, the hypothesis (294) is tested against the examples retrieved from the Sinica Corpus. The examples of four genres are examined: Personal Essay, Fiction, Report and Commentary. The results are summarized below.

(a) A clause with *guo* serves as a special kind of *Background*. It does not provide its event time as a temporal frame for another event. It expresses background information, based on which some assumption can be made, or with the knowledge of which another event can be predicted to take place. The time provides by a *guo* clause as a temporal frame is the time of the (discontinued) resultative state caused by the event marked by *guo*. This kind of *Background* is marked as *Background*$_{\mathrm{I}}$, while a temporal background is represented as *Background*$_{\mathrm{T}}$. These two kinds of background need to be distinguished because they manifest different temporal relations.

(b) A clause with *guo* cannot be connected to the clause following it by *Narration* unless there is a temporal location phrase in the *guo* clause.

(c) Among all of the rhetorical relations, *Elaboration* and *Background*$_{\mathrm{I}}$ do not need any indicator. *Narration* does not require an indicator either, but a temporal location phrase is required.

(d) In addition to *Narration*, *Elaboration*, and *Background*$_{\mathrm{I}}$, a *guo* clause can be connected to another clause by *Result*, *Parallel*, *Contrast*, *Explanation*, *Reason*, *Consequent*, etc.

(f) The experiential *guo* can also appear in a relative clause or an embedded

clause, where *guo* does not interact with the main timeline of a story, and has no direct bearing on the decision of rhetorical relations.

The notation for Table IX is exactly the same as the notation for the tables presented in the previous chapters. The column *context* refers to the number of *guo* clauses in the data examined, where *guo* can interact with the main timelines of stories. The column *isolated* refers to the number of *guo* clauses, where *guo* does not directly interact with the main timelines of stories. This kind of examples include examples with *guo* in relative clauses and examples with *guo* in embedded clauses.

The column *related* is the number of *guo* in the examples where the clauses with *guo* are connected to adjacent clauses with rhetorical relations. Under the column *unrelated* is the number of *guo* in the examples where the clauses with *guo* are not connected to adjacent clauses by any rhetorical relation, e.g. the first clause of a paragraph, which is not connected to the last clause of its previous paragraph by any rhetorical relation.

Because *related* and *unrelated* are the examples which have the potential to be connected to adjacent clauses by rhetorical relations and because each clause can be connected to its preceding or following clause, *related* plus *unrelated* equals twice as much as *context*. The number of the examples of all rhetorical relations equals to the number of *related*.

The statistics of the experiential *guo* examined is given below.

Table IX: The Distribution of *GUO* Examined

	context	isolated	related	unrelated
Personal Essay	35	9	56	14
Fiction	49	15	63	35
Report	116	39	179	53
Commentary	36	14	58	14
Total	236	77	356	116

Table IX (continued)

	Elaboration	Background	Narration	Contrast	Parallel
Personal Essay	19	4	0	4	11
Fiction	10	25	0	10	4
Report	57	18	3	34	29
Commentary	15	12	2	5	9
Total	101	59	5	53	53

Table IX (continued)

	others	embedded	REL
Personal Essay	18	3	4
Fiction	14	12	3
Report	38	4	35
Commentary	15	6	7
Total	85	25	49

Table X: The Percentage of *GUO* in the Sinica Corpus Examined

	total number examined	total number in the Sinica Corpus	Percentage
Personal Essay	44	444	9.90%
Fiction	64	654	9.78%
Report	155	1512	10.25%
Commentary	50	368	13.58%
Total	313	2978	10.51%

5.4.1 Narration

Though there are not many examples of *Narration*, they still play an important

role in the argument against Yeh's (1993b) proposal that a *guo* sentence is temporally independent of other clauses and that *guo* is a temporal quantifier.

It has been argued in Section 6.3 that *guo* predicates on an event type which was realized at indefinite past and which is repeatable. Since the event type was realized at indefinite past, it is impossible to pinpoint its event time. Since the event time cannot be pinpointed, it cannot be advanced. However, if there is a way to narrow down the possible range of the event time of a *guo* clause, it will be possible to advance the event time of the token. A temporal location phrase can serve this purpose. In the examples of *Narration* found, every single one has a temporal location phrase in it. The discourse becomes incoherent if the temporal location phrase is removed. Two typical examples are presented below.

295. a. maozedong zai changsha dushu shi de laoshi
Chair Mao at Changsha study time DE teacher
hongjun changzheng shi zui nianzhang de xuteli
communist army long march time most senior DE Xu Teli
dangshi yijing shi bashier sui de lao ren
then already be 82 year-old DE ole man
'Xu Teli, Chair Mao's teacher when he studied at Changsha and the most senior member in the communist army during the Long March, was already a 82-year-old old man at that time.'

b. liang nian qian hui **guo** hunan laojia

two year ago return EXP Hunan hometown

‘(He) returned to his hometown in Hunan two years ago.’

c. yijiuwuba nian di zaidu fan xiang shi

1958 year end again return home time

‘(When he) returned home again at the end of 1958,’

d. faxian xiri conglong de qiuling huang ni luolo

find past green DE hill yellow mud appear

‘(he) found that the hills which used to be green because of trees were now covered with yellow mud and dust only.

e. linzi quan hui le

forest all destroy PFV

‘all of the forests were destroyed.’

In this example, *guo* is in (295b), which contains a temporal location phrase *liang nian qian* ‘two years ago’. This phrase narrows down the possible range of the event time of the *guo* clause. Now, since the temporal location phrase locates the event time of the *guo* clause in a more specific temporal frame, it is possible to advance the event time. (295c) narrates (295b) because there is a shared syntactic topic, i.e. zero anaphora, and 1958 is a time later than the time specified by *liang nian qian* ‘two years ago’. Note that the RT for *liang nian qian* ‘two years ago’ here is *dang shi* ‘at that time’ in (295). This temporal location phrase does not use 1958 as its RT.

Another example of *Narration* is given below. It has exactly the same feature as the one discussed above, that is, it requires a temporal location phrase to narrow down the possible temporal frame for the *guo* clause.

296. a. shida jiankang zhongxin yuanben sheyou canying
NTNU health center originally have eating
weijiao zu
health-ed branch
'Originally, the health center at NTNU had an Eating Health Education Branch,'

b. you shida weijiao xi de xuesheng zhixing
by NTNU health-ed department DE student run
'It was run by the students of the Dept. of Health Education at NTNU.'

c. qishiba niandu jiu juban **guo** leisi de tizhong kongzhi
78 year JIU held EXP similar DE weight control
huodong
activity
'In 1989, they held a similar weight-control activity.'

d. bashier nian cai zhengshi chengli tizhong kongzhi zu
82 year CAI officially establish weight control branch
'Not until 1993 was the weight control branch established.'

In this example, *guo* is in (296c), which has a temporal location phrase *qishiba*

niandu ‘1989’. (296d) narrates (296c) because this small paragraph shares a common theme, i.e. weight control, and (296c) is an event that occurs after 1989. Without the temporal location phrase in (296c), this discourse will become incoherent.

In sum, the event time of a *guo* clause is considered unknown and unspecific. Without any assistance to locate its event time, a *guo* clause cannot be connected to the clause following it by *Narration*. With the assistance of a temporal location phrase to narrow down the possible range for the event time of a *guo* clause, it can be connected to the clause following it by *Narration.*

6.4.2 Background$_{I}$

A clause with *guo* can either serve as a background for another event or has another event serve as its background. When a *guo* clause has another event serve as its background, that background is a regular background, that is, it provides its event time as a temporal frame in which the *guo* clause occurs. However, when a *guo* clause serves as a background, it is a special background, which does not provide its event time as a temporal frame. Instead, it provides some background information, based on which assumptions can be made, or with the knowledge of which some things can be predicted to happen, and it provides as a temporal frame the time for the (discontinued) resultative state caused by th event presented by *guo*. Relevant examples are given below.

297. a. ta zi lai huijiang zhihou
she from come Huijiang after
‘Since she came to Huijiang,’

b. congwei jian **guo** duiliang

never see EXP couplets

‘(she) had never seen couplets,’

c. ye conglai mei you ren jiao **guo** ta dushu

also ever no have person teach EXP she read

‘and nobody had ever taught her how to read.’

d. haozai zhe shisi ge zi jun bu jianshen

fortunately this 14 CL character all no difficult

‘Fortunately, none of these 14 characters was difficult.’

e. xiaoshiho ta muqi dou cengjing jiao **guo** de

young she mother all ever teach EXP Prc

‘Her mother taught her these 14 characters when she was little.’

f. wenyi que quanran bu dong

meaning but completely not understand

‘But, the meaning of the couplets she did not understand at all.’

This example has both a background for *guo* clauses and *guo* clauses serving as a background. Three clauses have *guo*: (297b), (297c), and (297e). For (297b) and (297c), (297a) provides a temporal frame and hence is connected to them by *Background*$_{T}$. The structural hint is *zhihou* ‘after (temporally)’, which explicitly specifies that it leads a temporal location clause. (297b) and (297c) are connected to each other by *Parallel* because they are semantically parallel. Together, these two clauses serve as *Background*$_{I}$ for the following three clauses. The time these two

clauses provide as a temporal frame is the time for the resultative states caused by the negative experience of *jian duliang* ‘to see couplets’ and of *jiao* ‘to teach’. It is not their discontinued resultative states because these two events, just like *chi niupai* ‘to eat steak’ and *gai san dong fanzi* ‘to build three houses’, consist of individual tokens, whose precondition requires their resultative states to continue, as stated in (283b).

These two clauses provide the background knowledge needed to make the judgment stated below them. They are not the reason of the following clauses because the context becomes very incoherent if *suoyi* ‘so’ is added at the beginning of (297d). If an event is the reason of another event, *suoyi* can always be added to specify this rhetorical relation. This is shown below.

298. a. ta yijing bing le hen duo tian le
he already sick PFV very many day Prc
‘He has been sick for many days.’

b. suoyi yizhi bu neng lai shangke
so always not can come go to a class
‘So, he can’t come to school.’

In the example above, (298a) is the reason for (298b). The structural indicator *suoyi* ‘so’ can always appear to specify that it is *Reason* that connects (298a) and (298b) together. However, the addition of *suoyi* ‘so’ to (297d) will render the context incoherent. This proves that (297b) and (297c) are not connected to (297d) by *Reason*. They cannot be connected to each other by *Narration* because the two *guo* clauses do not have a temporal location phrase to narrow down the possible temporal frame for

them. Nor are they connected to each other by *Elaboration* because no semantic subordination is involved. Nor are they connected to each other by other rhetorical relations since in the data examined the other rhetorical relations require indicators. Therefore, it can be concluded that they are connected to each other by *Background*$_{I}$. This rhetorical relation fits the semantic function of the *guo* clauses here because the *guo* clauses here DO provide background information.

(297e) also has a *guo* in it. (297f) is connected to it by *Contrast* because (280f) has an indicator, *que* 'but', which specifies that *Contrast* connects these two clauses together. As argued in the previous chapters, an indicator monotonically determines which rhetorical relation connects the clauses together. The experiential *guo* does not affect the rhetorical relation directly in this case.

299. a. wo liang yiqi jingli **guo** wushu weinan
I two together experience EXP numerous difficulty-danger
'We have experienced numerous difficulties and danger together.'

b. zhe ci huoxu ye neng taotuo
this time perhaps also can escape
'This time, maybe we can also escape (from the danger).'

(299) is another example where a *guo* clause serves as a background. (299a) is the background knowledge based on which the speaker makes an assumption, (299b). (299a) is not a reason for (299b) because *suoyi* 'so' cannot be added to (299b). Since *jingli wushu weinan* 'to experience countless difficulties and danger' also consists of

individual tokens, the time (299a) provides as a temporal frame is the time for the resultative state caused by this cause.

300. a. ta ceng qi muotuoche shuaiduan guo tui
he ever ride motorbike fall-break EXP leg
'He has the experience of falling off a motorbike and breaking his leg.'

b. congci ta jiu bu gan qi moutuoche le
ever since he JIU no dare ride motorbike Prc
'Ever since, he dare not ride a motorbike anymore.'

In (300), *shuaiduan tui* 'to fall and break one's leg' consists of sptaio-temporal tokens, just like *dang zhe zhi shoubiao* 'to pawn this watch' or *diao na ge pijiazi* 'to lose that wallet'. The precondition on this kind of event token requires its resultative state to discontinue, as stated in (283). Therefore, the event time (300a) provides as temporal frame is the time for the discontinued resultative state caused by this clause.

One feature about the examples of a *guo* clause serving as a background is that they do not require any indicator. Just like the discussions in the previous chapters, *Background*, *Narration*, and *Elaboration* do not require indicators.

A *guo* clause can have another event serve as its background which provides a temporal frame for it. (297a) is a good example. Another example is given below.

301. a. ta zai huijiang shier nian
she at Huijiang 12 year
'She had stayed at Huijiang for 12 years.'

b. congwei jian **guo** zheban guguai de tianse

never see EXP so weird DE weather

'She had never seen such a weird weather before.'

(301a) is a temporal background for (301b). This is indicated by the time phrase *shier nian* 'twelve years' in (301a). This context basically says that during the twelve years she stayed at Huijiang, she had never had this kind of experience.

In sum, a *guo* clause can either serve as a background for another event or have another event serve as its background. When a *guo* clause has another event serve as its background, it is usually a temporal background, which provides the event time of the backgrounded clause as a temporal frame for the *guo* clause. When a *guo* clause serves as a background for another event, it does not provide its event time as a temporal frame. Instead, it provides background information, based on which an assumption can be made or with the knowledge of which something can be predicted to happen, and it also provides as a temporal frame the time for the (discontinued) resultative state caused by the event presented by *guo*. No indicator is required when a *guo* clause serves as a background for another event. This complies with the hypothesis (294) since its event time is not advanced.

6.4.3 Elaboration

A clause with *guo* can either elaborate another clause or be elaborated by another clause. Just as the discussion about *Elaboration* in the previous chapters, an elaborating clause must be semantically subordinated to an elaborated clause. Two examples where a *guo* clause elaborates another clause are presented below.

302. a. xuesheng de yanguang yao fang yuan yidian

student DE vision need put far a bit

'Students' vision should be extended to future.'

b. huoxu xianzai xuedao de dongxi yihou hui yongdedao

maybe now learn DE thing later will useful

'Maybe the things learned now will be useful in the future.'

c. keshi xuesheng dou bu hui kaolüdao zhe dian

bu student all no will consider this point

'But, students never think about this point.'

d. bu yao zhishi wei fandui er fandui

no will only for oppose and oppose

'Don't oppose only for the sake of opposition.'

e. wo cengjing wen **guo** yi wei xuesheng weihe fandui

I ever ask EXP one CL student why oppose

shang junxunke

take military training class

'I asked a student why he opposed to taking a military training class.'

f. ta ye shuobuchu ge suyiran lai

he also can't tell CL reason Prc

'He couldn't give me a reason, either.'

In this example, *guo* is in (302e). This is an article about the military training classes

offered at high school and at university in Taiwan. Students do not want to take the classes, and the government tries to persuade students to take the classes. (302e) and (302f) elaborate (302d). The speaker asked a student why he opposed to taking a military training class. The student asked could not provide a reason. This is a specific example of the claim that students oppose to taking the military training classes only for the sake of opposition and do not have a good reason. This is semantic subordination, and therefore these clauses are connected together by *Elaboration*.

303. a. yanjiu guocheng fangwen le ershi yu wei dianying
research process interview PFV 20 more CL movie
congye renyuan
professional person
'During the research process, more than twenty persons who worked for the movie industry were interviewed.'

b. tamen youxie jingli **guo** guo-gong
they some experience EXP Nationalist-Communist
neizhan
civil war
'Some of them experienced the Civil War.'

c. ye youxie zai ri-ju shidai bian toushen
also some at Japanese-occupation period then devote
yu xinju yundong
to new-theater movement
'Some of them had been devoted to the new theater movement
since as early as the Japanese-Occupation Period.'

In this example, *guo* is in (303b). (303b) and (303c) are connected together by *Parallel* because they are structurally parallel. These two clauses elaborate (303a). The hint is lexical. (303a) mentions the persons interviewed during the process of a research. The antecedent of the anaphor *tamen* 'they' in (303b) and (303c) is *dianying congye renyuan* 'persons working for the movie industry' in (303a). The quantifier *youde* 'some' specifies the part-whole relation, which is an instance of semantic subordination. Therefore, it can be concluded that (303b) and (303c) are connected to (303a) by *Elaboration*.

The two examples above, where a *guo* clause elaborates another clause, both involve semantic subordination. Two examples where a *guo* clause is elaborated by another event are presented below. They also involve semantic subordination.

304. a. ni shifou kan **guo** zizhu shi yimai huo ceng
you whether see EXP self-help style charity sale or ever
qu **guo** you zhizhangsheng fuwu de canting ne
go EXP have retarded person serve DE restaurant Q
'Have you ever seen a self-assisted charity sale or have you been to a restaurant where mentally-challenged persons serve?'

b. wei le choumu zhijiao jijin yu jiachiang
in order to raise Teach-Retarded fund and enhance
zhizhangsheng de jiuye nengli
retarded person DE working ability
'In order to raise fund for Educate-Mentally-Challenged and to enhance mentally-challenged persons' working ability,'

c. weiyu taibei gongguan de guting qineng zhongxin
located Taipei Gongguan DE Guting revoke-ability center
tuixing zhe liang xiang youyiyi de huodong
promote this two CL meaningful DE activity
'The Guting center for mentally-challenged persons located at Gongguan Taipei promoted these two meaningful activities.'

In this example, (304b) and (304c) elaborate (304a). (304a) introduces a self-assisted charity sale and a restaurant with mentally-challenged persons as waiters or waitresses. These two entities are just a general type. (304b) and (304c) provide a

specific example, that is, the charity sale and the kind of restaurant promoted by the center. This is also one kind of semantic subordination. Here no temporal overlapping is involved because it is an entity (object) that is elaborated.

305. a. zai taida de si nian li
at Taiwan University DE four year inside
'During the four years I studied at NTU,'

b. wo zhi ting **guo** qian xiaozhang gei huaxue xi
I only hear EXP Qian president for chemistry department
tongxuemen zuo de youguan fenxi huaxue de yanshuo
classmates make DE about analytic chemistry DE speech
'I only heard once the speech on analytic chemistry President Qian delivered to the chemistry majors.'

c. ta yuzhongxinchangde mianli tongxue yi fan hua
he sincerely encourage classmates one CL words
'He sincerely encouraged the students that he addressed to.'

d. zhi jin hai jiyiyouxin
to now still memory-fresh
'The memory is still fresh so far.'

(305) is used in Section 6.2 to argue against Yeh's (1993b) proposal. This is also an example where a *guo* clause is elaborated. The experiential *guo* is in (305b). The phrase *yi fan hua* 'one CL words' in (305c) is clearly part of *yanshuo* 'speech' in (305b). This is an example of semantic subordination. Therefore, it can be concluded

that (305c) is connected to (305b) by *Elaboration*.

This example involves temporal inclusion because *he sincerely encouraged the students that he addressed to* must occur during the time when he was delivering the speech, i.e. it is an event elaboration and hence (305c) is temporally included in (305b).

To sum up, a clause with *guo* can either be elaborated by another event or elaborate another event. When it is an entity (object) that is elaborated, temporal overlapping does not have to occur. When it is an event that is elaborated, temporal overlapping is involved. When a *guo* clause is elaborated, it has to be temporally related to its elaborating clause even though there is no temporal location phrase to narrow down the possible temporal frame. It is the nature of *Elaboration* that an elaborating clause is temporally included in its elaborated clause when it is an event elaboration.

6.4.4 Contrast

A clause with *guo* can also be connected to an adjacent clause by *Contrast*. The examples found in the Sinica Corpus all require an indicator to explicitly specify this rhetorical relation. Relevant examples are given below.

306. a. shanfudui ceng gen yuanwuzhe xue
Aboriginal-Service team ever from aboriginal dancer learn
guo ailingji deng wuma
EXP Ailing Festival etc. dance
'The members of the Aboriginal-Service Team learned from the aboriginal dancers the dances for Ailing and other festivals.'

b. dan ruguo ziji yanchu
but if self perform
'But, if the members perform those dances,'

b. bujin shueifuli cha ye bu gou zhuanye
no only convincing bad also no enough professional
'it is not only unconvincing but also unprofessional.'

In (306), *guo* is in (306a). It is connected to the clauses following it by *Contrast* because the structural indicator *dan* 'but' in (306b) explicitly specifies this information.

307. a. daxuesheng de jianchai gongzuo linlangmanmu
university student DE part-time job various
'There are various kinds of part-time jobs for university students.'

b. <u>dan</u> ni keneng mei xiang **guo** xianzai renti muoteer ye
but you likely no think EXP now human model also
cheng le daxuesheng dagong de xin chulu
become PFV university students part-time work DE new way
'But, you probably never think about this: posing nude for
artists has become a new kind of part-time job.'

(307) also has the structural indicator *dan* 'but', which specifies the rhetorical relation. The difference of (306) and (307) lies in the position of the *guo* clauses. In (306) the *guo* clause occurs before *dan* 'but', whereas in (307) the *guo* clause appears after *dan* 'but'.

In (306), the experience of learning how to do aboriginal dances occurs before the request for the members of the team to do the dances. In (307), (307b) does not occur before (307a) because (307a) is a generic sentence and is not anchored to a specific time. These two examples suggest that *Contrast* does not have a decisive influence on the temporal relation between the clauses connected together by it.

6.4.5 Parallel

Parallel can either have an indicator, such as *qie* 'and', or have no indicator but just manifests syntactic parallel. For the examples that manifest syntactic parallel, there cannot be semantic subordination or other information indicating another rhetorical relation in them. Two typical examples are presented below.

308. a. xian ren banqiao guoxiao jiaoshi yanxihui
now work as Banqiao Elementary School teacher workshop
zhuren de ouyongsheng
directo REL Ou Yongsheng
'Ou Yongsheng, who is working as the director of the teachers' workshop of the Banqiao Elementary School,'

b. huode yi bai duo wei xiaonei xiaowai renshi
receive one hundred more CL on-campus off-campus person
tuijian
recommendation
'(he) received recommendation from more than one hundred people working on campus and people from off-campus.'

c. qie yi fabiao **guo** banxue linian
and already make public EXP run school idea
'(and he) has already made public his ideas how to run a school.'

In Mandarin, *qie* 'and' is an indicator for *Parallel* because no conjunction is necessary for the clauses connected together by *Narration*. Actually, in Mandarin, clauses are usually put together without any conjunction. Therefore, *qie* 'and' cannot just serve as a regular conjunction which does not indicate any rhetorical relation. It indicates that the clauses are connected together by *Parallel*.

309. a. gongsi xingzheng dalo jiran bei baocun
company administrative building now that PASS preserve
'Now that the company's administrative building is preserved,'

b. chongxinzhengxu shi yi da jianju gongcheng
re-model be one big difficult project
'To remodel it is a huge difficult project.'

c. fenxi **guo** dizhen duanceng dai yu xingzheng
analyze EXP earthquake dislocation belt with administrative
dalou zhi juli
building DE distance
'(we) analyzed the distance between the earthquake dislocation belt and the administrative building.'

d. yuce weilai keneng dizhen zhi qiangdu yu ji you
predict future likely earthquake DE power and already exist
jianzhuwu zhi jiegou qingxing
building DE structure status
'(and we) predicted the power of the earthquakes that would occur in the future and the structural status of the currently existing building.'

e. jiegou gongchengshi yu zhengfu danwei zhangkai
structure engineer with government unit start
xieshang
negoate
'The structure engineers started negotiating with the government.'

The experiential *guo* is in (309c). (309c) and (309d) are connected together by *Parallel* because they are syntactically parallel and no other information indicates other rhetorical relation.

Parallel does not have deterministic influence on the temporal relations between the clauses connected together by it, just like *Contrast*. While (309c) and (309d) seem to be temporally overlapped with each other, (308c) is more likely to temporally precede (308b).

In sum, *Parallel* can, but does not have to, have an indicator. Syntactic parallel can indicate *Parallel* as long as there is no information indicating otherwise. *Parallel* does not have a direct bearing on the temporal relation between the clauses connected together by it.

6.4.6 Others

A clause with *guo* can also be connected to an adjacent clause by other rhetorical relations: *Explanation*, *Consequence*, *Reason*, etc. These rhetorical relations require indicators to specify which rhetorical relation connects the clauses together. Three typical examples are presented below.

(310) is an example of *Explanation*, which is specified by *yinwei* ‘because.’ Since an explanation should occur before what is explained, it is very natural that a *guo* clause can explain another clause.

310. a. suiran tichu zhe ge xiangfa hen you xinyi
though propose this CL idea very have innovation
‘Though proposing this idea is very innovating,’

b. danshi yinwei mei you ren yanjiu **guo**
but because no have person research EXP
‘yet, because nobody has done any research on this,’

c. yinci cai yanjiu guocheng hui pongdao yixie zuli
so at research process will meet some obstacle
‘so, during the research process, (we) will meet some obstacle.’

In this example, (310b) is connected to (310c) by *Explanation* first and then this whole big unit is connected to (310a) by *Contrast*, which is indicated by the structural indicator *dan* ‘but’. Obvious, (310b) temporally precedes (310c).

(311) is an example of *Result*, which is specified by *jieguo* ‘as a result’ in the example. *Result* specifies that the clause as a result cannot temporally precede the clause as a cause. (311) is a good example.

311. a. ta yizhi hen bu xihuan nianshu
he always very not like study
‘He always disliked studying.’

b. jieguo ta kao **guo** san ci daxue liangkao

as a result he take EXP three time university entrance exam

'as a result, he took the University Entrance Exam three times.'

c. dou mei kaoshang

all no pass

'He didn't get any admission all three times.'

(311a) is a generic sentence and is true at all times. Therefore, it generally cannot serve as an RT. The structural indicator *jieguo* 'as a result' specifies that (311b) is attached to (311a) by *Result*. That is, (311b) is the result of (311a). But, because (311a) is a generic sentence, the temporal relation between these two clauses is not determined, except that (311b) cannot temporally precede (311a).

(312a) is a condition, which is specified by *ruguo* 'if'. Since a condition should occur before its consequent, it seems reasonable that a clause with *guo* can serve as a condition.

312. a. ruguo ta kan **guo** zhe ben shu

if he read EXP this CL book

'If he has read this book,'

b. zenme yi ge wenti dou dabuchulai

why one CL question all cannot answer

'How come he can't even answer one question?'

To sum up, the examples discussed in this section all require indicators to specify which rhetorical relation connects together the clauses in those examples.

What kind of temporal relation the rhetorical relations discussed here can determine between the clauses connected together by them depends on the properties of the rhetorical relations and the clause types.

6.4.7 Embedded

Just as the examples discussed in the previous chapters, a *guo* clause can also appear in an embedded clause or a relative clause. In this case, *guo* does not directly interact with the main timeline of a story and has no direct bearing on the decision of the rhetorical relations. Two examples are presented below.

313. a. mei shang **guo** ke ye mei canjia yuanzhuming zhi
no take EXP class also not participate aboriginal DE
lü de yanyuan jiangguosheng aohuide biaoshi
tour DE actor Jiang Guosheng regretted say
'Actor Jiang Guosheng, who never took a class and did not participate in the tour about aboriginals, said with regret,'

b. cuoguo zhe xie jihui dui ta de biaoyan you hen da
miss this PL chance to he DE performance have very big
de yingxiang
DE influence
'Missing these chances had a huge influence on his performance.'

In (313), *guo* is in a relative clause. It does not affect which rhetorical relation connects (313a) and (313b) together and does not have direct interaction with the

main timeline of the story.

314. a. yanyuan zhiyao zhidao hao de dexing
Yan Yuan as long as know good DE virtues
'As long as Yan Yuan learned of good virtues,'

b. jiu nuli qu shentilixing
then diligently go practice
'then he would practice it diligently.'

c. congwei kan ta tingzhi **guo**
never see he stop EXP
'People never saw him ever stop.'

In (314), *guo* is in a small clause. The main verb of (314c) is *kan* 'to see'. It is this main verb that interacts with the main timeline of the story. The experiential *guo* does not have direct interaction with the main timeline of the story, and does not have a direct bearing on which rhetorical relation connects these clauses together.

6.5 Summary

In this chapter, the experiential *guo* is argued to predicate on an event type which was realized at indefinite past and which is repeatable. All of the special properties of the experiential *guo*, but discontinuity, follow from this event type-token distinction. Discontinuity is related to different kinds of event tokens.

Because a *guo* clause occurs at indefinite past, the semantics of *guo* does not contain a temporal variable. A temporal location phrase can coerce and introduces a temporal variable into the semantics of *guo*. Based on this aspectual property of *guo*,

it is proposed that the event time of a *guo* clause cannot be advanced unless there is a temporal location phrase to specify a temporal frame for the *guo* clause.

This hypothesis is tested against the examples retrieved from the Sinica Corpus, and it is verified. A *guo* clause can be connected to its adjacent clause by different rhetorical relations. Only *Background*$_{\text{I}}$, *Narration*, and *Elaboration* do not require indicators.

The experiential *guo* by default indicates a special kind of *Background*. A clause with *guo* provides background information, based on which an assumption can be made, or with the knowledge of which something can be predicted to take place. This *Background*$_{\text{I}}$ does not provide its event time as a temporal frame. Instead, it provides as a temporal frame the time for the (discontinued) resultative state caused by the event presented by *guo*. This temporal overlapping of the (discontinued) resultative state cuased by a *guo* clause serving as *Background*$_{\text{I}}$ with another event complies with the aspectual functions of the experiential *guo* and the pragmatic function of *Background*$_{\text{I}}$.

With a temporal location phrase and a shared topic, syntactic or semantic, a clause with *guo* can be connected to the clause following it by *Narration*, contrary to what is traditionally thought about this aspect marker. Just as all of the examples of *Narration*, a clause with *guo* temporally precedes the clause contextually following it when they are connected together by *Narration*.

Whenever there is semantic subordination, it is *Elaboration*. A *guo* clause can either elaborate anther clause or be elaborated. Whether temporal inclusion is

involved in the examples of *Elaboration* depends on what is elaborated. When it is an entity (object) that is elaborated, temporal inclusion does not necessarily occur. When it is an event that is elaborated, temporal inclusion occurs.

A clause with *guo* can be connected to its adjacent clauses by other rhetorical relations, such as *Explanation*, *Result*, *Consequence*, etc. What kind of temporal relation these rhetorical relations can determine between the clauses connected together by them depends on the properties of the rhetorical relations and the clause types.

The experiential *guo* can also occur in an embedded clause or a relative clause. In these cases, *guo* does not directly influence which rhetorical relation connects the clauses together and has no direct interaction with the main timeline of a story.

CHAPTER SEVEN

Aspect Markers, Rhetorical Relations and Modeling Temporal Progression

7.1 Introduction

In the previous chapters, the aspectual properties of the four aspect markers in Mandarin and their semantics have been discussed. Based on their aspectual properties, the hypotheses of their roles in temporal progression are proposed and tested against the data retrieved from the Sinica Corpus. It has been argued that the aspectual properties of an aspect marker exert (partial) constraints on the rhetorical relation connecting together a clause with that aspect marker and its adjacent clause. It has also been argued that each aspect marker specifies a rhetorical relation by default.

In this chapter, first, the relation between aspect markers and rhetorical relations is discussed. The data examined for temporal relations in the previous chapters are sorted in terms of rhetorical relations, and the temporal relation between two clauses is shown to be inferred via the rhetorical relation that connects them together. One might ask why this is done this way and might propose that aspect markers directly determine the temporal relations. This issue is addressed in Section 7.2, which is a discussion of why the temporal relations are not determined directly by aspect markers but are indirectly affected by aspect markers via rhetorical relations. Section 7.3 examines the relation between rhetorical relations and temporal order. Asher and Lascarides (2003) have discussed the temporal order of several rhetorical relations. In this section, the relationship between temporal order and rhetorical

relations is discussed. Section 7.4 demonstrates how SDRT models the phenomena observed. First, Section 7.4.1 demonstrates how MDC determines the attachment sites of clauses in a Mandarin text. In Section 7.4.2, the axioms for defeasibly inferring rhetorical relations from the four aspect markers, the axioms for indicators, and the meaning postulates for rhetorical relations are proposed, based on the discussions in the previous chapters and in Section 7.3. In addition, the constraints of aspect markers on *Narration* are also stated as axioms, which work in the glue logic, to guarantee that these constraints are obeyed when an SDRS representing a discourse is built. Then, in Section 7.4.3, how those axioms work in the glue logic and how the model-theoretic interpretation of the logic of information content can decide temporal relations are demonstrated. Section 7.5 summarizes this chapter.

7.2 Aspect Markers and Rhetorical Relations

One question about the approach of this dissertation that can be asked is why it is argued that aspect markers influence temporal relations indirectly via rhetorical relations and why it is not proposed that either aspect markers or rhetorical relations determine temporal relations alone. There are several pieces of evidence that support the proposal that aspect markers do not directly determine temporal relations but have indirect influence via rhetorical relations.

First, aspect markers cannot directly determine the temporal relations because the same aspect markers can appear in clauses with different temporal relations. Take the perfective *le* and the experiential *guo* as an example. The perfective *le* presents a terminated or completed event and the experiential *guo* predicates on an event type

which was realized at indefinite past and which is repeatable. Therefore, one might propose that *le* specifies *Narration* and *guo* does not. The examples in (315) can demonstrate this seemingly reasonable intuition.

315. a. ta chi **le** fan kan **le** dianshi zuo **le** gongke
he eat PFV rice watch PFV TV do PFV homework
cai qu shuijiao
CAI go sleep
'He ate a meal, watched TV, did his homework, and then went to sleep.'

b. qunian ta shang **guo** danxue zuo **guo** shengyi dang
last year he go EXP university do EXP business be
guo jingcha zhongshi yishiwucheng
EXP police finally total failure
'Last year, he attended a university, did some business, worked as a cop, but finally turned out to be a total failure.'

In (315a), the three events presented by *le* occurred consecutively. That is, *eating a meal* occurs before *watching TV*, which in turns occurs before *doing homework*. This is an example of *Narration*. In (315b), the three events presented by *guo* all occurred in last year, but their temporal order is unknown. This is not an example of *Narration*.

The two examples in (315) seem to support the proposal that aspect markers can determine temporal relations directly. However, there are examples that show

otherwise. In (316) and (317), although the two examples include events presented by *le* and *guo* respectively, the temporal relations in (316) and (317) differ from the ones in (315a) and (315b).

316. a. hushi yuanzhang zai kaimushi de zhici zhong tandao **le**
Hushi dean at opening DE speech inside talk PFV
bushao ling ren shen si de hua
a lot make person deep think DE words
'In his speech at the opening, Dean Hui talked about a lot of things that made people think profoundly.'

b. ta tandao kexue shi yi zhong fangfa mingzhu shi yi
he talk science be one CL method democracy be one
zhong shenghuo fangshi
CL life style
'He said that science was a way (of exploring the unknown) and democracy was a lifestyle.'

317. a. maozedong zai changsha dushu shi de laoshi
Chair Mao at Changsha study time DE teacher
hongjun changzheng shi zui nianzhang de xuteli
communist army long march time most senior DE Xu Teli
dangshi yijing shi bashier sui de lao ren
then already be 82 year-old DE ole man
'Xu Teli, Chair Mao's teacher when he studied at Changsha and the most senior member in the communist army during the Long March, was already a 82-year-old old man at that time.'

b. liang nian qian hui **guo** hunan laojia
two year ago return EXP Hunan hometown
'(He) returned to his hometown in Hunan two years ago.'

c. yijiu wuba nian di zaidu fan xiang shi
1958 year end again return home time
'(When he) returned home again at the end of 1958,'

d. fanxian xiri conglong de qiuling huang ni luolou
find past green DE hill yellow mud appear
'(he) found that the hills which used to be green because of trees were now covered with yellow mud and dust only.

e. linzi quan hui le

forest all destroy PFV

'all of the forests were destroyed.'

In (316), (316b) is temporally included (316a) even though (316a) is presented by *le*. This is an example of *Elaboration*, where (316b) elaborates (316a). In (317), (317c) to (317d) temporally follows (317b), which is presented by *guo*. This is an example of *Narration*. These two examples show that aspect markers do not monotonically specify a temporal relation.

Secondly, as shown in the previous chapters, the four aspect markers can appear in clauses that are connected together by different rhetorical relations as long as there is no semantic clash between the aspectual properties of the markers and the temporal relations specified by the rhetorical relations. This point further supports that aspect markers do not directly determine temporal relations since different rhetorical relations can specify different temporal relations and some rhetorical relations even remain neutral with respect to temporal relations, i.e. they do not specify the temporal relation between the clauses they connect together.

Thirdly, some aspect markers cannot appear in clauses connected together by some rhetorical relations. For example, the perfective marker *le* cannot occur in a clause that is connected to another by *Reason*. However, it can appear in a clause that is connected to another by *Result*. *Reason* expresses a goal to achieve and hence is usually not completed or terminated yet, whereas *Result* specifies the result of some action and is usually completed or terminated. This suggests that aspect markers DO

interact with the temporal relations specified by rhetorical relations to a certain extent. Otherwise, aspect markers should be able to appear freely. This is demonstrated in the following examples.

318. a. weile winde (*le) shengli tamen nuli lianxi
in order to win PFV victory they diligently practice
'In order to win the victory, they practiced diligently[76].'

b. tamen nuli lianxi suyi yingde le shengli
they diligently practice so win PFV victory
'They practiced diligently. So they won the victory.'

Though (318a) and (318b) have a similar meaning and can be regarded as two different ways of describing the same event, they represent different viewpoints of the speaker on the same event. Using (318a), the speaker looks at the process of *they diligently practice*. It does not matter for the speaker whether this event occurred in the past or is ongoing at the speech time, because the speaker chooses to look at the process, instead of the whole event. On the other hand, uttering (318b), the speaker chooses to look at the whole big event, that is, *they practicing diligently* results in *they winning the victory*. Since the whole big event is presented, naturally the perfective *le* can be used to present the result.

The clauses in (318a) and (318b) are connected together by different rhetorical

[76] One might suggest that *le* cannot appear here because it is infinitival. Hu, Pan, and Xu (2001) argue that in fact Mandarin does not have the finite vs. infinite (infinitival) distincion because all of the tests used in related literature cannot really make this distinction. Based on this study, the ungrammaticality of (318a) with *le* in the *Reason* clause cannot be attributed to the clause being infinitival.

relations. In (318a), the indicator *weile* ‘in order to’ specifies that it is *Reason* that connects these two clauses together. In (318b), the indicator *suoyi* ‘so’ indicates that it is *Result* that connects these two clauses together.

Since the event that serves as a reason occurs after the event whose process the speaker chooses to look at, it is not completed (or even has not happened) yet in terms of the speaker’s viewpoint. This is why the perfective marker cannot present it. When a resultative event is stated, it is usually the case that both the causative event and the resultative event occurred and are completed. In this case, the perfective *le* is good to present the resultative state.

All of the constraints posed by aspect markers on rhetorical relations show that while rhetorical relations directly determine temporal relations, aspect markers interact indirectly with temporal relations.

The three points discussed above seem to suggest that aspect markers are not necessary and that rhetorical relations do all the work. However, this is not true. The examples below can illustrate this point. Changing the aspect marker in (319a) also changes the rhetorical relation that connects the two clauses together.

319. a. xiaoli **zai** youyung
Xiaoli PRG swim
‘Xiaoli was swimming.’

b. laozhang kandao le renbuzhu jiao le ta ji zhao
Laozhang see PFV cannot help teach PFV he several move
'Laozhang saw him, and couldn't help himself but showed him a few moves.'

319. a'. xiaoli you **le** yong
Xiaoli swim PFV swim
'Xiaoli was swimming.'

b'. laozhang kandao le renbuzhu jiao le ta ji zhao
Laozhang see PFV cannot help teach PFV he several move
'Laozhang saw him, and couldn't help himself but showed him a few moves.'

In (319a) and (319b), it is *Background*$_T$ that connects these two clauses together because *zai* specifies *Background*$_T$ by default and there is no information in the two clauses that indicates otherwise. However, if the progressive marker *zai* in (319a) is changed and replaced with the perfective marker *le*, as in (319a'), it is no longer *Background*$_T$ that connects these two clauses together. Instead, it is *Narration* that connects together these two clauses in (319) because the perfective marker *le* defeasibly indicates *Narration*, and there is nothing in the two clauses indicating otherwise. In addition, they share a theme: swimming. Since the rhetorical relation that connects these two clauses together changes, the temporal order between them changes accordingly.

These two examples show that aspect markers can determine, to a certain

degree, which rhetorical relation connects together the clauses in discussion. In turn, the rhetorical relation determines the temporal order. Neither of them works alone on this matter.

In addition, aspect markers can exert constraints on rhetorical relations. It has been argued in Chapter Three that the event time of an event presented by the progressive marker *zai* cannot be advanced. In Chapter Four, it is argued that the event time of an event/eventuality presented by the durative marker *zhe* can be advanced only under restricted circumstances. In Chapter Six, just like the durative marker *zhe*, it is argued that the event time of an event presented by the experiential *guo* can be advanced only under restricted contexts.

In sum, aspect markers and rhetorical relations do not work alone to decide temporal relations between clauses. Instead, both of them work together. Aspect markers sepcify constraints on which rhetorical relation can connects clauses together, and rhetorical relations decide temporal relations. That is, aspect markers indirectly affect temporal relations via rhetorical relations.

7.3 Rhetorical Relations and Temporal Progression

In the last four chapters, the examples of all kinds of rhetorical relations are examined in terms of their distribution together with different aspect markers. In this section, the examples are examined based on rhetorical relations, that is, the clauses that are connected together by the same rhetorical relation but have different aspect markers. The rhetorical relations examined in this section include *Narration*, *Elaboration*, *Background*$_{T}$, *Background*$_{I}$, *Parallel*, *Contrast*, *Result* and *Consequence*.

The first three rhetorical relations have their own influence on temporal relations, as discussed in Asher and Lascarides (2003). The influence of the last four rhetorical relations on temporal relations is carefully examined in this section.

For *Narration*, though all of the four aspect markers can appear in clauses connected to adjacent clauses by *Narration*, they have different constraints. These constraints basically render the aspectual properties of the markers to fit the temporal function of *Narration*, i.e. to advance the narrative time. To advance the narrative time of an event, this event should be either completed or, at least, terminated. Otherwise, its event time cannot be advanced.

The progressive *zai* is argued to present an event ongoing at an instant and it cannot present a process with a natural final endpoint. Therefore, though a clause with *zai* can be connected to its previous clause by *Narration*, a clause following a *zai* clause cannot be connected to the *zai* clause by *Narration*. This is because an event presented by *zai* is not completed or terminated yet[77] and hence it is impossible to advance its event time. But, as argued in Chapter Three, *zai* can present the beginning of an event and hence a *zai* clause can advance the event time of another clause.

The durative *zhe* is argued to present an event/eventuality lasting for an interval and it does not present a natural final endpoint since the predicates that can go with *zhe* do not have a natural final endpoint. A *zhe* clause can narrate another clause because it also presents the beginning of an event/eventuality, just like the progressive

[77] According to the Imperfective Paradox, it is even unknown whether it will be completed or terminated, and hence it is unlikely at all to advance the event time of a *zai* clause.

zai. However, it is different from *zai* in that a clause following a *zhe* clause can narrate the *zhe* clause as long as one constraint is satisfied, that is, there must be another event that denotes completion, which is syntactically embedded under the predicate presented by *zhe*. The example below can demonstrate this point.

320. a. ta jingjing zhu zai nar
he quietly sit at there
'He sat there quietly.'

b. ting **zhe** yinyuehui jieshu[78]
listen DUR concert end
'(he) listened to the concert until it ended.'

c. ranhou like zhuan shen likai
then immediately turn body leave
'Then, (he) immediately turned and left.'

This is an example of *Narration* where (320c) narrates (320b). The predicate marked by *zhe* is *ting* 'to listen to'. This event itself does not come to an end. Instead, it is the completion of anther event *the concert ended* that is experienced and witnessed.

In sum, a clause following a *zhe* clause can narrate the *zhe* clause only when the *zhe* clause describes that the process to the natural final endpoint of an event is being witnessed.

[78] At first glance, this clause looks like the V_1 *zhe* V_2 construction. However, it is not because the subject of the two verbs in the the V_1 *zhe* V_2 construction are the same, but in this clause the subject of the embedded verb is the object of the matrix verb, i.e. *yinyuehui* 'concert'.

It has been argued in Chapter Five that the perfective *le* indicates *Narration* by default. This is a natural conclusion because the perfective *le* defeasibly presents a completed or terminated event, that is, an event presented by *le* includes both the initial endpoint and the final endpoint. Therefore, it can advance the event time of another event or its event time can be advanced by another event.

The experiential *guo* is argued to predicate on an event type which was realized at indefinite past and which is repeatable. That is, the event time of an event presented by *guo* is unknown and hence a *guo* clause cannot advance the event time of another event or be advanced by another event. But, if the event time of a *guo* clause can be narrowed down, then *Narration* is possible for a *guo* clause. This can be demonstrated by the following example.

321. a. ta <u>qunian</u> qu **guo** yi ci xianggang
he last year go EXP one time Hong Kong
'He went to Hong Kong once last year.'

b. xia ge yue you yao qu le
next CL month again will go Prc
'Next month, (he) will go again.'

The temporal location phrase *qunian* 'last year' in (321a) narrows down the range of the event time of the *guo* clause. Therefore, there is a reference time point to advance from in this clause. That is why (322b) can narrate (322a).

To sum up, the perfective *le* goes naturally with *Narration* because its aspectual property fits the advancement of the narrative time well. For the other three aspect

markers, they need the assistance of other phrases to twist or expand their aspectual properties to accommodate the advancement of the narrative time. But, due to its rigid aspectual property, a clause following a *zai* clause can never advance the event time of the *zai* clause.

For *Elaboration*, it is an important issue whether temporal inclusion is involved. In the previous chapters, it is argued that object elaboration does not necessarily involve temporal inclusion while event elaboration does. Here, this issue is examined in detail.

Event elaboration refers to examples where an event elaborates another event. Event elaboration always involves temporal inclusion, i.e. the elaborating clause is temporally included in the elaborated clause. The example below can demonstrate this point.

322. a. xiao dian li mai bing de laotaitai shi ji nian
small store inside sell ice REL old woman ten several years
xialai hai **zai** mai bing
down still PRG sell ice
'For over a decade, the old woman selling ice in the small store is still selling ice.'

b. ta de shengming haoxiang jingzhi zai na ge xiaoxiao
she DE life seem freeze at that CL small
de fanwei li
DE domain inside
'Her life seems to freeze in that small domain,'

c. buduan **zai** zuo tongyang de shi
without stop PRG do same DE thing
'(and she) is doing the same thing without stop.'

In this example, (322c) elaborates (322b). The hint is that *zai zuo tongyang de shi* 'to be doing the same thing' is a subtype of (i.e. is semantically subordinated to) *jingzhi* 'to freeze'. This is a case where an event elaborates another event, and hence temporal inclusion is involved.

Object elaboration refers to examples where an object is elaborated. When object elaboration involves temporal inclusion, there are three cases. The first is where the VP is the way of performing the NP. The second is where the VP is a subtype of the NP. The third is where the elaborated clause is an activity and is not completed or terminated. When the hint for *Elaboration* is one of the three cases, temporal inclusion is involved.

323. a. zai taida de si nian li
at Taiwan University DE four year inside
'During the four years I studied at NTU,'

b. wo zhi ting **guo** qian xiaozhang gei huaxue xi
I only hear EXP Qian president for chemistry department
tongxuemen zuo de youguan fenxi huaxue de yanshuo
classmates make DE about analytic chemistry DE speech
'I only heard once the speech on analytic chemistry President Qian delivered to the chemistry majors.'

c. ta yuzhongxinchangde mianli tongxue yi fan hua
he sincerely encourage classmates one CL words
'He sincerely encouraged the students that he addressed to.'

d. zhi jin hai jiyiyouxin
to now still memory-fresh
'The memory is still fresh so far.'

In this example, (323c) elaborates (323b). The hint is that *mianli* 'to encourage' is a subtype (i.e. one of the functions) of *yanshuo* 'speech'. This is an example of a VP elaborating an NP of which the VP is a subtype. This example involves temporal inclusion.

324. a. zuotian wo qu ting **le** shili jiaoxiangyuetuan
yesterday I go listen PFV municipal orchestra
de yinyuehui
DE concert
'Yesterday, I went to the concert of the Municipal Orchestra.'

b. tamen yianzo le wo zui xihuan de qumu
they perform PFV I most like REL piece
zhongxiayiezhimong
mid-summer dream
'They performed my favorite piece: the Mid-Summer Dream.'

c. ran wo hen gaoxing
make I very happy
'(that) made me very happy.'

In (324), (324b) elaborates (324a). The hint is that the VP *yianzo* 'to perform' is the way of performing *yinyuehui* 'concert'. This is an example where the VP is a way of performing the NP. This example also involves temporal inclusion.

325. a. ta yimian shuo
he simultaneously say
'He was saying,'

b. you shou manmande tiqi
right hand slowly raise
'and raising his right hand slowly.'

c. muzhi shizhi zhijian wo **zhe** ji mei du zhen
thumb index finger between hold DUR several CL poison needle
'There was a poisonous needle held between the thumb and the index finger.'

In this example, (325c) elaborates (325b). The hint here is that *muzhi* 'thumb'

and *shizhi* ‘index finger’ are a subtype (i.e. parts) of *you shou* ‘right hand’. This is an example of the elaborated clause being an activity. Obviously, (325c) is temporally included (325b). This is because (325b) is activity and has a process that can temporally include another event or eventuality.

When it is object elaboration and no temporal inclusion is involved, the elaborated clause usually describes a completed or terminated event. Since it is not event elaboration, the internal process of a completed or terminated event is not available and the elaborating clause cannot be temporally included in the elaborated clause. This is demonstrated by the following example.

326. a. zhe xiang jihua houlai dedao guofangbu gaodeng
this CL project later receive Dept. of Defense advanced
yanjiu jihua zhongxin de zanzhu
research project center DE support
‘Later, this project received support from the Center for Advanced Research Project of the Dept. of Defense.’

b. yiner deyi jiashe zui zao de yi tiao wangji
so can build most early DE one CL internet
wanglu ARPAnet
network ARPAnet
‘Therefore, they could build the first inetnet: ARPAnet.’

c. ta lianxi **le** shidanfo yanjiusuo jiada luoshanji fenxiao
it connect PFV Stanford research center UC LA campus
jiada shengtabababla fenxiao youta daxue deng xiaoyuan
UC St. Barbara campus Utah Univ. etc. campus
'It connected campuses, such as the Research Center at
Stanford University, UCLA, UCSB, Univ. of Utah, etc.'

In this example, (326c) elaborates (326b). The hint is that the *lianxi* 'to connect' is the function of *internet*. Here, no temporal inclusion is involved because during the process of building the first internet, the internet did not connect the campuses mentioned above. It is immediately after the construction of the first internet was completed when it connected the campuses. That is, no temporal inclusion is involved because (326b) is an accomplishment.

To sum up, event elaboration involves temporal inclusion. Object elaboration can, but not necessarily, involve temporal inclusion, depending on the hint that indicates elaboration and the aspectual types of the elaborated clauses.

As for *Background*, it has been argued that there are two kinds: $Background_T$ and $Background_I$. *zai*, *zhe*, and *le* can serve as $Background_T$ while *guo* serves as $Background_I$. Neither of the two kinds of *Background* requires an indicator.

Though none of the four aspect markers needs indicators to specify *Background*, the perfective *le* cannot freely serves as a background while the other three indicate *Background* by default.

As argued in Chapter Five, a clause with *le* can serve as a background only

when there is a temporal phrase in the clause. When a *le* clause serves as a background, the temporal frame provided is the time after the event presented by *le* is completed or terminated. This fits the aspectual function of the perfective *le*.

Both of the progressive *zai* and the durative *zhe* provide the event time of the event (or eventuality) presented by them as a temporal frame. However, they differ in that *zai* provides an instant at which another event is taking place whereas *zhe* provides an interval for which an event is lasting.

The experiential *guo* specifies a special kind of *Background*. It provides background knowledge and information, based on which an assumption can be made or something can be predicatd to happen. $Background_{\mathrm{I}}$ does not provide the event time of the backgrounded clause as a temporal frame. Instead, it provides as a temporal frame the time for the (discontinued) resultative state caused by an event presented by *guo*.

It is argued in Chapter Six that the precondition on a spatio-temporal token requires the resultative state caused by the event token to discontinue, whereas the precondition on an individual token requires the resultative state caused by the event token to hold. It is the time for this (discontinued) resultative state that *guo* provides as a temporal frame.

In sum, though *le*, *zai*, and *zhe* all provide temporal background, the temporal frame provided differs with respect to the aspectual properties of these three aspect markers. The experiential *guo* specifies an informational background, based on which some assumption can be made, or with the knowledge of which some event can be

predicted to take place. It provides as a temporal frame the time for the (discontinued) resultative state caused by an event presented by *guo*.

The temporal relations between clauses connected together by *Parallel*, *Result* or *Consequence* are clear. The examples retrieved from the Sinica Corpus show that when two clauses are connected by *Parallel*, their temporal relation should be parallel too. That is to say, a clause that is connected to another one with either *guo* or *le* by *Parallel* describes a completed or terminated event too. A clause that is connected to another one with either *zhe* or *zai* by *Parallel* describes an ongoing or a durative event/eventuality too. While two ongoing or durative events (eventualities) are temporally overlapping, two completed or terminated events are not necessarily so. This is because two events can be completed or terminated at different times and the event times do not necessarily overlap. Therefore, while the clauses with either *zai* or *zhe* connected together by *Parallel* are temporally overlapping, the clauses with either *guo* or *le* connected by *Parallel* are, at best, known to occur before certain RTs. But, the temporal order between them is undecided.

For the examples of *Result*, it is found that B cannot occur before A if the result of A is B. This follows naturally from the cause-effect relation of *Result* since the cause should occur before the result. This observation seems to suggest that once two clauses are connected together by *Result*, they are connected by *Narration* too, but not vice versa.

For *Consequence*, just like *Result*, the consequent should occur after the conditional antecedent, following the same temporal restriction posed by the

cause-effect relation indicated by *Consequence*.

For *Contrast*, things are much more complicated. Asher and Lascarides (2003: 168) propose that both *Parallel* and *Contrast* involve structural similarity. But, in terms of temporal relations, while *Parallel* has aspectual parallel as discussed above, *Contrast* does not manifest aspectual contrast. Instead, the examples examined show that the temporal relation between clauses connected together by *Contrast* follows from the aspectual properties and discourse constraints of aspect markers.

Since the perfective *le* presents a completed or terminated event, a clause connected to a *le* clause by *Contrast* is temporally included in the time after the event described by the *le* clause is completed or terminated. There are two possible cases here: the contrasted clause can advance the narrative time further or it can remain temporally included.

For the cases of *Narration*, either there are temporal location phrases that indicate the advancement of narrative time or a *le* clause is contrasted with clauses that are connected by *Narration*. The following two examples can demonstrate this.

327. a. ji tian qian axio yijing fangqi **le** xiwang
several day ago A-Xio already quit PFV hope
'Several days ago, A-Xio already gave up hope.'

b. renwei bu hui you ren lai jiu ta le
think no will have person come save she Prc
'(and she) did not think that anyone would come save her.'

c. danshi <u>xianzai</u> tingdao **le** yuanchu de ren sheng

but now hear PFV distant DE person voice

'But, <u>now</u>, she heard distant persons' voice.'

d. ta you ranqi le xiwan

she again rekindle PFV hope

'Her hope was rekindled.'

In this example, the two adverbs *ji tian qian* 'several days ago' and *xianzai* 'now' clearly indicate the advancement of narrative time. That is, the clauses are connected not only by *Contrast*, as indicated by *danshi* 'but', but also by *Narration*, as specified by the temporal adverbials.

328. a. da hui lang gei ta yi la zhixia : π_1

big gray wolf PASS she one pull under the situation of

'The big gray wolf was pulled by her.'

b. xianghou tui **le** yi bu : π_2

backward back PFV one step

'(it) took one step backwards.'

c. <u>dan</u> ta e dehuang le : π_3

but it hungry very much Prc

'But, it was very hungry.'

d. hou zu laolao judi : π_4

rear leg firmly grasp the ground

'Its rear legs grasped the ground firmly.'

e. jiao liwenxio zaiye la ta bu dong : π_5

make Li Wenxio any more pull it cannot move

'(that action) made Li Wenxio unable to pull it back any more.'

f. genzhe youshi yi kou yaoluo : π_6

then again one mouth bite-toward

'Then, (it) bit toward them again.'

This example is also an example where the clauses are connected both by *Contrast* and *Narration*. But, the hint here is not adverbs. Instead, it is the rhetorical relation of the contrasted part. The rhetorical relations of the clauses in (328) can be briefly shown as in (328').

328'. π_{12}: $\text{Background}_T(\pi_2, \pi_1)$

π_{45}: $\text{Result}(\pi_4, \pi_5)$

π_{456}: $\text{Narration}(\pi_{45}, \pi_6)$

π_{3456}: $\text{Result}(\pi_3, \pi_{456})$

π_0: $\text{Contrast}(\pi_{12}, \pi_{3456})$

(328) basically says that (328e) is connected to (328d) by *Result*, and this relation is labeled as π_{45}. Then, (328f) is connected this bigger unit, π_{45}, by *Narration*, which is labeled as π_{456}. Then, π_{456} is connected to (328c), which is labeled as π_{3456}.

Finally, π_{3456} is connected the chunk of (328a) and (328b) by *Contrast*, labeled as π_0. The narrative time is advanced because (328b) is contrasted to a chunk of discourse with a rhetorical relation that advances narrative time.

For those examples where narrative time is not advanced, the clause contrasted with a *le* clause does not have any sign of advancing narrative time and hence the event time of the contrasted clause is temporally included in the time after the event described by a *le* clause is completed or terminated. This is demonstrated in the following example.

329. a. jishi jiaqian hen gui de bieshu dou
even though price very expensive DE bungalow all
maidiao **le**
be sold PFV
'even though bungalows which are very expensive are all sold,

b. xue duo pianyi de gongyu faner
very many cheap DE apartment contrastively
xiao bu chuqu
sell cannot out
'Apartments that are cheaper than bungalows cannot be sold.'

In this example, (329b) does not advance the narrative time because it is more like a state. Therefore, (329b) is temporally included in the time after the expensive bungalows are sold.

For the experiential *guo*, a clause contrasted with a *guo* clause is basically temporally included in the time when the experience holds. Just like the perfective *le*, the examples include both advancing narrative time and simple temporal inclusion. For the examples of narrative time being advanced, the constraint of *guo* on *Narration* must be obeyed, that is, there must be a temporal location phrase to narrow down the range of the temporal frame for a *guo* clause, as argued in Chapter Six. These two cases are demonstrated by the following examples.

330. a. you shi sui gen fumu xue **guo** yixie wuyi
young time though with parents learn EXP some martial arts
'Though she learned some martial arts from her parents in her youth,'

b. <u>dan</u> fumu si hou jiu paohuan zao yi wangji ganjing
but parents die after JIU not practice early already forget clean
'(yet) after her parents died, she never practiced and had completely forgot.'

In (330), the temporal location phrase *you shi* 'in one's youth' restrains the time for the experience to be in the subject's youth. This makes it possible to advance the event time of a *guo* clause. Therefore, these two clauses are connected both by *Contrast* and by *Narration*.

For cases where the constraint of *guo* on *Narration* is not obeyed, the narrative

time cannot be advanced. For those cases, a clause contrasted with a *guo* clause has to be temporally included in the time when the experience holds.

331. a. mao sui bu zancheng da ren
Chair Mao though not agree hit person
'Though Chair Mao did not agree communist officials beating citizens up,'

b. keshi ta congwei xiang **guo** falü yingdang baohu
but he never think EXP law should protect
renming bu bei da
citizen not PASS hit
'But, he never thought that laws should protect citizens from being beaten up (by communist officials).'

In this example, the narrative time cannot be advanced because the constraint of *guo* on *Narration* is not obeyed. Therefore, (331a) is temporally included in the time when the experience *never thinking that laws should protect citizens from being beaten up* holds.

For the two imperfective markers *zai* and *zhe*, a contrasted clause either can be temporally overlapping or can advance narrative time. In the cases of narrative time being advanced, the constraints of *zai* or of *zhe* on *Narration* must be obeyed. This can be demonstrated by the following examples.

332. a. kongzi tong yanyuan shuo le yi tian de daoli
Confucius to Yan Yuan speak PFV one day DE principle
'Confucius explained, for a whole day, to Yan Yan the principles of how to function as a person.'

b. yanyuan bu wen wenti ye bu fanbuo
Yan Yuan no ask question also no refute
'Yan Yuan neither asked questions nor refuted.'

c. haoxiang hen ben de yangzi
seeming very stupid DE appearance
'He seemed stupid.'

d. danshi ta sidixia que shi queshi **zai** shijian
but he privately but be precisely PRG practice
kongzi shuo guo de hua
Confucius say EXP REL words
'But, privately, he was practicing what Confucius taught him.'

e. yici yanyuan yidangye bu ben
so Yan Yuan at all no stupid
'So, Yan Yuan was not stupid at all.'

This is an example where a *zai* clause is connected to other clause by *Cotnrast* and by *Narration*. The hint for *Narration* comes from the experiential marker *guo* in (332d). It indicates that practicing the teachings of Confucius comes after Confucius gave the teachings. In Chapter Three, it has been argued that a *zai* clause can narrate

its preceding clause, but not vice versa. This example obeys this constraint because the *zai* clause, (332d), narrates its preceding clauses.

For other cases, a clause contrasted with a clause with an imperfective marker temporally overlaps the clause the marker, as shown in (333).

333. a. aman dao ni qu de wo ye qu de
A-man say you go can I also go can
'A-man said, " you can go, and I can go too."'

b. ta xing zhong queshi **zai** shuo ni si le
she mind in contrastively PRG say you die PFV
nadao wo yi ge ren hai neng huo me
how can I one CL person still can live Q
'(But), in her mind, she was saying, "If you die, do you think I live without you?"'

The durative marker *zhe* manifests exactly the same behavior. That is, when it is an example of *Contrast* and *Narration*, the constraint of *zhe* on *Narration* must be obeyed. For other cases, it is temporally overlapping. This is shown in (334) and (335).

334. a. ta kan **zhe** axio hewan niunai
he watch DUR A-xio drink-finish milk
'He watched A-xio drink and finish milk.'

b. dan que meiyou zoguoqu jieguo chawan
but contrastively not walk over pick up bowl
'But, he did not walk over to pick up the bowl.'

c. faner zhuan shen zo le chuqu
instead turn body walk PFV out
'Instead, he turned and walked out.'

This is clearly an example of both *Contrast* and *Narration* because (334b) and (334c) occur after (334a), in which there is a predicate which is not presented by *zhe* and which describes a completed event. This is exactly the constraint of *zhe* on *Narration.*

335. a. da tian li kan bu dao fengshou de zhuangjia
big farm inside see cannot see abundant DE crop
'In the big farms, no crops could be seen.'

b. que cha **zhe** yi dui yi dui de hong qi
but erect DUR one hump one hum DE red flag
'But, there were humps of red flags erected in the farms.'

This is an example of temporal overlapping, where the state of *no crops in the big farms* temporally overlaps *humps of red flags being erected in those farms*. In this case, the constraint of *zhe* on *Narration* is irrelevant.

To summarize this section, the examples of *Narration* involve advancement of narrative time. Except for the perfective *le*, the other three aspect markers have their own constraints on *Narration*.

The examples of *Elaboration* can, but not necessarily, involve temporal inclusion, depending on whether it is event elaboration or object elaboration, and on the hint that indicates elaboration and the aspectual type of the elaborated clauses when it comes to object elaboration.

The examples of both kinds of *Background* all involve temporal overlapping. The two imperfective markers *zai* and *zhe* provide the event time of the event marked by them as a temporal frame. The perfective marker *le* provides as a temporal frame the time after the event presented by *le* is completed or terminated. The experiential *guo* provides as a temporal frame the time for the (discontinued) resultative state caused by an event presented by *guo*.

For the examples of *Result*, the resultative clause cannot occur before the causal clause. This is natural because *Result* indicates a cause-effect relation and in this world cause comes before effect.

For the examples of *Consequence*, just like the examples of *Result*, the event described by the conditional antecedent clause occurs before the event described by the consequent clause. This also follows the cause-effect relation, which is indicated by *Consequence*.

For the examples of *Parallel*, aspectual parallel is required. This means that the both sides of *Parallel* should have the same aspectual properties. But, the temporal order between clauses with *zhe* or *zai* is different from that of clauses with *le* or *guo*. While the clauses with either *zai* or *zhe* connected together by *Parallel* are temporally overlapping, the clauses with either *guo* or *le* connected by *Parallel* are, at best,

known to occur before certain RTs. But, the temporal order between them is undecided.

For the examples of *Contrast*, the temporal order can either be advancement of narrative time or temporal overlapping. The examples of advancement of narrative time must have indication and must obey the constraints of aspect markers on *Narration*.

7.4 Modeling Temporal Progression

With the temporal relations indicated by the rhetorical relations clarified, in this section, it is attempted to model temporal progression with SDRT. In SDRT, the rhetorical relations between clauses must be determined first, and then the temporal relations are examined in the meaning postulates for rhetorical relations in the Satisfaction Schema. The attachment site of a new clause coming in the discourse is determined by MDC, as introduced in Chapter One. Therefore, in Section 7.4.1, how MDC works for Mandarin texts is discussed. Then, the axioms to defeasibly infer rhetorical relations and the meaning postulates for rhetorical relations are proposed in Section 7.4.2. Section 7.4.3 demonstrates how the axioms and the meaning postulates work to determine the temporal relations.

7.4.1 Maximal Discourse Coherence

In SDRT, it is very important to determine the correct attachment site for a new clause coming in the discourse. Discourse update does not decide the attachment site of a new clause. It is MDC that is responsible for finding out the correct attachment site for a new clause. MDC (Asher and Lascarides 2003: 233), which is introduced as

(16) in Chapter One, is repeated below as (336).

336. If discourse update produces two SDRSs *K* and *K'*, *K* describes a preferred or more coherent interpretation of the discourse (so far) if the followings conditions hold:

(a) *K* has more and better quality rhetorical relations than *K'*

(b) *K* has fewer inconsistencies and pragmatic clashes

(c) *K* has a simpler structure unless a simpler structure would generate an inconsistency or a clash

(d) *K* has fewer unresolved underspecifications

The example used to demonstrate how MDC works is repeated below:

337. a. da hui lang gei ta yi la zhixia : π_1

big gray wolf PASS she one pull under the situation of

'The big gray wolf was pulled by her.'

b. xianghou tui **le** yi bu : π_2

backward back PFV one step

'(it) took one step backwards.'

c. <u>dan</u> ta e dehuang le : π_3

but it hungry very much Prc

'But, it was very hungry.'

d. hou zu laolao judi : π_4

rear leg firmly grasp the ground

'Its rear legs grasped the ground firmly.'

e. jiao liwenxio zaiye la ta bu dong : π_5

make Li Wenxio any more pull it cannot move

'(that action) made Li Wenxio unable to pull it back any more.'

f. genzhe youshi yi kou yaoluo : π_6

then again one mouth bite-toward

'Then, (it) bit toward them again.'

π_2 has to be connected to π_1 because the zero anaphor subject in π_2 could not find an accessible antecedent if π_2 were to stand alone, which would violate (336d). π_2 is connected to π_1 by *Background*$_{\text{I}}$ because *zhixia* 'under the situation of' indicates an informational background.

π_3 has three options. It can be attached to π_1, to π_2 or stand alone, waiting for new clauses coming in. π_3 cannot be attached to π_1 because π_3 has an indicator *dan* 'but' specifying *Contrast*, but π_1 has an indicator *zhixia* 'under the situation of' spelling out *Background*$_{\text{I}}$. These two rhetorical relations are not compatible.

Though π_2 has no indicator, π_3 cannot be attached to it because of (336b). For *Contrast* to connect two clauses together, these two clauses have to contrast in some way. The two examples below demonstrate two possible ways to be contrastive.

338. a. ta xie le yi feng xin keshi mei xiewan
he write PFV one CL letter but no write-finish
'He wrote a letter, but he did not finish it.'

b. zhangsan xie le yi feng xin bushi lisi
Zhangsan write PFV one CL letter not Lisi
'Zhangsan wrote a letter, not Lisi.'

(338a) contrasts between events, i.e. while the perfective *le* indicates completion by default, this information is negated by the clause after *keshi* 'but'. (338b) contrasts between NPs, that is, it is Zhangsan, not Lisi, who wrote a letter. These two examples suggest that for two clauses to be connected together by *Contrast*, they, at least, have to contrast either between events, as (338a), or between NPs, as (338b). However, π_3 and π_2 do not contrast in either way. Therefore, there would be a pragmatic clash and inconsistency if π_3 were attached to π_2 by *Contrast*. Therefore, π_3 should wait for new clauses coming in the discourse.

π_4 cannot be attached to π_3 because there is no information to decide which rhetorical relation connects them together. There would be an underspecified rhetorical relation if π_3 were connected to π_4. This would violate (336d).

π_5 has several options. It cannot be connected to π_3 because no information can decide which rhetorical relation connects them together. It cannot be connected to π_2 or π_1 for the same reason. It can be attached to π_4 by *Result* because of the cause_D relation between *wolf's legs grasping the ground* firmly and *making Li Wenxio unable*

to pull it back anymore.

π_6 contains an indicator *genzhe* 'then', so it is connected to another clause by *Narration*. It should be connected to the chunk consisting of π_4 and π_5 because the important temporal relation between this big chunk and π_6 would be lost if π_6 were connected to any clause before π_5.

Now, the chunk consisting of π_4, π_5 and π_6 can be attached to π_3 by *Result* because of the cause_D relation between *the wolf being very hungry* and *it managing to bite again*. Then the big chunk consisting of π_3, π_4, π_5, and π_6 can be attached to the chunk consisting of π_1 and π_2 by *Contrast*. At this point, there is a contrast between events, i.e. *the wolf being pulled back* and *it managing to bite again*. The whole discourse can be represented as follows:

339. a. π_{12}: $\text{Background}_I(\pi_2, \pi_1)$

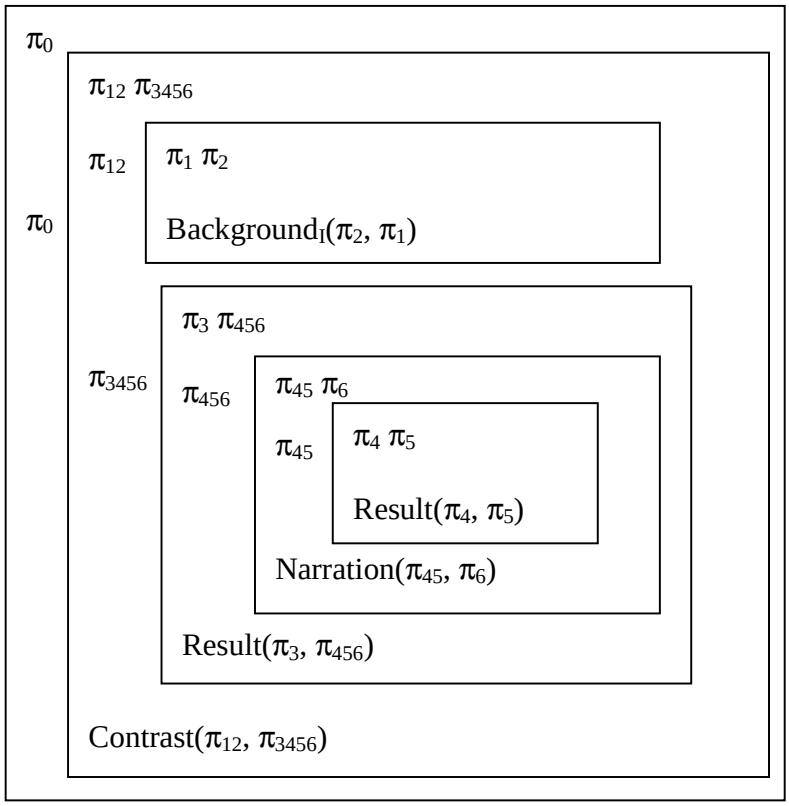
π_{45}: $\text{Result}(\pi_4, \pi_5)$

π_{456}: $\text{Narration}(\pi_{45}, \pi_6)$

π_{3456}: $\text{Result}(\pi_3, \pi_{456})$

π_0: $\text{Contrast}(\pi_{12}, \pi_{3456})$

b.



In sum, discourse update does not decide the attachment site of a new clause coming into the discourse. MDC is responsible for choosing the attachment site that can maximize discourse coherence for a new clause. In this section, it is demonstrated how MDC works on a Mandarin example to accurately generate an SDRS that matches a native speaker's intuition about the discourse.

7.4.2 Axioms and Meaning Postulates

In the previous chapters, it has been argued that each aspect marker specifies a rhetorical relation by default. The perfective marker *le* indicates *Narration*. The progressive marker *zai* and the durative marker *zhe* specify *Background*$_T$, which is a temporal background. The experiential marker *guo* indicates *Background*$_I$, which is a

informational background. These generalizations can be captured by the axioms presented in (340).

340. Axioms for aspect markers

a. $(?(\alpha, \beta, \lambda) \wedge le(.....)(\alpha)) > Narration(\alpha, \beta, \lambda)$

b. $(?(\alpha, \beta, \lambda) \wedge guo(.....)(\alpha)) > Background_{I}(\beta,\alpha, \lambda)$

c. $(?(\alpha, \beta, \lambda) \wedge zai(.....)(\alpha)) > Background_{T}(\beta,\alpha, \lambda)$

d. $(?(\alpha, \beta, \lambda) \wedge zhe(.....)(\alpha)) > Background_{T}(\beta,\alpha, \lambda)$

These axioms are interpreted in the following way. $?(\alpha, \beta, \lambda)$ means that β is connected to α under the context λ with an underspecified rhetorical relation. In *le*(...)(α), (...) is a gloss over the arguments taken by *le* and α is the label that represents this clause. So, (340a) says that if β is connected to α under the context λ with an underspecified rhetorical relation and the clause labeled as α contains the perfective marker *le*, then the underspecified rhetorical relation can be defeasibly resolved to *Narration*, that is, it can be overridden by other explicit information. The other axioms can be interpreted in the same way.

In addition to the default axioms, *guo*, *zai*, and *zhe* have their own constraints on *Narration*. The experiential *guo* requires a temporal location phrase. The progressive *zai* can narrate others only. The durative marker *zhe* embeds under itself a predicate that denotes completion or termination so that a clause following a *zhe* clause can narrate the *zhe* clause. These constraints can be captured by the following axioms.

341. Constraints on *Narration*

a. (*Narration*(α, β, λ) ∧ *guo*(....)(α)) → TMP_LOC(...)(α)

b. (*Narration*(α, β, λ) ∧ *zhe*(....)(α)) →

(*zhe*(P_1(..., P_2(..., e))) ∧ SigP(e) ≺ RT) (α)

c. (*Narration*(α, β, λ) ∧ *zai*(...)) → *zai*(....)(β)

The axioms in (341) are different from those in (340) in that they are monotonic inference (→) because they are constraints that must be obeyed. (341a) basically says that if β is connected to α under the context λ and α contains the experiential marker *guo*, then there is a temporal location (TMP_LOC) phrase in α. (341b) says that if β is connected to α under the context λ and α contains the durative marker *zhe*, then there is a predicate embedded under the predicate marked by *zhe* and the event described by the embedded verb must be completed or terminated. (341c) means that if β is connected to α under the context λ and either α or β contains the progressive marker *zai*, then it must be β that contains *zai*.

As proposed in Asher and Lascarides (2003) and discussed in the previous chapters, indicators can monotonically decide which rhetorical relation connects clauses together. This generalization can be captured by the following axioms.

342. a. (?(α, β, λ) ∧ *ranhou/name/jiezhe*(α, β)) → *Narration*(α, β, λ)

ranhou ‘then’ / *name* ‘then’ / *jiezhe* ‘and then’

b. (?(α, β, λ) ∧ *suoyi*(α, β)) → *Result*(α, β, λ)

suiyi ‘so’

c. $(?(\alpha, \beta, \lambda) \wedge \text{subtype}_D(e_\alpha, e_\beta)) \rightarrow \textit{Elaboration}_{\text{event}}(\alpha, \beta, \lambda)$

d. $(?(\alpha, \beta, \lambda) \wedge \text{subtype}_D(\text{NP}(\alpha), e_\beta)) \rightarrow \textit{Elaboration}_{\text{obj}}(\alpha, \beta, \lambda)$

e. $(?(\alpha, \beta, \lambda) \wedge \textit{dan...deshi ho}(\alpha, \beta)) \rightarrow \textit{Background}_T(\alpha, \beta, \lambda)$

dan....de shiho 'when'

f. $(?(\alpha, \beta, \lambda) \wedge \textit{danshi/keshi/que}(\alpha, \beta)) \rightarrow \textit{Contrast}(\alpha, \beta, \lambda)$

danshi 'but' / *keshi* 'but' / *que* 'contrastively, but'

g. $(?(\alpha, \beta, \lambda) \wedge \textit{ruguo/yaoshi}(\alpha, \beta)) \rightarrow \textit{Consequence}(\alpha, \beta, \lambda)$

ruguo 'if' / *yaoshi* 'if'

Just like in (340), $?(\alpha, \beta, \lambda)$ means that β is connected to α under the context λ with an underspecified rhetorical relation. The right hand side of $\wedge$ is indicator + clause labels. For example, $\textit{ranhou}(\alpha, \beta)$ means that there is an indicator *ranhou* 'then' that connects α and β. Whenever there is *ranhou* 'then', the underspecified rhetorical relation can be monotonically resolved to *Narration*. This is what (342a) says. The other axioms in (342) can be interpreted the same way.

One thing about the axioms in (342) that needs clarification is *subtype* in (342c) and (342d). Asher and Lascarides (2003: 206) defines $\text{subtype}_D(\alpha, \beta)$ as that there is evidence in the context that says that β is a subtype of α. As argued in Section 7.3, the definition of $\text{subtype}_D(e_\alpha, e_\beta)$ should be extended to include the relation where e_β is a function of e_α, in addition to a pure subtype. The relation $\text{subtype}_D(\text{NP}(\alpha), e_\beta)$ means that e_β is a way of performing, achieving or accomplishing $\text{NP}(\alpha)$.

Asher and Lascarides (2003: 155-168) discuss the temporal relations of

Narration, *Elaboration*, and *Background*, and meaning postulates are used to infer their influence on temporal relations. In Section 7.3, the temporal relations of *Parallel*, *Result*, *Consequence*, and *Contrast* are also discussed. Based on those discussions, meaning postulates are proposed to capture the influence of rhetorical relations on temporal relations, while those postulates in Asher and Lascarides (ibid) that fit the discussion in Section 7.3 are adopted.

In addition, given the fact that the two imperfective markers and the experiential marker indicate different kinds of *Background*, which has different influence on the temporal relations and the fact that two different types of *Elaboration* also have different influence and constraints on the temporal relations, new postulates for these two rhetorical relations are also required. The meaning postulates are presented in (343).

343. a. Narration

$$\Phi_{Narration(\alpha, \beta)} \Rightarrow \text{overlap}(\text{prestate}(e_\beta), \text{ADV}(\text{poststate}(e_\alpha)))$$[79]

b. Result

$$\Phi_{Result(\alpha, \beta)} \Rightarrow (\neg e_\beta \prec e_\alpha)$$

c. $\text{Elaboration}_{\text{event}}$

$$\Phi_{Elaboration_{\text{event}}(\alpha, \beta)} \Rightarrow \text{part\_of}(e_\beta, e_\alpha)$$

[79] This meaning postulate is taken from Asher and Lascarides (2003: 163).

d. $\text{Elaboration}_{\text{obj}}$

$\Phi_{Elaboration_{\text{obj}}(\alpha, \beta)} \Rightarrow ((\text{activity}(e_\alpha) \vee \text{subtype}_D(\text{NP}(\alpha), e_\beta)) \rightarrow \text{part\_of}(e_\beta, e_\alpha))$

e. Background_T

$\Phi_{\text{Background}_T(\beta,\alpha)} \Rightarrow (\text{zai/zhe}(...)(\alpha) \rightarrow \text{overlap}(e_\beta, e_\alpha))$

$\Phi_{\text{Background}_T(\beta,\alpha)} \Rightarrow (\text{le}(...)(\alpha) \rightarrow (e_\alpha \prec t \wedge \text{overlap}(e_\beta, t)))$

f. Background_I

$\Phi_{\text{Background}_I(\beta,\alpha)} \Rightarrow (\text{precondition}(e_\alpha, s, t) \wedge \text{overlap}(s, e_\beta))$

g. Parallel

$\Phi_{\text{Parallel}(\alpha, \beta)} \Rightarrow (\textit{le/guo}(....) \rightarrow e_\alpha \prec RT_1 \wedge e_\beta \prec RT_{2)}$

or $\Phi_{\text{Parallel}(\alpha, \beta)} \Rightarrow (\textit{zai/zhe}(....) \rightarrow \text{overlap}(e_\alpha, e_\beta))$

h. Consequence

$\Phi_{\text{Consequence}(\alpha, \beta)} \Rightarrow (\neg e_\beta \prec e_\alpha)$

i. Contrast

$\Phi_{\text{Contrast}(\alpha, \beta)} \Rightarrow (\textit{le/guo}(....)\ (\alpha) \rightarrow (e_\alpha \prec t \wedge \text{overlap}(e_\beta, t)))$

or $\Phi_{\text{Contrast}(\alpha, \beta)} \Rightarrow (\textit{le/guo}(....)\ (\beta) \rightarrow (e_\beta \prec t \wedge \text{overlap}(e_\alpha, t)))$

or $\Phi_{\text{Contrast}(\alpha, \beta)} \Rightarrow (\textit{zai/zhe}(....)\ (\alpha) \rightarrow \text{overlap}(e_\alpha, e_\beta))$

or $\Phi_{\text{Contrast}(\alpha, \beta)} \Rightarrow (\textit{zai/zhe}(....)\ (\beta) \rightarrow \text{overlap}(e_\alpha, e_\beta))$

(343a) basically says that if β is connected to α by *Narration*, then the poststate of α should overlap the prestate of β adjusted by a temporal (or spatial) adverb. The

function of adverbs can be demonstrated by the example below.

344. a. ta wu nian qian qu le xianggang yi ci
he five year ago go PFV Hong Kong one time
'He went to Hong Kong once five years ago.'

b. liang nian hou you qu le yi ci
two year later again go PFV one time
'He went again three years ago.'

In this example, the poststate of (344a) does not overlap the prestate of (344b) because there is a two-year gap. The ADV in the meaning postulate (326a) fills this gap. That is, overlap(poststate(344a), two_years_later(344b)) means that the poststate of (344a) overlaps the prestate of (344b) that occurs two years after (344a).

(343b) says that if the result of α is β, then the event time of β cannot precede the event time of α. (343c) says that for event elaboration temporal inclusion is involved. (343d) says that for object elaboration if the elaborated clause is activity or an event is a subtype of an NP then temporal inclusion is also involved. (343e) says that a temporal background guarantees temporal overlapping. The two imperfective markers provide as a temporal background the event time of an event marked by one of them. The perfective *le* provides as a temporal background the time after an event presented by *le* is terminated or completed. (343f) says that for $Background_{I}$ the temporal frame is the time for the (discontinued) resultative state caused by an event presented by *guo*. (343g) says that for *Parallel* if one of the clauses has a perfective

marker then both events are completed or terminated; if one of the clauses has an imperfective marker then the clauses are temporally overlapping. (343h) says that if β is connected to α by *Consequence* then the event time of β cannot precede the event time of α.

(343i) says that for *Contrast* if one of the clauses has a perfective marker then the event time of the other clauses are included in the time after the event time of the clause with a perfective marker; if one of the clauses has an imperfective marker then the clauses are temporally overlapping.

Note that it is argued in Section 7.3 that the clauses connected together by *Contrast* can also be connected by *Narration*. For this kind of *Contrast*, the meaning postulate for *Narration* alone suffices. The inference of rhetorical relations occurs in the glue logic. Inferring both *Contrast* and *Narration* in the glue logic can guarantee that the constraints on *Narration* specified in (341) are also obeyed by the examples of both *Contrast* and *Narration*.

With those axioms and meaning postulates ready, it can be demonstrated how the temporal relation between two clauses in a context can be determined with SDRT, which is illustrated in the next section.

7.4.3 SDRT Update, Satisfaction Schema and Temporal Progression

This section is to demonstrate how SDRT can be used to accurately model temporal progression in coherent discourse and to block incoherent discourse. The four aspect markers are discussed respectively in four subsections.

7.4.3.1 The Progressive Marker *zai*

First, an example of *Narration* is taken from Chapter Three for demonstration[80].

345. a. liwenxiu weiwei lengxiao dao
Li Wenxiu slightly sneer say
'Li Wenxiu slightly sneered and said,'

b. ni bu rende wo wo que rende ni
you not recognize I I but recognize you
'You don't recognize me, but I recognize you.'

c. qianje hasake buluo haisi bushao hasakeren de
rob Kazakhstan tribe kill many Kazakstan people REL
jiu shi ni zhe pi hanren qiangdao
JIU be you this group Han robber
'You are the group of Han robbers who rob the Kazakhstan tribes, and kill the Kazakhstan people.'

d. shuo dao zheli
speak to here
'(When) she spoke to this point,'

[80] For simplicity, proper names are treated as constants and the complications about representing proper names are ignored since they are irrelevant to the purpose here. Besides, the rhetorical relation connecting together clauses without any aspect marker is determined manually, not by inference, since the focus of this dissertation is on how aspect markers affect the determination of which rhetorical relation connects clauses together and how aspect markers affect temporal relations.

e. shengyin bian de shenwei kuse

voice become DE pretty dry

'Her voice became pretty dry.'

f. xin zhong **zai** xiang

mind inside PRG think

'She was thinking in her mind,"

g. ruguo bushi nimen zhe xie qiangdao zuo le zhe xuiduo

if no you this CL robber do PFV so many

huai shi

bad thing

'If you robbers had not done so many bad things,

h. suluke yie bu hui zheyang zenghen women hanren

Suluke also no will so hate we Han people

'Suluke would not have hated us Han people so much.'

The example above can be translated into the glue logic, as shown below.

345. a'. π_1: say'(Li Wenxio') $\wedge$ slightly'(sneer'(Li Wenxio'))

b'. π_2: $\neg$ know'(x, y) $\wedge$?(x) $\wedge$?(y)

π_3: know'(y, x) $\wedge$?(x) $\wedge$?(y) $\wedge$ *but*(π_2, π_3)

π_{23}: R_{23}(π_2, π_3)

c'. π_4: rob'(x, y) $\wedge$ Kazakhstan_tribe'(y) $\wedge$ Han_robber'(x) $\wedge$?(x)

π_{234}: R_{234}(π_{23}, π_4)

π_{1234}: $R_{1234}(\pi_1, \pi_{234})$

d'. (indicator)

e'. π_5: become'(dry(voice_of'(x)) $\wedge$?(x)

f'. π_6: π_6: *zai*'(think'(x)) $\wedge$?(x)

g'. π_7: many'(y, bad_thing'(x), $\neg$ do(x, y)) $\wedge$ robber'(x) $\wedge$?(x)

h'. π_8: $\neg$hate'(Suluke' y) $\wedge$ Han_people'(y) $\wedge$ *if*(π_7, π_8)

$\pi_{78:}$ $R_{28}(\pi_7, \pi_8)$

π_{678}: $R_{678}(\pi_6, \pi_{78})$

(π_0: (π_{5678}: $R_{5678}(\pi_5, \pi_{678})$) $\wedge$ $R_0(\pi_{1234}, \pi_{5678})$)

$\vee$ (π_0: $R_0(\pi_{1234}, \pi_5)$ $\wedge$ π_0: $R'_0(\pi_{1234}, \pi_{678})$)

For this example, an axiom is needed to infer the rhetorical relation connecting together a clausal complement and a verb that subcategorizes the clausal complement because there are two clausal complement-taking verbs, *dao* 'to say' in (345a) and *xiang* 'to think' in (345f). Asher and Lascarided (2003: 285) suggest that *Elaboration* can do this. Following this idea, an axiom[81] for verbs taking a clausal complement is proposed as follows:

346. (?(α, β, λ) $\wedge$ VP_{COMP}(....)(α)) $\rightarrow$ $Elaboration_{event}(\alpha, \beta, \lambda)$

VP_{COMP}: verbs taking clausal complement, such as *dao* 'to say', *xiang* 'to think', *xiangxin* 'to believe', etc.

[81] This is a simplified rule because it assumes that whatever comes after a clause with a clausal complement-taking verb is its clausal complement. There are some complications, but they will not be addressed further here and are left for future study.

In (345b'), the underspecified rhetorical relation R_{23} is resolved to *Contrast* because of the indicator *but*(π_2, π_3). In (345c'), the underspecified rhetorical relation R_{234} is resolved *Elaboration*$_{obj}$ because (345c) provides more information for the second person pronoun in (345b). That is, π_4 is connected π_{23} by *Elaboration*$_{obj}$. π_4 cannot be attached to π_1 because π_4 is the content of something being said and π_1 is the clause describing the saying event. Then, Axiom (346) resolves R_{1234} to *Elaboration*$_{event}$. So, π_{234} is connected to π_1 by *Elaboration*$_{event}$.

Since the underspecified rhetorical relations in (345b') and (345c') are all resolved, the underspecified variables can be resolved too. The *x* and *y* in both π_2 and π_3 contains information specifying that *x* is second-person and *y* first-person. When π_3 is connected to π_2, the *x* in π_3 is identified with the *x* in π_2 and the *y* in π_3 with the *y* in π_2 because of the person agreement. When π_{23} is connected to π_1, *y* is resolved to the subject of *dao* 'to say' because that is what first-person means. Under the same attachment, *x* is resolved to the listener because that is what second-person means. The variable *x* in π_4 also contains information specifying that it is second-person. π_4 is connected to π_{23}, which is in turn connected to π_1. That is, π_4 is indirectly attached to π_1. Therefore, the *x* in π_4 is also resolved to the same listener.

π_5 can be attached to π_{1234} now, or it can wait for the rest of the discourse, depending on which attachment can maximize the coherence of this discourse. This is captured by the disjunction $(\pi_0: (\pi_{5678}: R_{5678}(\pi_5, \pi_{678})) \wedge R_0(\pi_{1234}, \pi_{5678})) \vee (\pi_0: R_0(\pi_{1234}, \pi_5) \wedge \pi_0: R_0(\pi_{1234}, \pi_{678}))$. The left hand side of $\vee$ represents the case where

the rest of the clause is attached to π_5 first and then the whole big chunk is attached to π_{1234}. The right hand side represents the other case, where the rest of the discourse and π_5 are attached to π_{1234} separately.

If the second option were chosen, then the relationship between π_5 and π_6 would be ignored, but they are obviously related. Therefore, the first option, where the relationship between π_5 and π_6 is determined and then they are attached to π_{1234} together, is chosen because it can maximize the coherence of the discourse[82].

The verb in π_6 is a clausal complement-taking verb, and it is expected that there will be its content following it. That is, π_7 and π_8 are its content. π_8 is attached to π_8 by *Consequence* because of the indicator *if*(π_7, π_8). This means R_{78} is resolved to *Consequence*. Axiom (346) resolves R_{678} to $Elaboration_{event}$. Then, π_{678} is attached to π_5 by *Parallel* because of structural parallel. That is, R_{5678} is resolved to *Parallel*. At last, π_{5678} is attached to π_{1234} by *Narration* because of the indicator in (345d). This means that R_0 is resolved to *Narration*, based on the Specificity Principle (Asher and Lascarides 2003: 191), which is presented below.

347. The Specificity Principle

When conflicting default rules apply, only the consequent of the most specific default rule (if there is one) is inferred. In particular,

If $\vdash A \rightarrow C$, then $A > \neg B, C > B, A \mid\sim \neg B$

[82] This is not a special case. Asher and Lascarides (2003: 225-226) discusses a case very similar to the one discussed here.

Now, the underspecified anaphors can be resolved. The *x* in π_7 is identified with the *x* in π_6, which in turn is identified with the *x* in π_5, since this is the only possible resolution. The *x* in π_5 and π_6 represent zero anaphors. A zero anaphor is usually identified with an antecedent which occupies the same syntactic position as the zero anaphor. Since π_{56} is attached to π_{1234}, then the possible candidate for the antecedent of these two zero anaphors is the subject of *dao* 'to say'. Therefore, they are resolved to Li Wenxio. This is exactly what the discourse is intended to describe.

Since π_6 is a *zai* clause and it is (indirectly) attached to π_{1234} by *Narration*, the constraints on *Narration* needs to check whether the constraint of *zai* (341c) is obeyed. It is obeyed because π_6 narrates π_1.

This is the process of inferring underspecified rhetorical relations and underspecified anaphors in the whole discourse. Since aspect markers are the focus of discussion, the part about π_6 is worth a little more attention.

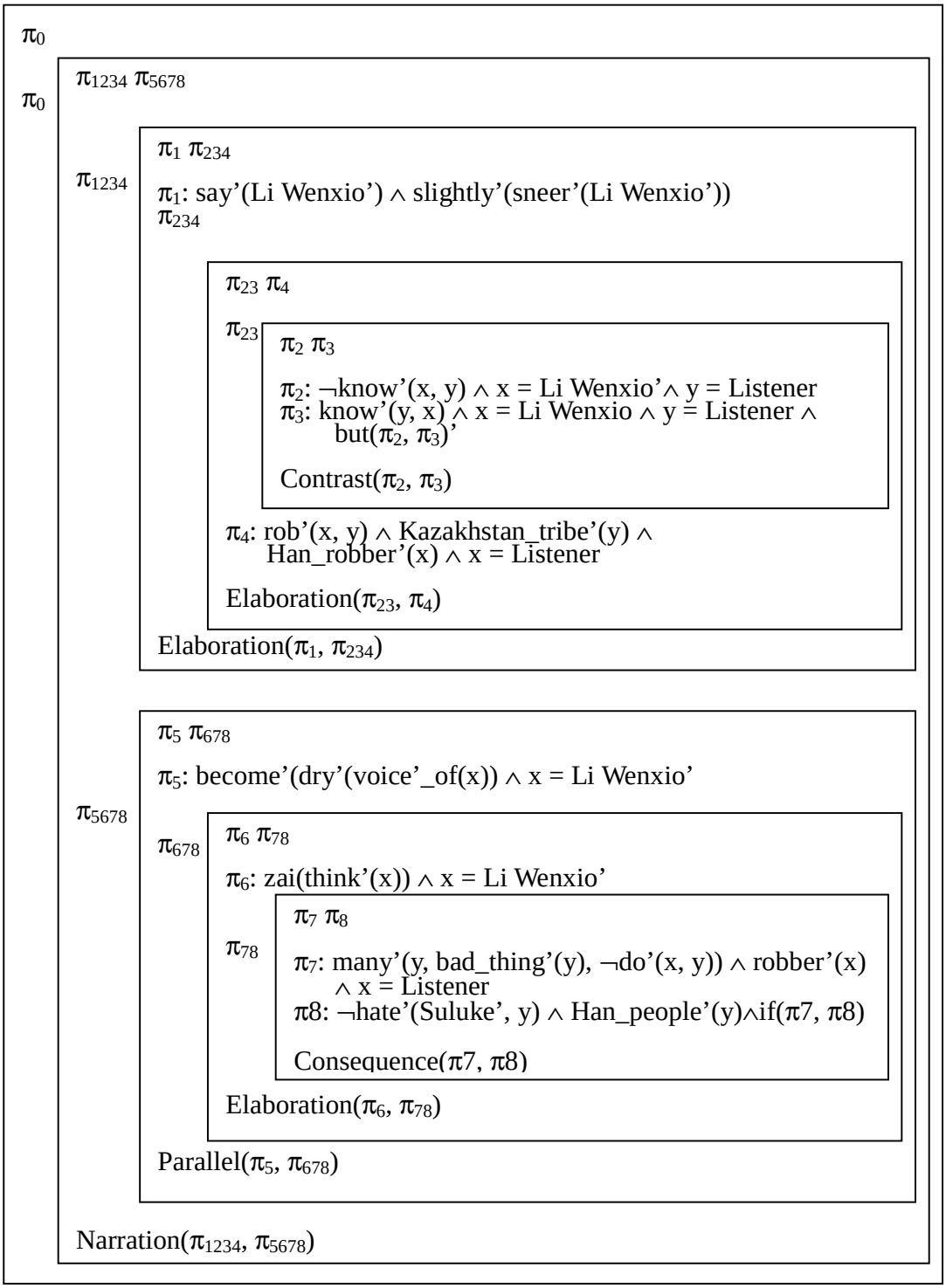
π_6 has two possible attachment sites: π_{1234} and π_5. If it is attached to π_{1234} directly and π_5 is left behind, this violates the Maximal Discourse Coherence (Asher and Lascarides 2003: 233) because the obvious relationship between π_5 and π_6 is unspecified. Besides, the zero anaphor in π_6 is related to the zero anaphor in π_5. If π_6 is directly attached to π_{1234}, and π_5 is also attached to π_{1234}, though they are still co-referential, the relationship between them is lost. Therefore, to maximize the coherence of this discourse, first, π_{678} should be attached to π_5 by *Parallel*, and this big chunk is labeled as π_{5678}. Then this big chunk is attached to π_{1234} by *Narration*.

In addition, the Specificity Principle specifies that π_6 is connected to π_5 by *Parallel*, instead of *Background*, which the progressive *zai* indicates by default, because structural parallel provides more specific information and it can override the default rhetorical relation indicated by aspect markers.

And, since a *zai* clause is attached to another clause by *Narration*, the constraint of *zai* on *Narration* must be obeyed. That constraint basically says that a *zai* clause can be attached to its preceding clause by *Narration*, but cannot be connected to the clause following it by *Narration*. This constraint is obeyed in this discourse because the *zai* clause is attached to a clause that precedes it, though not immediately. If a *zai* clause is connected to a clause following it by *Narration*, then the constraint of *zai* on *Narration* will block the formation of the SDRS of this discourse. Since the SDRS of a discourse of this kind cannot be built, it cannot be interpreted and hence is an ill-formed discourse.

The result of this process can be represented as an SDRS in the next page.

345’.


π0
π0
π1234 π5678
π1234
π1 π234
π1: say’(Li Wenxio’) ∧ slightly’(sneer’(Li Wenxio’))
π234
π23 π4
π23
π2 π3
π2: ¬know’(x, y) ∧ x = Li Wenxio’∧ y = Listener
π3: know’(y, x) ∧ x = Li Wenxio ∧ y = Listener ∧ but(π2, π3)’
Contrast(π2, π3)
π4: rob’(x, y) ∧ Kazakhstan_tribe’(y) ∧ Han_robber’(x) ∧ x = Listener
Elaboration(π23, π4)
Elaboration(π1, π234)
π5 π678
π5: become’(dry’(voice’_of(x)) ∧ x = Li Wenxio’
π5678
π678
π6 π78
π6: zai(think’(x)) ∧ x = Li Wenxio’
π78
π7 π8
π7: many’(y, bad_thing’(y), ¬do’(x, y)) ∧ robber’(x) ∧ x = Listener
π8: ¬hate’(Suluke’, y) ∧ Han_people’(y)∧if(π7, π8)
Consequence(π7, π8)
Elaboration(π6, π78)
Parallel(π5, π678)
Narration(π1234, π5678)

The temporal relation is inferred in the Satisfaction Schema (Asher and Lascarides 2003: 156). Here only the temporal relation between the *zai* clause and the clauses to which it is attached is discussed. Following the convention in Asher and Lascarides (2003), an SDRS labeled as π is abbreviated as K_{π}. For example, the SDRS labeled as π_{1234} is represented as $K_{\pi_{1234}}$. So, the two rhetorical relations to discuss here are *Parallel*(π_5, π_{678}) and *Narration*(π_{1234}, π_{5678}). The Satisfaction Schema for these two rhetorical relations is given below.

348. a. (w, f) $[\![\textit{Parallel}(\pi_5, \pi_{678})]\!]_M$ (w', g) iff

$$(w, f)\ [\![K_{\pi_5} \wedge K_{\pi_{678}} \wedge \phi_{\text{Parallel}(\pi_5, \pi_{678})}]\!]_M\ (w', g)$$

b. (w, f) $[\![\textit{Narration}(\pi_{1234}, \pi_{5678})]\!]_M$ (w', g) iff

$$(w, f)\ [\![K_{\pi_{1234}} \wedge K_{\pi_{5678}} \wedge \phi_{\text{Narration}(\pi_{1234}, \pi_{5678})}]\!]_M\ (w', g)$$

To interpret ϕ, the meaning postulates for rhetorical relations, which are presented in (343), are needed. The relevant meaning postulates are repeated below for the sake of convenience.

343. a. Narration

$$\Phi_{\textit{Narration}(\alpha, \beta)} \Rightarrow \text{overlap}(\text{prestate}(e_\beta), \text{ADV}(\text{poststate}(e_\alpha))$$

g. Parallel

$$\Phi_{\text{Parallel}(\alpha, \beta)} \Rightarrow \textit{le/guo}(....) \rightarrow e_\alpha \prec RT_1 \wedge e_\beta \prec RT_2$$

$$\text{or}\quad \Phi_{\text{Parallel}(\alpha, \beta)} \Rightarrow \textit{zai/zhe}(....) \rightarrow \text{overlap}(e_\alpha, e_\beta)$$

Since for *Parallel*, π_6 is a *zai* clause, then π_5 and π_{678} should be temporally

overlapping, according to the second clause of the meaning postulate (343g). This inference complies with the intuition about these two clauses, that is, *voice becoming and staying dry* temporally overlaps *was thinking*.

For *Narration*, the meaning postulate says that the prestate of $e_{\pi_{5678}}$ overlaps the poststate of $e_{\pi_{1234}}$ since there is no adverb in the clauses. This means that π_{5678} advances the narrative time. This also complies with the intuition about this discourse. Therefore, the temporal relations of the clauses in this discourse are correctly determined.

(345) is an example where specific information overrides the default rhetorical relation indicated by *zai*. (349) below is an example where there is no specific information indicating a rhetorical relation and therefore the default axiom for *zai* provides $Background_T$ as the rhetorical relation connecting the clauses together.

349. a. xiaoli **zai** youyong
Xiaoli PRG swim
'Xiaoli was swimming.'

b. laozhang kandao le renbuzhu jiao le ta ji zhao
Laozhang see PFV cannot help teach PFV he several move
'Laozhang saw him swim, and couldn't help himself but showed him a few moves.'

This is a simple discourse with two clauses. Again, it can also be translated into the glue logic.

349. a'. π_1: *zai*'(swim'(Xioali'))

b'. π_2: *le*'(see'(Laozhang', y)) $\wedge$?(y)

π_3: can't_help'(x, teach'(x, y, z))) $\wedge$?(x) $\wedge$?(y) $\wedge$ move'(z)

(π_{23}: $R_{23}(\pi_2, \pi_3) \wedge \pi_0$: $R_0(\pi_1, \pi_{23})$)

$\vee$ (π_0: $R_0(\pi_1, \pi_3) \wedge \pi_0$: $R'_0(\pi_1, \pi_2)$)

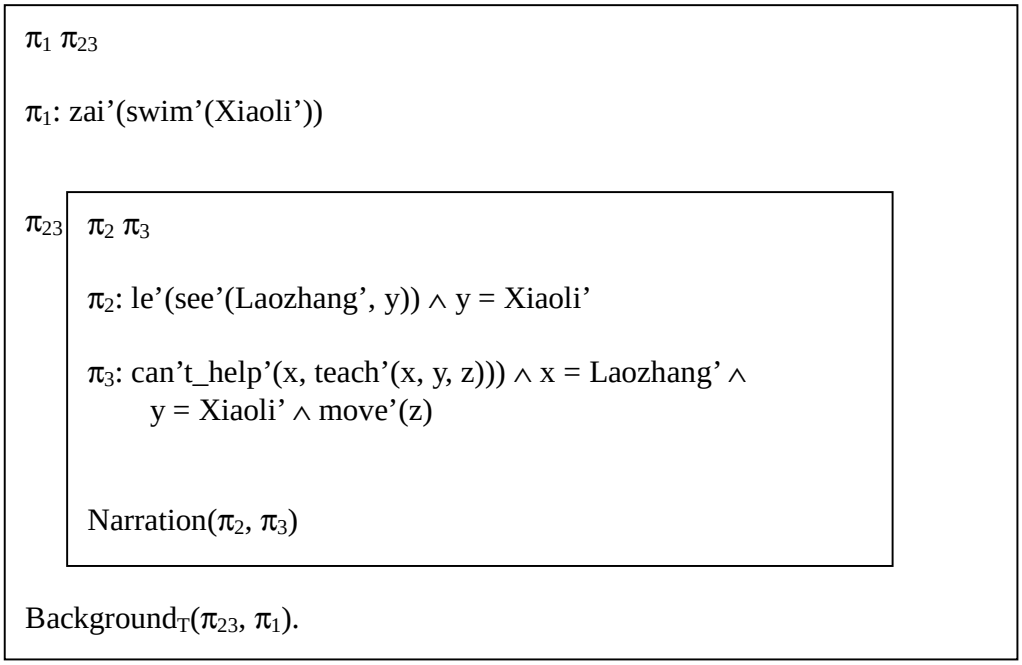
In (349b'), π_2 has only one attachment site, π_1. π_3 has two possible attachment sites: π_1 or π_2. This is represented by the disjunction (π_{23}: $R_{23}(\pi_2, \pi_3) \wedge \pi_0$: $R_0(\pi_1, \pi_{23})$) $\vee$ (π_0: $R_0(\pi_1, \pi_3) \wedge \pi_0$: $R'_0(\pi_1, \pi_2)$). Just like the case in (345), if π_3 is attached to π_1, then the obvious relationship between π_2 and π_3 is left unspecified. Therefore, to maximize the coherence of this discourse, π_3 should be connected to π_2 first, and the whole big chunk is attached to π_1, that is, π_{23}: $R_{23}(\pi_2, \pi_3) \wedge \pi_0$: $R_0(\pi_1, \pi_{23})$.

Since π_2 is a *le* clause and there is no other information indicating otherwise, *Narration*, the default rhetorical relation indicated by the perfective *le*, is inferred to connected π_2 and π_3 together. That is, π_{23} is resolved to *Narration*. And, because there is no other information indicating otherwise, the axiom for *zai* specifies that π_{23} is connected to π_1 by $Background_T$. That is, R_0 is resolved to $Background_T$.

Now that the attachment sites are determined, the underspecified anaphors can be resolved. The *x* in π_3 represents a zero anaphor as the subject of the clause, and hence it needs a subject antecedent. Since π_3 is attached to π_2, *x* is resolved to the subject of *kan* 'to see', i.e. Laozhang. The *y* in π_3 has only one possible antecedent, i.e.

the *y* in π_2. Since π_{23} is connected to π_1, the underspecified anaphor *y* has only one possible candidate: Xiaoli, the subject of *youyung* 'to swim'. This resolution of anaphors fits the intuition of this discourse. The result after SDRT update can be represented as an SDRS as follows.

349'.



Again, the temporal relations are determined by the Satisfaction Schema. The Satisfaction Schema for the two rhetorical relations, *Narration*(π_2, π_3) and *Background*$_T$(π_{23},π_1) is presented in (350). To interpret ϕ in the Satisfaction Schema, the relevant meaning postulates for *Narration* and *Background*$_T$ are repeated below for the sake of convenience.

350. a. (w, f) $[\![\textit{Narration}(\pi_2, \pi_3)]\!]_M$ (w', g) iff

$$(w, f) [\![K_{\pi_2} \wedge K_{\pi_3} \wedge \phi_{\text{Narration}(\pi_2, \pi_3)}]\!]_M (w', g)$$

b. (w, f) $[\![\textit{Background}_T(\pi_{23}, \pi_1)]\!]_M$ (w', g) iff

$$(w, f) [\![K_{\pi_1} \wedge K_{\pi_{23}} \wedge \phi_{\text{Background}_T(\pi_{23}, \pi_1)}]\!]_M (w', g)$$

343. a. Narration

$$\Phi_{\textit{Narration}(\alpha, \beta)} \Rightarrow \text{overlap}(\text{prestate}(e_\beta), \text{ADV}(\text{poststate}(e_\alpha))$$

e. Background_T

$$\Phi_{\text{Background}_T(\alpha, \beta)} \Rightarrow (\text{zai}(...)(\beta) \rightarrow \text{overlap}(e_\beta, e_\alpha))$$

(343a) says that e_{π_2} occurs before e_{π_3}. This fits the intuition about the temporal order of these two clauses. (343e) says that e_{π_1} temporally overlaps $e_{\pi_{23}}$. This also fits the intuition about this discourse because the teaching event occurs when the swimming event is ongoing.

This section demonstrates how the axioms and meaning postulates proposed in Section 7.4.2 work to determine the temporal relations between a *zai* clause and another clause. Basically, the default rhetorical relation indicated by *zai* can be overridden by the rhetorical relation specified by indicators. The temporal relation is hence determined by the ϕ condition in the Satisfaction Schema. It is also discussed how the constraint of *zai* on *Narration* can prevent ill-formed discourses from being interpreted.

7.4.3.2 The Durative Marker *zhe*

This section demonstrates the formation of the SDRS's of two examples of *zhe* and how the temporal relations are determined. The first example demonstrated is an example of *Background*$_T$, which *zhe* specifies by default. The second is an example of *Narration*, which has to obey the constraint of *zhe* on *Narration*.

351. a. na tian wanshang liwenxio fa **zhe** gaoshao
that day night Li Wenxio have DUR high fever
'That night, Li Wenxio had high fever.'

b. xiao liandanr shao de tong hong
small face burn to a degree that completely red
'Her small face was so hot that it turned red.'

c. shuo le xuduo huhua
say PFV many flapdoodle
'She murmured a lot of flapdoodle.'

(351) can be translated into the glue logic as follows.

351. a'. π_1: e ○ ⟦that night'⟧ ∧ *zhe*'(have'(Li Wenxio', y, e)
∧ high'(fever'(y))

b'. π_2: burn'(face_of'(x))) ∧ become'(red'(face_of'(x)) ∧ ?(x)

c'. π_3: many'(y, word'(y), *le*'(say'(x, y)) ∧ ?(x)

(π_{23}: $R_{23}(\pi_2, \pi_3) \wedge \pi_0$: $R_0(\pi_1, \pi_{23})) \vee (\pi_0$: $R_0(\pi_2, \pi_1) \wedge$
π_0: $R'_0(\pi_1, \pi_3))$

π_3 has two possible attachment sites: π_2 and π_1. This is represented by (π_{23}: $R_{23}(\pi_2, \pi_3) \wedge \pi_0$: $R_0(\pi_1, \pi_{23})) \vee (\pi_0$: $R_0(\pi_2, \pi_1) \wedge \pi_0$: $R'_0(\pi_1, \pi_3))$. To capture the relationship between π_2 and π_3 and to maximize discourse coherence, π_2 is attached to π_3. The big chunk is labeled as π_{23}, which in turn is attached to π_1. That is, π_{23}: $R_{23}(\pi_2, \pi_3) \wedge \pi_0$: $R_0(\pi_1, \pi_{23})$ is chosen.

π_3 is attached to π_2 by *Parallel* because of structural parallel. That is, R_{23} is resolved to *Parallel*. π_{23} is attached to π_1 by *Background*$_T$ because there is no information indicating otherwise and *zhe* specifies *Background*$_T$ by default. That is, R_0 is resolved to *Background*$_T$.

The underspecified anaphors can be resolved too. The *x* in π_3 is identified with π_2 because that is the only possibility. When π_{23} is attached to π_1, the *x* in π_2 and in π_3 can be resolved to Li Wenxio since it is the only possible antecedent. The result of SDRT update can be represented as follows.

351'.

π_1 π_{23}

π_1: e ○ ⟦that night'⟧ ∧ *zhe*'(have'(Li Wenxio', y, e) ∧ high'(fever'(y))

π_{23}

π_2 π_3

π_2: burn'(face_of'(x)))∧become'(red'(face_of'(x))∧x = Li Wenxio

π_3: many'(y, word'(y), *le*'(say'(x, y)) ∧ x = Li Wenxio'

Parallel(π_2, π_3)

Background$_T$(π_{23},π_1)

The temporal relation is determined in the Satisfaction Schema. The

Satisfaction Schema and the relevant meaning postulates are repeated below for the sake of convenience.

352. a. (w, f) $[\![\textit{Background}_T(\pi_{23}, \pi_1)]\!]_M$ (w', g) iff

$(w, f) [\![K_{\pi_1} \wedge K_{\pi_{23}} \wedge \phi_{\text{Background}_T(\pi_{23},\pi_1)}]\!]_M$ (w', g)

b. Background_T

$\Phi_{\text{Background}_T(\alpha, \beta)} \Rightarrow (\text{zhe}(...)(\beta) \rightarrow \text{overlap}(e_\beta, e_\alpha))$ (= (343e))

(341e) says that e_{π_1} temporally overlaps $e_{\pi_{23}}$. This fits the intuition about this discourse because the *face becoming red because of high fever* event and the *saying nonsense* event both occurs in the interval for which *Li Wenxio having a high fever* lasts.

353. a. Ji cong wahu li dao le yi wan re nailau

Ji from kettle inside pour PFV one bowel hot thick milk

'Ji poured a bowel of hot thick milk from the kettle.'

b. qiao **zhe** Li hexia le

watch DUR Li drink-down PFV

'(he) watched Li drink the thick milk'

c. you ti ta longhao beiwo

also for she tuck comforter

'(and he) tucked her in.'

(353) can also be translated into the glue logic as follows.

353. a'. π_1: *le*'(pour'(Ji', y)) $\wedge$ milk'(y) $\wedge$ hot'(y) $\wedge$ from'(y, z)

$\wedge$ kettle'(z)

b'. π_2: *zhe*'(watch'(x, Li, le'(drink'(e, Li, z)))$\wedge$?(x) $\wedge$SigP(e) $\prec$ RT

c'. π_3: tuck_in'(x, y) $\wedge$?(x) $\wedge$?(y)

(π_0: $R_0(\pi_1, \pi_2) \wedge \pi_0$: $R'_0(\pi_1, \pi_2)) \vee$

(π_{23}: $R_{23}(\pi_2, \pi_3) \wedge \pi_0$: $R_0(\pi_1, \pi_{23})$)

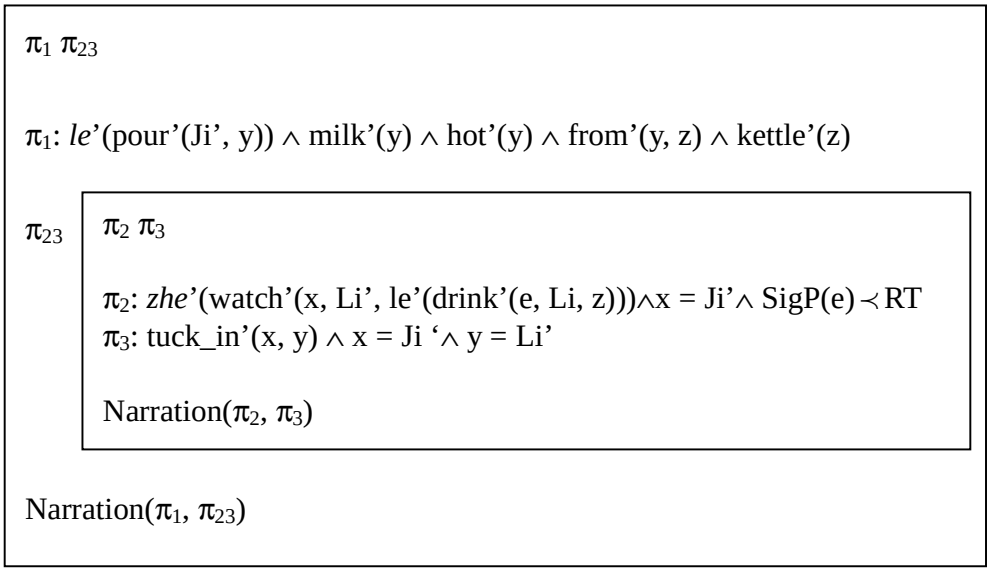
Again, π_3 has two possible attachment sites: π_2 and π_1. This is represented by (π_{23}: $R_{23}(\pi_2, \pi_3) \wedge \pi_0$: $R_0(\pi_1, \pi_{23})) \vee (\pi_0$: $R_0(\pi_2, \pi_1) \wedge \pi_0$: $R'_0(\pi_1, \pi_3))$. To capture the relationship between π_2 and π_3 and to maximize discourse coherence, π_2 is attached to π_3. The big chunk is labeled as π_{23}, which in turn is attached to π_1. That is, π_{23}: $R_{23}(\pi_2, \pi_3) \wedge \pi_0$: $R_0(\pi_1, \pi_{23})$ is chosen. In addition, if π_3 is attached to π_1, there is only one possible human antecedent in π_1, but π_3 has two underspecified anaphors. This will leave one of the anaphors underspecified. A discourse with underspecified elements is very incoherent. This further supports the choice of π_{23}: $R_{23}(\pi_2, \pi_3) \wedge \pi_0$: $R_0(\pi_1, \pi_{23})$.

π_3 is attached to π_2 by *Narration* because of the indicator *you* 'also', which indicates that two events occur in sequence. The information provided by *you* 'also' overrides the default rhetorical relation indicated by *zhe*, according to the Specificity Principle. In addition, since π_2 has *zhe*, the constraint of *zhe* on *Narration* must be obeyed. In this discourse, the constraint is obeyed. Then, π_{23} is attached to π_1 by *Narration* too because there is no information indicating otherwise and *le* specifies

Narration by default.

Since π_3 is attached to π_2 and the variable *x* in π_3 represents a zero anaphor, the *x* in π_3 is identified with the x in π_2. There is only one possible antecedent left in π_2, that is, Li. Therefore, the *y* in π_3 is resolved to Li. When π_{23} is attached to π_1, the underspecified anaphor is resolved to the only human antecedent, Ji. The result of SDRT update can be represented by as the SDRS below.

353'.



Again, the temporal relation is determined in the Satisfaction Schema. The Satisfaction Schema for *Narration* and the meaning postulate for *Narration* are represented below.

354. a. (w, f) $[\![Narration(\pi_1, \pi_{23})]\!]_M$ (w', g) iff

(w, f) $[\![K_{\pi_1} \wedge K_{\pi_{23}} \wedge \phi_{Narration(\pi_1, \pi_{23})}]\!]_M$ (w', g)

b. Narration (= (343a))

$\Phi_{Narration(\alpha, \beta)} \Rightarrow$ overlap(prestate(e_β), ADV(poststate(e_α))

According to the meaning postulate (343a), e_{π_3} occurs after e_{π_2}, and $e_{\pi_{23}}$ occurs after π_1. Since this is a transitive relation, it can be inferred that e_{π_3} occurs after e_{π_2}, which in turn occurs after E_{π_1}. The temporal order between these three events inferred above fits the intuition about the temporal order between these three events.

In this section, it is demonstrated how the axiom of *zhe*, the constraint of *zhe* on *Narration*, and the meaning postulates for rhetorical relations discussed in Section 7.4.2 work together to accurately determine the temporal relations between a *zhe* clause and its adjacent clause. MDC helps determine the attachment site of a clause. The Specificity Principle helps to determine a rhetorical relation when there are more than one option.

7.4.3.3 The Perfective Marker *le*

Both of (349) and (353) contain clauses connected together by *Narration* determined by the perfective *le* in them. In this section, one example of *Elaboration* and one of $Background_T$ are presented to demonstrate how SDRT determines temporal relations.

(355) is an example where a clause with *le* is elaborated by another clause. It is object elaboration because it is the speech that is elaborated. It involves temporal inclusion because the verb in the elaborating clause is a way of performing ‘speech’.

355. a. hushi yuanzhang zai kaimushi de zhici zhong tandao **le**

Hushi dean at opening DE speech inside talk PFV

bushao ling ren shen si de hua

a lot make person deep think DE words

'In his speech at the opening, Dean Hu talked about a lot of things that made people think profoundly.'

b. ta tandao kexue shi yi zhong fangfa mingzhu shi yi

he talk science be one CL method democracy be one

zhong shenghuo fangshi

CL life style

'He said that science was a way (of exploring the unknown) and democracy was a lifestyle.'

This can be translated into the glue logic as follows.

355. a'. π_1: *le*'(talk'(Dean_Hu', y)) $\wedge$ word'(y) $\wedge$

make'(people', profoundly'(think'(people', y)))[83]

b'. π_2: say'(x) $\wedge$?(x)

π_3: way'(science'), π_4: life_style'(democracy')

π_{34}: $R_{23}(\pi_3, \pi_4)$

π_{234}: $R_{234}(\pi_2, \pi_{34})$

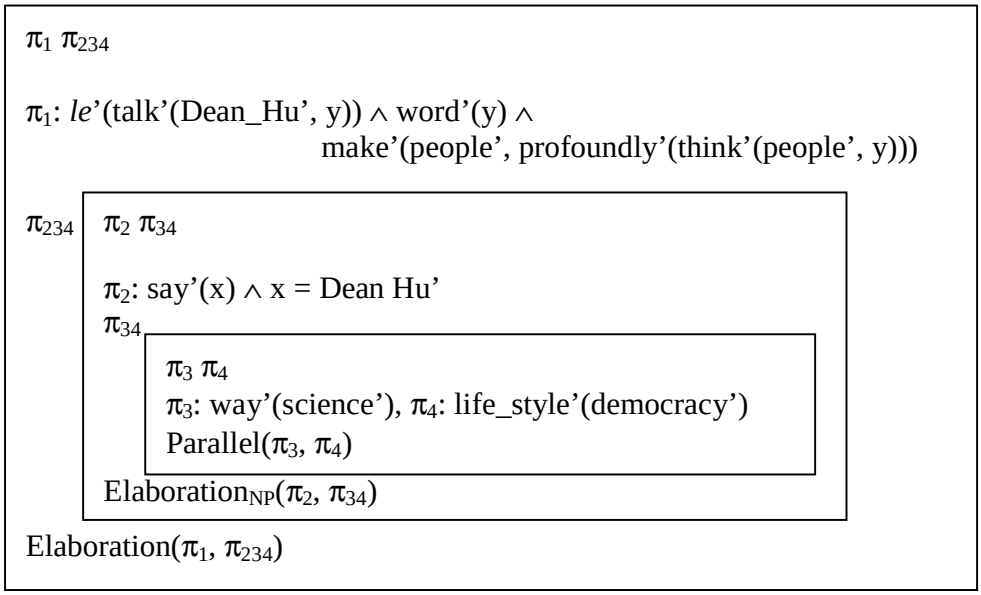
π_0: $R_0(\pi_1, \pi_{234})$

[83] The PP *in the speech at the opening* is omitted in this glue logic formula to avoid unnecessary complexity. The generic *people* is represented as *people* for the same reason.

In π_2, *say* is a clausal complement-taking verb and hence Axiom (346) specifies that π_{34} should be connected to π_2 by *Elaboration*. That is, R_{234} is resolved to *Elaboration*. π_4 is connected to π_3 by *Parallel* because of structural parallel. That is, R_{34} is resolved to *Parallel*. The $subtype_D$ relation between *say* and *speech* monotonically decides that it is $Elaboration_{obj}$ that connects π_{234} to π_1. That is to say, R_0 is resolved to $Elaboration_{obj}$.

This example has only one underspecified anaphor, which is in π_2. Since π_{234} is attached to π_1, and there is only possible antecedent in π_1, the variable *x* in π_2 is resolved to Dean Hu. The result of SDRS update can be represented as the SDRS below.

355’



The temporal relation is determined by the Satisfaction Schema. The

Satisfaction Schema for *Elaboration*$_{obj}$ and the meaning postulate for *Elaboration*$_{obj}$ are presented below.

356. a. (w, f) $[\![$*Elaboration*$_{obj}(\pi_1, \pi_{234})]\!]_M$ (w', g) iff

(w, f) $[\![K_{\pi_1} \wedge K_{\pi_{234}} \wedge \phi_{Narration_{obj}(\pi_1, \pi_{234})}]\!]_M$ (w', g)

b. Elaboration$_{obj}$ (= (343e))

$\Phi_{Elaboration_{obj}(\alpha, \beta)} \Rightarrow ((activity(e_\alpha) \vee subtype_D(NP(\alpha), e_\beta)) \rightarrow$

part_of(e_β, e_α))

According to (343e), because it is *Elaboration*$_{obj}$ and *say* in π_2 is a subtype of (a way of performing) *speech* in π_1, therefore $e_{\pi_{234}}$ temporally overlaps e_{π_1}. This fits the intuition about the temporal order between these two clauses.

357. a. mei nian dao **le** jinma guoji yingzhang reji
every year arrive PFV Jinma international movie show season
'Every year, when the season of the Jinma International Movies Show comes,'

b. xuduo daxusheng chen ci jihui dao yingzhan
many university student use this chance go to show
gongzuo danwei dagong
work unit work part-time
'Many university students go and work part-time at the organization responsible for the International Movies Show.'

Again, this example can be translated into the glue logic as follows.

357. a'. π_1: *le*(come'(y)) $\wedge$ movie_show_season'(y)[84]

b'. π_2: many'(x, college_student'(x), use(x, y)) $\wedge$ chance'(y) $\wedge$
do'(x, y, e) $\wedge$ part_time_job'(y) $\wedge$ at'(z, e) $\wedge$
movie_show'(z)

π_0: $R_0(\pi_1, \pi_2)$

The temporal phrase *movie show season* indicates that the *le* clause serves as a temporal background. Therefore, the underspecified rhetorical relation R_0 is resolved to $Background_T$. The result of SDRS update on this small discourse can be represented as an SDRS below.

357'.

π_1 π_2
π1: *le*'(come' (y)) $\wedge$ movie_show_season'(y) π2: many'(x, college_student'(x), use'(x, y)) $\wedge$ chance'(y) $\wedge$do'(x, y, e) $\wedge$ part_time_job'(y) $\wedge$ at'(z, e) $\wedge$ movie_show'(z)
$Background_T(\pi_2,\pi_1)$

358. a. (w, f) $[\![Background_T(\pi_2, \pi_1)]\!]_M$ (w', g) iff

(w, f) $[\![K_{\pi_1} \wedge K_{\pi_2} \wedge \phi_{Background_T(\pi_2, \pi_1)}]\!]_M$ (w', g)

b. $\Phi_{Background_T(\beta,\alpha)} \Rightarrow$ (le(...)(α) $\rightarrow$ (t $\prec e_\alpha \wedge$ overlap(e_β, t)))

π_1 contains the perfective *le*. Since nothing in the discourse indicates otherwise, *le* presents a completed event. e_{π_2} overlaps the time after the event presented by *guo* is

[84] The adverb *every year* is left out since it is not relevant here.

completed. This is different from *Elaboration*. For *Elaboration*, the event time of the elaborated event is the time when the event occurs or is taking place. This is the inherent property of *Elaboration*. As argued in Chapter Five, an event presented by *le* is a complete whole, whose internal process cannot be accessed unless it is made accessible. Only *Elaboration* can do this because accessing the internal process of an elaborated clause is a natural property of *Elaboration*. Other rhetorical relations cannot make accessible the internal process of an event presented by *le*.

This section demonstrates the building of SDRS and the determination of temporal order of two examples, one of which is *Background*$_{\mathrm{T}}$ and the other of which is *Elaboration*$_{\mathrm{obj}}$. These two rhetorical relations are monotonically determined by lexical information and hence they can override the default rhetorical relation specified by the perfective *le*, according to the Specificity Principle. The difference in the temporal overlapping between *Background*$_{\mathrm{T}}$ with *le* and *Elaboration* with *le* is also discussed.

7.4.3.4 The Experiential Marker *guo*

In this section, two examples with *guo* are presented. One is of *Background*$_{\mathrm{I}}$ and the other of *Narration*. As discussed in Chapter Six, a clause with *guo* provides an informational background and its temporal relation is slightly different from a temporal background. For a *guo* clause which is connected to a clause following it by *Narration*, the constraint of *guo* on *Narration* must be obeyed. These points are shown below.

359. a. wo liang yiqi jingli **guo** wushu weinan

I two together experience EXP numerous difficulty-danger

'We have experienced numerous difficulties and danger together.'

b. zhe ci huoxu ye neng taotuo

this time perhaps also can escape

'This time, maybe we can also escape (from the danger).'

This example can be translated into the glue logic as follows.

359. a'. π_1: many'(x, danger'(x), *guo*'(together'(experience'(we', x))))

b'. π_2: this_time'(maybe'(escape'(x))) $\wedge$?(x)[85]

π_0: $R_0(\pi_1, \pi_2)$

Since no information indicates otherwise, the experiential *guo* specifies $Background_I$ by default. That is, R_0 is resolved to $Background_I$. Since π_2 is attached to π_1 and there is only one possible antecedent in π_1, the variable *x* in π_2 is resolved to *we*. The result of SDRT update can be represented as follows.

359'.

π_1 π_2 π_1: many'(x, danger'(x), *guo*'(together'(experience'(we', x)))) π_2: π_2: this_time'(maybe'(escape'(x))) $\wedge$ x = we' $Background_I(\pi_2,\pi_1)$

[85] To avoid unnecessary complications of this first person plural anaphor, it is represented as *we* in the formula. Note that this is a simplified representation and does not mean that pronouns are dealt with this way in SDRT.

The Satisfaction Schema for *Background*$_{I}$ and the meaning postulate for *Background*$_{I}$ are presented below.

360. a. (w, f) $[\![$*Background*$_{I}(\pi_2, \pi_1)]\!]_{M}$ (w', g) iff

$$(w, f) [\![K_{\pi_1} \wedge K_{\pi_2} \wedge \phi_{Background_I(\pi_2,\pi_1)}]\!]_M (w', g)$$

b. Background$_{I}$

$$\Phi_{Background_I(\beta,\alpha)} \Rightarrow (precondition(e_\alpha, s, t) \wedge overlap(s, e_\beta))$$

The meaning postulate says that e_β temporally overlaps the state *s* in the precondition e_α. In this example, *jingli wushu weinan* 'to experience countless difficulties' is just like *gai san dong fanzi* 'to build three houses' in that they both consist of individual tokens, i.e. the resultative states caused by them do not have to discontinue. Therefore, e_{π_2} temporally overlaps the resultative state caused by e_{π_1}. This fits the intuition about the temporal relation about this discourse.

Next example is one of *Narration*. It has been argued in Chapter Six that a clause with *guo* requires a temporal location phrase to be connected to the clause following it by *Narration*. This is stated as the constraint of *guo* on *Narration*, which has to be obeyed. These two requirements are both satisfied in the following example.

361. a. maozhedong zai changsha dushu shi de laoshi
Chair Mao at Changsha study time DE teacher
hongjun changzheng shi zui nianzhang de xuteli
communist army long march time most senior DE Xu Teli
dangshi yijing shi bashier sui de lao ren
then already be 82 year-old DE ole man
'Xu Teli, Chair Mao's teacher when he studied at Changsha and the most senior member in the communist army during the Long March, was already a 82-year-old old man at that time.'

b. liang nian qian hui **guo** hunan laojia
two year ago return EXP Hunan hometown
'(He) returned to his hometown in Hunan two years ago.'

c. yijiu wuba nian di zaidu fan xiang shi
1958 year end again return home time
'(When he) returned home again at the end of 1958,'

d. fanxian xiri conglong de qiuling huang ni luolou
find past green DE hill yellow mud appear
'(he) found that the hills which used to be green because of trees were now covered with yellow mud and dust only.

e. linzi quan hui le

forest all destroy PFV

'all of the forests were destroyed.'

This example can be translated into the glue logic below.

361. a'. π_1: at_that_time'(84_years_old'(Xu Tele'))[86]

b'. π_2: *guo*'(return_home'(x, e)) $\wedge$?(x) $\wedge$ e $\subseteq$ ⟦two years ago'⟧

c'. π_3: return_home'(x, e) $\wedge$?(x) $\wedge$ e $\subseteq$ ⟦the end of 1958'⟧

d'. π_4: find'(x) $\wedge$?(x)

π_5: green'(x, s) $\wedge$ mountain'(x) $\wedge$ s $\prec$ RT $\wedge$ covered'(x, y)

$\wedge$ dust'(y)

e'. π_6: *le*'(destroyed'(x)) $\wedge$ forest'(x)

π_{56}: $R_{56}(\pi_5, \pi_6)$

π_{456}: $R_{456}(\pi_4, \pi_{56})$

π_{3456}: $R_{3456}(\pi_3, \pi_{456})$

π_{23456}: $R_{23456}(\pi_2, \pi_{3456})$

π_0: $R_0(\pi_1, \pi_{23456})$

This example has a complex case of deciding attachment sites. π_2, π_3, π_4 and π_5 can be connected to π_1 separately. This is incoherent because the relationships between these events are ignored. The indicator *shi* 'when' in π_3 indicates that π_3 is a

[86] The appositions and the relative clause in the appositions are ignored in this glue logic formula to keep this formula simple and easy to understand, and to facilitate understanding of the point here. In the formulae of this example, irrelevant information are not represented to avoid complexity.

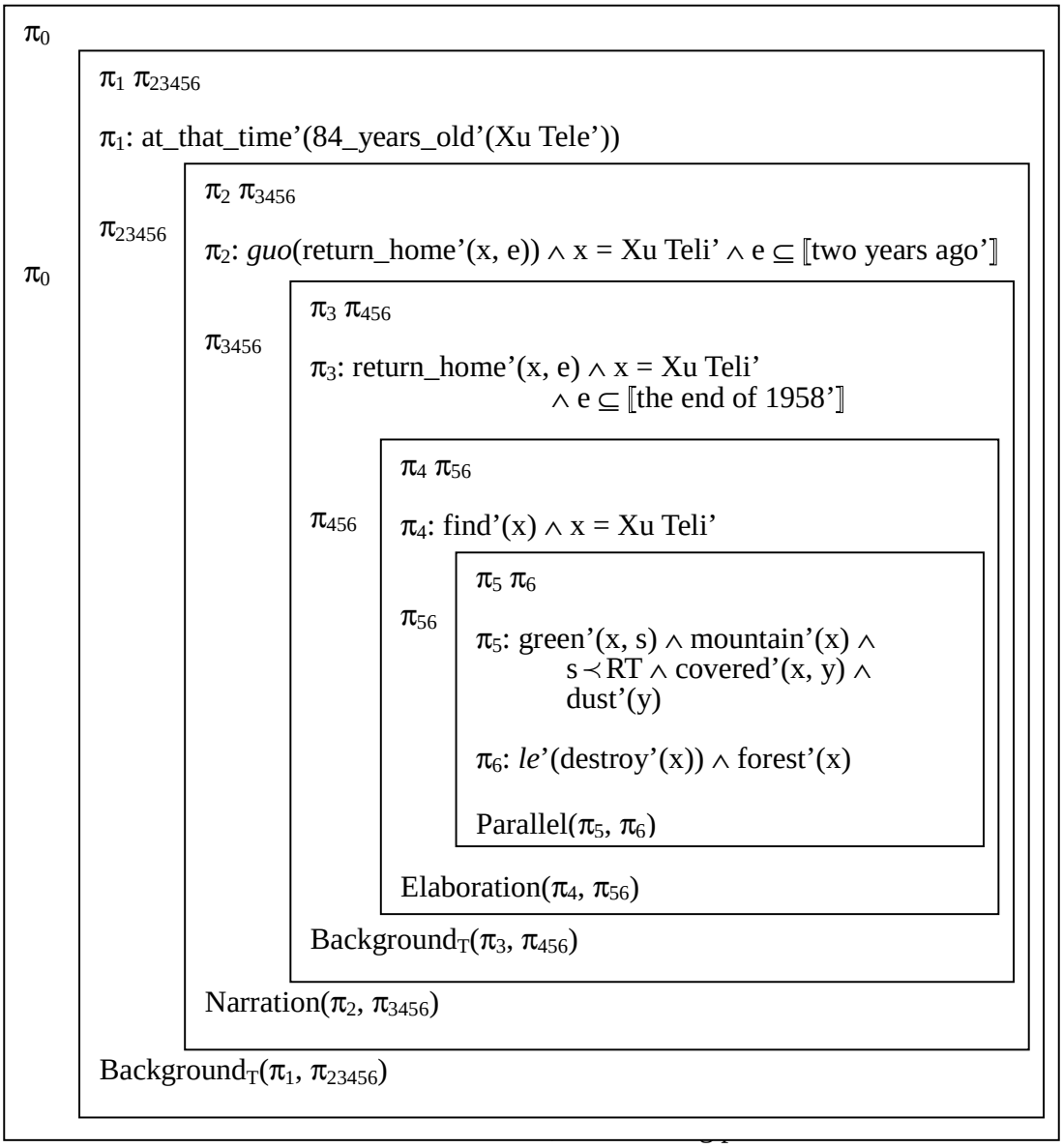
temporal background for the clause following it. The verb *find* in π_4 is a clausal complement-taking verb and Axiom (346) specifies that the clauses following are attached to it by *Elaboration*.

π_4 and π_5 are semantically parallel, and hence can be connected together by *Parallel*. If π_5 and π_6 are attached to π_4 separately, then this relation will be lost and hence the MDC will be violated. π_2 has a temporal location phrase and *guo*. π_3 has another temporal location phrase that is temporally following the phrase in π_2. This means that π_3 narrates π_2. The constraint of *guo* on *Narration* is obeyed here. If π_3 and π_2 are connected to π_1 separately, this important information about the temporal relation between them cannot be captured. Not only does this violate the MDC but also contradicts the intuition about this discourse because a very important piece of information is lost. Finally, π_1 is stative and serves as a temporal background for the whole discourse.

In the glue logic formulae in (361), only the correct ways of attachment is listed. Based on the discussion above, R_{56} is resolved to *Parallel*. R_{456} is resolved to *Elaboration*. R_{3456} is resolved to $Background_T$. R_{23456} is resolved to *Narration*. R_0 is resolved to $Background_T$.

The underspecified variables in this example all represent zero anaphor. Since all of the clauses are attached, directly or indirectly, to π_1, and Xu Teli is the only possible antecedent, all of the zero anaphors are resolved to Xu Teli. The result of SDRS update can be represented below.

361’.



The Satisfaction Schema, the meaning postulate for *Narration* and the constraint of *guo* on *Narration* are presented below, to determine the temporal relation between the *guo* clause and the clause following it.

362. a. (w, f) $[\![\mathit{Narration}(\pi_1, \pi_{23456})]\!]_M$ (w', g) iff

$$(w, f) [\![K_{\pi_1} \wedge K_{\pi_{23456}} \wedge \phi_{\text{Narration}(\pi_1, \pi_{23456})}]\!]_M (w', g)$$

b. Narration (= (343a))

$$\Phi_{\mathit{Narration}(\alpha, \beta)} \Rightarrow \text{overlap}(\text{prestate}(e_\beta), \text{ADV}(\text{poststate}(e_\alpha))$$

c. $(\mathit{Narration}(\alpha, \beta, \lambda) \wedge \mathit{guo}(....)(\alpha)) \rightarrow \text{TMP\_LOC}(...)(\alpha)$

(= (341a))

(343a) says that the poststate of the *returning home* event occurred two years ago temporally overlaps with the pestate of the *returning home* event in 1958. The constraint of *guo* on *Narration* is also obeyed because *two years ago* is the temporal location phrase required. This fits the intuition about the temporal order in this example.

This section demonstrates the building of SDRS, SDRT update and the determination of temporal order of examples with *guo*. Two examples are presented. One is $\mathit{Background}_I$ and the other *Narration*. The temporal order determined by the Satisfaction Schema for the two rhetorical relations fits the intuition about the temporal order in these two examples.

7.5 Summary

In this chapter, the relationship between aspect markers and rhetorical relations is discussed. It is argued that they work together to accurately determine temporal relations between clauses.

Four pieces of evidence are provided. First, aspect markers alone cannot

determine the temporal relations because the same aspect markers can appear in clauses with different temporal relations.

Secondly, aspect markers can occur in clauses connected by different rhetorical relations as long as there is no semantic clash between the aspectual properties of aspect markers and the temporal relations specified by the rhetorical relations. This point further supports the fact that aspect markers alone cannot determine temporal relations.

Thirdly, some aspect markers cannot occur in clauses connected together by some rhetorical relations. This means that aspect markers have selectional restrictions on rhetorical relations and hence they have indirect selectional restrictions on temporal relations.

Fourthly, changing an aspect marker in a clause also changes the rhetorical relation that connects together that clause and another. This point suggests that aspect markers do play a role in determining the temporal relations between clauses because changing aspect markers would not change anything else if rhetorical relations were solely responsible for determining the temporal relations.

Then, the relationship between rhetorical relations and temporal order is discussed. The examples of *Narration* involve advancement of narrative time. Except for the perfective *le*, the other three aspect markers have their own constraints on *Narration.*

The examples of *Elaboration* can, but not necessarily, involve temporal inclusion, depending on whether it is event elaboration or object elaboration, and on

the hint that indicates elaboration and the aspectual type of the elaborated clauses when it comes to NP elaboration.

The examples of *Background* with *le, guo*, *zai*, and *zhe* involve temporal overlapping though the temporal frame provided by *le* is different from the one provided by *zai* and *zhe*. *zai* and *zhe* provide their event time as a temporal frame while *le* provides as a temporal frame the time after an event presented by *le* is completed or terminated. The *Background* indicated by *guo* is an informational background. It provides as a temporal frame the time for the (discontinued) resultative state caused by an event marked by *guo*.

For the examples of *Result*, the resultative clause occurs after the causal clause. This is natural because *Result* indicates a cause-effect relation and in this world cause comes before effect.

For the examples of *Consequence*, just like the examples of *Result*, the event described by the antecedent clause occurs before the event described by the consequent clause. This also follows the cause-effect relation, which is indicated by *Consequence*.

For the examples of *Parallel*, aspectual parallel is required. This means that the both sides of *Parallel* should have the same aspectual properties. But, the temporal order between clauses with *zhe* and *zai* is different from that of clauses with *le* and *guo*. While the clauses with either *zai* or *zhe* connected together by *Parallel* are temporally overlapping, the clauses with either *guo* or *le* connected by *Parallel* are, at best, known to occur before certain RTs. But, the temporal order between them is

undecided.

For the examples of *Contrast*, the temporal order can either be advancement of narrative time or temporal overlapping. The examples of advancement of narrative time must have indicators and must obey the constraints of aspect markers on *Narration*.

After these discussions, the axioms for aspect markers to assign default rhetorical relations, the axioms of the constraints on *Narration*, the axioms for indicators to monotonically determine rhetorical relations and the meaning postulates for rhetorical relations are proposed. A demonstration of how SDRT can determine the temporal relations between clauses, with the assistance of the information provided by aspect markers, are given to demonstrate how the temporal relations can be accurately computed.

CHAPTER EIGHT

Concluding Remarks

8.1 Summary of the Study

In the previous six chapters, the aspectual properties of the four aspect markers, *zai*, *zhe*, *le*, and *guo*, have been discussed in detail. It has also been discussed how the aspectual properties of the four aspect markers influence which rhetorical relation can connect together a clause with an aspect marker and its adjacent clause. It has been argued that aspect markers do not directly determine the temporal relation between two clauses. Instead, aspect markers affect indirectly the temporal order between two clauses through rhetorical relations. It has been argued that every aspect marker defeasibly specifies a rhetorical relation that connects together the clause with the aspect marker and its adjacent clause. Syntactic or structural indicators, such as *yinwei* 'because', *suoyi* 'so', *ranhou* 'then' or syntactic parallel, monotonically specify what rhetorical relations connect together clauses with the indicators and their adjacent clauses. Indicators can override the default rhetorical relations specified by aspect markers.

The significant point (SigP) analysis is proposed to account for the aspectual properties of the four aspect markers. A SigP for an event/eventuality is defeasibly inferred from the situation type (Aktionsart or lexical aspect) of the event/eventuality. The SigP of an event is its natural final endpoint. The SigP of accomplishment is its natural final endpoint. The SigP of achievement is also its natural final endpoint. Since the initial endpoint and the natural final endpoint of achievement coincide with

each other, the SigP of achievement happens to be its initial endpoint too. Activity does not have a natural final endpoint, and therefore its SigP is undefined. An activity predicate can be arbitrarily assigned a SigP as long as there is a context which demands the termination of that activity predicate. The SigP of state with an initial endpoint is its initial endpoint.

The progressive marker *zai* is argued to present an event on-going at an instant. *zai* can present any point in the process of an event, except for its SigP. This is why *zai* is not compatible with achievement because it has only one point: its SigP. Because *zai* does not present the SigP of an event, which is its natural final endpoint, and because progressive evokes the Imperfective Paradox, it remains unknown whether an event presented by *zai* is terminated/completed or not. Therefore, the event time of an event presented by *zai* cannot be advanced. That means that a *zai* clause and its following clause cannot be connected together by *Narration* though a *zai* clause can narrates a clause without *zai*. The progressive marker *zai* is argued to defeasibly specify $Background_{T}$, a temporal background, which connects together a *zai* clause and its adjacent clause when there is no information in the discourse indicating otherwise.

The durative marker *zhe* is argued to present an event/eventuality lasting over an interval larger than an instant. It cannot present a duration containing a SigP with nothing following in the semantics of an event/eventuality. The SigPs of achievement and accomplishment are their natural final endpoints and in their semantics nothing follows their natural final endpoints. Therefore, achievement and accomplishment are

not compatible with *zhe*. Activity does not have a natural final endpoint. State with an initial endpoint has a homogeneous state following its SigP (= its initial endpoint) in its semantics. Hence, activity and the kind of state with an initial endpoint are compatible with *zhe*.

However, the interaction between activity and *zhe* is a little complicated. While some activity predicates can go with *zhe* alone, others require an interval-denoting adverbial or an adverbial of manner to go with *zhe* when the clauses with *zhe* stands alone. If a clause with *zhe* is in a discourse and it serves as a temporal background for a main event, an activity predicate can also go with *zhe* alone. It is argued that *zhe* checks the feature 'homogeneity' at the highest level of a syntactic tree. In Mandarin, those activity predicates that can go with *zhe* alone contain less internal process or less obvious repeated actions in their semantics and are linguistically encoded as 'homogeneous'. Those activity predicates that do not go with *zhe* alone have more (obvious) internal process and/or repeated actions and are linguistically encoded as 'non-homogeneous'.

Dowty (1979: 168) argues that if α is an activity verb, then $\alpha(x)$ is true at an interval *I*, iff there is some physically definable property *P* such that the individual denoted by *x* lacks *P* at the lower bound of *I* and has *P* at the upper bound of *I*. Interval-denoting adverbials function to bring out the property *P* of a non-homogeneous activity predicate, which a too small temporal slice of that predicate cannot possess.

Adverbials of manner can bring out the homogeneity from those non-homogeneous activity predicates because they lump together the subevents of activity, eliminate the boundary between the subevents, and distribute the properties denoted by the adverbials of manner over the lumped-together subevents. This process leads to the subinverval property and hence renders non-homogeneous activity homogeneous.

Background$_{\mathrm{T}}$ has a similar function. A temporal background severs as a temporal frame for a main event. The internal process and/or repeated actions of an event serveing as a temporal background are not important and can be ignored. Therefore, when a non-homogeneous activity predicate goes with *zhe* in a clause which serves as a temporal background, *Background*$_{\mathrm{T}}$ also lumps together the subevents of the activity predicate and eliminates the boundary between them. This process also renders non-homogeneous activity homogeneous and makes it compatible with *zhe*.

Since *zhe* goes with predicates without a natural final endpoint, it is certainly unknown whether an event/eventuality presented by *zhe* is terminated or not. The event time of an event/eventuality presented by *zhe* cannot be advanced unless a verb denoting the termination or completion of an event is syntactically embedded under the verb marked by *zhe*. For example, when the termination or completion of an event is being witnessed, the event denoting ‘to witness’ can be presented by *zhe* in Mandarin. A *zhe* clause and its following clause can be connected together by *Narration* only under this circumstance.

Just like the progressive marker *zai*, the durative marker *zhe* is argued to nonmonotonically specify *Background*$_{T}$, which connects a *zhe* clause and its adjacent clause together when there is no information in the discourse indicating otherwise.

The perfective marker *le* is argued to identify the SigP of an event or eventuality and then to locate it before an RT. This is how the 'perfective' meaning is derived. It has been noted in the literature on the perfective *le* that it can present a terminated, but not completed, event. Since the SigP of an event or eventuality is nonmonotonically inferred, it can be overridden by explicit information in the discourse. This overriding is done by rhetorical relations, such as *Contrast*. Since the perfective *le* presents as a single complete whole an event or eventuality from its initial endpoint up to its SigP, that is, an event presented by the perfective *le* is terminated or completed, the perfective *le* is argued to defeasibly specify *Narration*, which connects together a *le* clause and its adjacent clause, when nothing in the discourse says otherwise.

Since the perfective *le* presents an event as a single whole, its internal process is not accessible unless another clause is connected to it by *Elaboration*. When an event is elaborated, the internal process of the event must be accessed because elaborating clauses provide more information about (the process of) the event. Only *Elaboration* can make accessible the internal of an event presented by *le*, and nothing else can, not even *Background*$_{T}$. *Background*$_{T}$ just needs time to serve as a temporal frame for another event. It does not have to be the time of the internal process of an event. Since *le* presents a terminated or completed event, it provides as a temporal

frame the time after the event is terminated or completed. Besides, *le* does not occur in a clause serving as a reason for another clause because in Mandarin a reason is usually an event yet to come. An event that has not been terminated or completed cannot be presented by the perfective *le*.

The experiential *guo* is argued to predicate on an event type, which was realized at indefinite past and which is repeatable. Because a *guo* clause was realized at indefinite past, the semantics of *guo* does not include a temporal variable and an event variable. An event type being repeatable at *t* is defined as follows: the event type was realized at indefinite past, it is possible in the future that the same event type is realized as an event token *e*, which occurs after the realization of the event type at indefinite past, the precondition of this realization on the resultative state must hold at *t*. The class meaning and the condition of recurrence come from the event token set of an event type, on which *guo* predicates. Two different event tokens are distinguished. Individual tokens are tokens where the same action acts upon different individuals of the same kind. The resultative state caused by an event token of this kind can continue. Spatio-temporal tokens are tokens where the same event occurs at different points of the time-space continuum. The resultative state caused by an even token of this kind must discontinue. That is, whether the resultative state caused by an *guo* event discontinues depends on what kind of event token it is.

Since a *guo* clause was realized at indefinite past, the event time of the selected token is unknown and unspecific. This is why the event time of a *guo* clause cannot be advanced unless there is a temporal location phrase to locate the event time of the

clause. That is, when a *guo* clause and its following clause are connected together by *Narration*, the *guo* clause must contain a temporal location phrase.

Just like the internal process of an event presented by *le* can be rendered accessible by *Elaboration*, the same rhetorical relation can also induce temporal inclusion between an elaborated event presented by *guo* and elaborating events.

The temporal relation between two clauses in a discourse is determined by the rhetorical relation that connects the two clauses together, while which rhetorical relation can connect clauses together is affected by the aspectual properties of aspectual markers. *Narration* evokes advancement of event time.

The examples of *Background* with *le*, *guo*, *zai*, and *zhe* involve temporal overlapping though the temporal frame provided by *le* is different from the one provided by *zai* and *zhe*. *zai* and *zhe* provide their event time as a temporal frame while *le* provides as a temporal frame the time after an event presented by *le* is completed or terminated. The *Background* indicated by *guo* is an informational background. It provides as a temporal frame the time for the (discontinued) resultative state caused by an event marked by *guo*.

When an event is elaborated, temporal inclusion is also involved. On the other hand, when an object is elaborated, temporal inclusion is not necessarily involved. *Parallel* induces aspectual parallel. *Result* also involves advancement of event time, which means *Result* also implies *Narration*. *Consequence* indicates that antecedent occurs before consequent.

8.2 Theoretical Implications

This study has two important theoretical implications. One is that it provides a strong support for the view of dynamic semantics on meanings. The other is that it clarifies the intuitive impression that Mandarin is a discourse-oriented language and provides affirmative evidence for this intuition. These two implications are discussed below.

In static semantics, the meaning of a sentence is the set of models it satisfies. However, in dynamic semantics, the meaning of a sentence is a relation between a set of input contexts, which represents the content of the discourse immediately before the sentence being processed, and a set of output contexts, which represents the content of the discourse including the just processed sentence This relational notion of the meaning of a sentence is called the sentence's *context change potential* (CCP). (Asher and Lascarides 2003: 41-42). That is, in dynamic semantics, the meaning of a sentence exists in the context where the sentence is located.

This study provides two convincing pieces of evidence to support the view of dynamic semantics on meanings. First, some sentences are not acceptable or incomplete unless they stand in a context. The examples come from the interaction between activity and the perfective marker *le* and between non-homogeneous activity and the durative marker *zhe*.

It has been argued in Chapter Four that a sentence with a non-homogeneous activity predicate and the durative *zhe* cannot stand alone, as shown in (363a). It has also been argued in Chapter Fivethat the SigP of activity is undefined and that is why

a sentence with an activity predicate and the perfective *le* is unacceptable if it stands alone, as shown in (363b). However, the same sentences are fine if they are in an appropriate context, as in (363c) and (363d).

363. a. [I]ta qi **zhe** jiaotache
he ride DUR bike
'He rode a bike, ...'

b. [I]ta chi **le** fan
he eat PFV rice
'He ate (a meal), ...'

c. ta qi **zhe** jiaotache daochu xiaguang
he ride DUR bike everywhere ramble
'He rambled everywhere, riding a bike'

d. ta chi **le** fan cai likai
he eat PFV rice CAI leave
'He ate (a meal) and then left.'

The contrast between (363a) and (363c) on the one hand and (363b) and (363d) on the other proves that (at least part of) the semantics of the durative *zhe* and of the perfective *le* is contextually defined. In (363c), *qi zhe jiaotache* 'ride DUR bike' serves as a temporal background for *daochu xianguang* 'to ramble everywhere' and behaves like an adverbial of manner. If this *zhe* phrase stands alone, it is incomplete. This is similar to the case where a two-place predicate is incomplete if only one of its arguments is realized in syntax. That is, in a sense, under certain circumstances, *zhe*

can be argued to take two events as its arguments and requires the one presented by it to serve as a temporal background for the other.

In (363d), *chi le fan* ‘eat PFV rice’ is also incomplete, standing alone. It is complete only when it serves as the first event in a series of events. If the analogy is accurate that *chi le fan* ‘eat PFV rice’ is incomplete for the same reason that a two-place predicate is incomplete if only one of its two arguments is realized in syntax, then the perfective *le* can also be argued to take two or more events as its arguments and requires that the events contextually following the one(s) marked by *le* narrate these events presented by *le*. That is, both the durative *zhe* and the perfective *le* seem to include rhetorical relations in their semantics under certain circumstances. That is, contextual information such as rhetorical relations can be claimed to be 'grammaticalized' under certain circumstances in Mandarin.

In syntax, the elements (i.e. arguments) required to make a sentence acceptable (in other words, complete) are claimed to be grammaticalized, i.e. encoded in syntax. Contextual information is usually considered ‘pragmatics’, which does not affect the acceptance of a sentence though it certainly affects the coherence of a discourse. The examples in (363) show that, at least for the aspect markers, pure syntactic approach to the well/ill-formedness of sentences does not work because what makes (363a) and (363b) incomplete is pragmatic information, i.e. rhetorical relations. The case where (363a) and (363b) are incomplete if they are not connected to another clause by a rhetorical relation is just like the case where a sentence with a two-place predicate is incomplete if one of the two arguments of the predicate is not realized in syntax. In a

sense, some pragmatic information in Mandarin seems to be grammaticalized, just like the arguments of a predicate. The grammaticalization of contextual information in Mandarin (at least for sentences with a certain type of predicates and aspect markers) strongly supports the concept of meanings in dynamic semantics that the meaning of a sentence is a relation between a set of input contexts and a set of output contexts. The incompleteness of (363a) and (363b) cannot be explained by (or will require considerable complication from) a static semantic model.

The second piece of evidence comes from the default rhetorical relations specified by the four aspect markers. This study argues that every aspect marker defeasibly specifies a rhetorical relation, which is determined by the aspectual properties of that marker. In a discourse without any indicators, the default rhetorical relation specified by an aspect marker is the one that connects together the clauses in the discourse. One with a strong position can suggest that the default rhetorical relation nonmonotonically specified by an aspect marker is lexically encoded in the semantics of that aspect marker. One with a weaker position can suggest that the rhetorical relation is defeasibly inferred from the aspect properties of an aspect marker when a sentence with that aspect marker stands in a discourse.

Regardless of which position is taken, it cannot be denied that aspect markers do perform certain pragmatic function and that changing an aspect marker in a sentence either changes the rhetorical relation binding the sentences together or even renders the discourse incoherent. This means that pragmatic and discoursal information is a significant part of the semantics of aspect markers no matter how the

information is associated with the semantics of aspect markers. This point also strongly supports the view of dynamic semantics on meanings.

In addition to providing support for dynamic semantics, this study also clarifies and verifies the intuitive impression that Mandarin is a discourse-oriented language, which is seldom elaborated if ever.

Li and Thompson (1981: 13-15) suggest that topic prominence distinguishes Mandarin from other languages. They (ibid:100-102) suggest that the topic in what they call 'topic prominence' belongs to discourse domain. This is an example of Mandarin being discourse-oriented. However, some linguists, e.g. Her (1991), argue that topic is a syntactic concept. Since it is arguable whether topic is a pragmatic or syntactic concept, topic prominence does not really provide much support for the intuitive impression that Mandarin is discourse-oriented. Besides, what it means to be discourse-oriented remains unclear.

Rhetorical relations and contexts are undoubtedly pragmatic concepts. The examples in (363) suggest that under certain circumstances contexts should be grammaticalized, just like the arguments of a predicate. This means that contextual information is so important in Mandarin that it can be grammaticalized and to determine whether a sentence is complete or not, it is not adequate to examine the sentential level only. People have the impression that a lot of Mandarin sentences, standing alone, are unacceptable or incomplete, whereas they are perfectly acceptable when they are in a discourse. If it can be argued that some information which is often considered 'pragmatic' can be grammaticalized in Mandarin, then the general

impression can be turned into a precise notion.

The fact that every aspect marker in Mandarin defeasibly specifies a rhetorical relation that binds together the clause with that aspect marker and its adjacent sentence also provides a solid example for the intuitive impression that Mandarin is discourse-oriented. Aspect markers can either nonmonotonically specify a rhetorical relation or exert constraints on which rhetorical relation can connect a sentence with an aspect marker to its adjacent sentence. This means that (at least some) pragmatic and discoursal information is associated with the semantics of aspect markers. This point further clarifies why Mandarin is discourse-oriented.

The reason why the previous studies cannot explain what it means to be discourse-oriented is that the previous studies look at sentences only. In this dissertation, the Sinica Corpus is used to provide real-life contexts. This is the difference between this dissertation and the previous studies. This dissertation is a corpus study, where complete contexts are examined. This is why the intuitive impression that Mandarin is discourse-oriented can be clarified and verified. In addition, because this dissertation uses the Sinica Corpus to examine the interface between semantics and pragmatics, it is not an extension of any previous study. Instead, it is an original research which explores problems that have not been addressed yet.

In sum, this study is theoretically significant in two respects. First, it provides strong and affirmative support for the view of dynamic semantics on meanings, i.e. the meaning of a sentence is a relation between a set of input contexts and a set of

output contexts.

Secondly, it clarifies and verifies the intuitive impression that Mandarin is discourse-oriented. This intuitive impression can be defined as: some pragmatic and contextual information is so important in Mandarin that it can be grammaticalized. This definition can explain why some sentences are incomplete when standing alone, just like a sentence with a two-place predicate is incomplete if only one of the two arguments of the predicate is realized in syntax. This study provides abundant examples to support this intuitive impression.

8.3 Further Studies

This dissertation focuses on the aspectual properties of aspect markers and how they interact with rhetorical relations to determine the temporal relations between clauses. However, Smith and Erbaugh (2000) notice that aspect markers are not obligatory in Mandarin texts. Therefore, how the temporal relations between clauses without any aspect marker are determined needs to be examined.

The issue of how many rhetorical relations there are is also worth exploring. Asher and Lascarides (2003) argue that only rhetorical relations that affect truth definition should be taken into consideration. Corpus study of rhetorical relations can provide a wider search domain and a more thorough examination.

The properties of rhetorical relations are worth examining. So far, the rhetorical relations are determined by intuition. If there can be more reliable way to determine rhetorical relations and if there are some tests that can distinguish one rhetorical relation from another, the research using rhetorical relations can be done more

objectively.

In Chapter Seven, it has been discussed that verbs taking clausal complements is connected to their complements by *Elaboration*, following Asher and Lascarides (2003: 285). This approach has two issues to address. First, clausal complement-taking verbs are still considered as two-place predicates. Dealing with them this way either causes a problem to the argument structure where one argument of a verb of this kind is missing or implies that rhetorical relations, at least some of them, should be encoded on the argument structure. Does this mean that rhetorical relations come into existence before a clause is attached to another in a discourse? Does this mean that somehow rhetorical relations are represented on the argument structure or in lexicon? Though Asher and Lascarides (ibid: 249-291) propose that some verbs do contain a rhetorical relation in their lexical entries, it is not clear at all what happens to a 'lexical' rhetorical relation when a sentence stands alone. This is an issue of the interface of lexical semantics, syntax and pragmatics. It is also related to the question whether contextual information, such as rhetorical relations, should be grammticalized and how the information is formalized if it should be grammaticalized. This issue absolutely deserves more attention.

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This dissertation was typed by the author.