



Time in Mandarin: The Fingerprints of Tense and Finiteness

Citation

He, Yuyin. 2020. Time in Mandarin: The Fingerprints of Tense and Finiteness. Doctoral dissertation, Harvard University Graduate School of Arts and Sciences.

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HARVARD UNIVERSITY
Graduate School of Arts and Sciences



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presented by Yuyin He

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Time in Mandarin: The Fingerprints of Tense and Finiteness

A dissertation presented
by

Yuyin He

to

The Department of Linguistics

in partial fulfillment of the requirements
for the degree of
Doctor of Philosophy
in the subject of
Linguistics

Harvard University
Cambridge, Massachusetts

August 2020

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Time in Mandarin: The Fingerprints of Tense and Finiteness

Abstract

This dissertation offers a systematic investigation of the temporal interpretations of root clauses and complement clauses in Mandarin involving functional projections of tense, aspect and modality, with a focus on the semantic analysis for root clauses and a syntactic analysis for complement clauses.

This dissertation argues that a two-null-tense analysis captures the Mandarin facts as good as a non-future tense approach. The two-null-tense approach can also account for the non-future constraint on time adverbs with bare predicates and the Mandarin-type PEDT phenomenon (plural eventualities in different temporal locations). Other than the empirical coverage, the two-null-tense hypothesis easily captures the parallelism between English and Mandarin that perfective aspect reports past events, by maintaining a simple, unified analysis for the aspectual system and a regular analysis for the tense system.

This dissertation also provides a thorough investigation about future readings in Mandarin, taking into account the following factors: constraints on eventualities, time adverbs, tense and aspect. Specifically, we argue that the overt future morpheme *hui* and the covert future morpheme PLAN in futurate constructions (constructions that express a future reading without an overt future modal) contain both a futurity component and

a modal component, with specific presuppositions that account for their restrictions in aspect and eventualities.

Following [Wurmbrand and Lohninger \(2020\)](#), this dissertation categorizes complement clauses into three groups based on their temporal/subject referential (in)dependence: *Propositions*, *Situations* and *Events*. A *Proposition* complement contains at least a CP, a future irrealis *Situation* complement contains at least a *wollP* and an *Event* contains at least a vP. Though all three types of complements have the option to project a syntactic CP (headed by the trivial complementizer *shuo*), only the *Proposition* complements contain the semantic Operator domain (CP), allowing sentence final particles, epistemic modals and functional projections related to the Operator domain. This dissertation suggests that *Proposition* complements contain semantic tenses as root clauses do, hence are able to license *hui* and overt referentially-independent subjects. *Situation* complements and *Event* complements lack the (semantic) Operator domain. Furthermore, we propose that finiteness in Mandarin can be defined by tense. *Proposition* complements are tensed and finite while *Event* complements are non-finite. *Situation* complements can have the finite form and the non-finite form, though most of them in Mandarin are non-finite. Finiteness, clausal independency, complexities and transparency of complement clauses follow the Implicational Complementation Hierarchy (ICH).

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Acknowledgement

This thesis germinated from my first generals paper on control constructions in Mandarin. At that time, I was hoping to account for the aspect lowering phenomenon in control constructions. Questions popped up as I tried to make the simplest assumptions about tense, aspect and modality in the language. Being confused by the contradictory predictions of available analyses in the market, I later realized that a story was in need for the most basic, unembedded cases before we can move on to talk about embedding. Thus the dissertation finally has the shape as it is now.

It has been a long way for me to be clear about what I can contribute to the field in this dissertation. Before my dissertation defense, I had once imagined how I would feel upon the completion of this thesis. I suspected that it might feel like ‘a handful of sour and bitter tears’ as the poem by Cao Xueqin depicts. But it turned out to be a totally different feeling: a flow of gratitude. Words are so plain to express my thankfulness to my committee: C.-T. James Huang, Gennaro Chierchia and Susi Wurmbrand. Without any one of them, the dissertation would not be what it is right now.

First and foremost, my deep gratitude goes to my advisor C.-T. James Huang. I met Jim, whom I prefer to call ‘Huang Laoshi’, before my arrival in the US. From the first day when I decided to work on Chinese linguistics, I already knew that it is the best luck for me to have Huang Laoshi as my advisor because he is the living encyclopedia of this field. From my first day in Cambridge, Huang Laoshi has guided me through each stage of my study and life at Harvard. In our meetings, we talked about all sorts of things: research, academia and life. I never need to worry about whether my ideas are too naive to be paid

attention to, for Huang Laoshi is always supportive, encouraging and patient, trying to help polishing my thoughts with his knowledge and wisdom. His support is in each draft of my work, each presentation where he is in the audience, each answer from him for my questions.

I am equally thankful and lucky to have Gennaro as my advisor and the co-chair of my dissertation. Working with Gennaro is one of the correct big decisions I made during my Ph.D. It is the meetings with Gennaro that gradually reveal to me the joy of doing semantics. I am so impressed by Gennaro's deep devotion to intellectual pursuits and his sharp insights as a great semanticist when he questioned about the data, the analysis and the cross-linguistic implications, even though tense is not a topic that he has ever worked on. He respects my interest from the very beginning, offering his best to help me shape my analysis. I would never have come this far without his support and faith in me for the past years. I am sincerely grateful for Gennaro's generosity in offering his valuable time, knowledge and ideas.

I am also very thankful that Susi is in my committee. Susi always keeps the big picture in mind rooted in rich cross-linguistic research. At the time when I was very confused about which direction to go with finiteness and complementation, Susi's suggestions to focus on the phenomena and possible solutions to account for them pulled me back from the struggle. Her influence is in every page of the part on complementation and finiteness in the dissertation. Chapter 4 would not have its current shape without Susi's detailed comments, insightful questions and concrete suggestions.

Other than my committee members, this dissertation has benefited from discussion

with other people. Many thanks to Kate Davidson for her time in regularly meeting with me on my research, offering insightful feedbacks on the content and the way of presentation; Uli Sauerland for his suggestions and comments on the earlier version of Chapter 2 during his visit at Harvard. I am also in debt to scholars outside the Cambridge area for their questions, suggestions and responses to my questions at the earlier stage of my thesis project (in alphabetical order): María J. Arche, Valentine Hacquard, Lisa Matthewson, Anne Mucha, Roumyana Panchava, Judith Tonhauser and Hongyuan Sun. My gratitude also goes to scholars who taught me the necessary skills for this dissertation outside Harvard: David Pesetsky who intrigued my interest in complementation in his syntax class and Yael Sharvit & Sam AL Khatib who taught me about tense and aspect in ESSLI 2017.

In the past six years in Harvard, I am lucky to be surrounded by a group of great people. I thank my teachers at Harvard for their great knowledge and valuable support: Diti Bhadra, Jonathan Bobaljik, Isabelle Charnavel, Jay Jasanoff, Masoud Jasbi, Masha Polinsky, Kevin Ryan, Gregory Scontras and Stuart Shieber. I appreciate the friendship with my colleagues in the Linguistics Department and the Meaning & Modality Linguistics Lab (ordered in their G years): C.- M. Louis Liu, Jenny Lee, Yimei Xiang, Edwin Tsai, Yujing Huang, Laine Stranahan, Marek Majer, Pooja Paul, Chrissy Zlogar, Dorothy Ahn, Gašper Beguš, Alex Klapheke, Laurence B-Violette, Lena Borise, Zuzanna Fuchs, Tyler Lau, Teodora Mihoc, Cristina Aggazzotti, Aurore Gonzalez, Julia Sturm, Kate Hodges, Lukas Kahl, Gunnar Lund, Tiffany Yang, Shannon Bryant, Zachary Rothstein-Dowden, Giuseppe Riciardi, Yingtong Liu, Ian Kirby, Niels Kuehlhert, Josh Martin, Ethan Wilcox,

Wei-fang Hsieh, Deniz Satik, Tamisha Tan, Yuhang Zhang, Jack Rabinovitch, Ankana Saha and Hande Sevgi. Without the support and help from our administrative staffs, my life at Harvard will definitely be less easy: Helen Lewis, Cheryl Murphy, Arlene Navarro, Kate Pilson, thank you! I am also grateful for the gourmet meals by Shimu (Emily Huang) that I had whenever I visited Huang Laoshi's place. Her energy and enthusiasm for life make every visit a pleasant memory. I am sure I will miss that a lot after graduation.

In the end, my special thanks goes out to my parents and my brother for having my back in the impermanence. To Weiguan, for his company in the past 9 years, despite the separation of the land and the ocean.

Chapter 1

Introduction

1.1. Motivations of this study

Finiteness is a concept pertaining to central properties of a clause but is least understood in linguistic theories (McFadden and Sundaresan 2014). The notion of finiteness goes back to Priscianus' *Institutiones Grammaticae*. A 'finite' form of verbs or nouns in the Latin grammar is taken to be completed or determined to refer to a concrete case with morphological inflections (the term 'finite' etymologically derives from *finitum*, the past participle of *finire* 'finish') (Klein 2009, McFadden and Sundaresan 2014).

This notion later extends to describe properties of clauses based on whether they contain a finite verb form or not. This move starts the exploration of the tendency for the finiteness of the verb form to have implications for some of the most central properties of a clause: tense, aspect, mood, agreement, referential properties and case marking of its subject and the way in which the clause is anchored to a higher one or to the utterance context (McFadden and Sundaresan 2014). As a wider range of languages is taken into account, variations among the distribution of inflectional categories across verb forms and mismatches between the morphological status of a verb form and its syntactic or semantic behavior challenge conventional definitions of finiteness. For example, European Portuguese bears clauses like the one in (1) that looks infinitival in the sense that it lacks tense morphology and cannot stand alone, but looks finite because it shows person agreement (*-em*) and takes an overt pronominal subject (*eles*) as well.

- (1) Será difícil [eles aprovar-em á proposta].
It will.be.difficult they to.approve-3PL the proposal
'It will be difficult [for them to approve the proposal].'

(Raposo 1987: 86, cited from McFadden and Sundaesan 2014: 7)

Raposo (1987), Landau (2004), Szabolcsi (2009) etc. share the common idea that finiteness is not a unitary phenomenon. It must be broken down into smaller components. Behaviors attributed to finiteness should be made derivative of the interplay between these components. For instance, Landau (2004) suggests that the finiteness of a clause is defined in terms of T and Agr features, specified on Infl and C. The value of an R-feature on DPs is determined by T and Agr features (the scale of finiteness), which leads to overt vs. covert, referentially independent vs. anaphoric subjects in different types of infinitives. European Portuguese inflected infinitives as in (1) are shown to have independent tense interpretations, despite their apparently non-finite inflection. Hence they are [+T, +Agr] and thus according to the R-assignment Rule below, they license referentially independent subjects that bear the [+R] feature. With the “calculus” of T and Agr features, Landau successfully derives the full paradigm of subjects in different morphological and semantic types of “infinitives” in European Portuguese, Greek, Hebrew and other languages.

(2) R-assignment Rule

For $X_{[\alpha T, \beta Agr]}^0 \in \{I^0, C^0 \dots\}$:

$\emptyset \rightarrow [+R]/X_{[\square]}^0$, if $\alpha = \beta = '+'$

$\emptyset \rightarrow [-R]/\text{elsewhere}$ (Landau 2004: 842)

Though Landau’s proposal is appealing in accounting for the cross-linguistic variations via a unified calculus, it immediately encounters challenges from languages that are

impoverished in inflections.¹ Mandarin is such a language that lack overt morphology of tense and agreement. On the one hand, parallel to the fact that the definition of a language being tensed or tenseless is not well understood in the literature, it is also highly controversial about whether Mandarin bears tense or not (Klein et al. 2000, Smith and Erbaugh 2005, J.-W. Lin 2006, W.-T. Dylan Tsai 2008, Bittner 2014, Sun 2014, to name a few), though apparently Mandarin does not bear tense morphology overtly inflected on verbs as Indo-European languages do. On the other hand, the majority of Mandarin researchers agree that Mandarin lacks agreement on ϕ features,² which raises questions for proposals that correlate finiteness to agreement.

One possibility is that languages like Mandarin do not encode finiteness (Hu et al. 2001, J.-W. Lin 2006, Grano 2012, 2015, 2017 among others) and thus it makes a futile effort to discuss finiteness in these languages. However, even though overt morphology of tense and agreement is absent in Mandarin, a wide range of observations are parallel to phenomena pertaining to finiteness in other languages with richer morphology: (i) overt realization of the subject arguments, (ii) opaque domains for some syntactic operations and (iii) the ability of a clause to stand as an independent assertion. In (3), complement clauses of speech predicates allow overt referentially independent subjects (referential expressions or referentially independent pronouns). But complement clauses of control

¹Another challenge for proposals that attribute finiteness to tense and agreement is the fact that in some languages such as Tamil, Sinhala etc., clauses that lack tense and agreement marking can still allow overt, referentially independent subjects, see details in McFadden and Sundaresan (2014).

²Cole et al. (1990), Miyagawa 2017 argue that Mandarin keeps person agreement based on the evidence of the Blocking Effect observed in constructions with long-distance reflexive *ziji* 'self'.

attitude predicates in (372) mostly only allow covert anaphoric subjects (PRO in the GB theory). The former are usually considered to be finite clauses while the latter are non-finite clauses (C.-T. James [Huang](#) 1989, Y.-H. Audrey [Li](#) 1990, Tz.-H. Jonah [Lin](#) 2011, N. [Zhang](#) 2016 among others).

- (3) a. Zhangsan_i shuo [**Lisi**_j/ **ta**_{i/j} chi-le fan].
 Zhangsan say Lisi 3SG eat-PFV food
 ‘Zhangsan said that Lisi/he had eaten.’
- b. Zhangsan_i gaosu Lisi_j [**Wangwu**_k/ **ta**_{i/j/k} chi-le fan].
 Zhangsan tell Lisi Wangwu 3SG eat-PFV food
 ‘Zhangsan told Lisi that Wangwu/he had eaten.’
- (4) a. Zhangsan_i dasuan [PRO_i (***ta**_i/ ***Lisi**) qu Beijing].
 Zhangsan plan 3SG/ Lisi go Beijing
 ‘Zhangsan planned to go to Beijing.’ / *‘Zhangsan planned that Lisi will go to Beijing.’
- b. Zhangsan_i quan Lisi_j [PRO_j (***ta**_j/ ***Wangwu**) zaodian lai].
 Zhangsan urge Lisi 3SG/ Wangwu earlier come
 ‘Zhangsan urged Lisi to come earlier.’ / *‘Zhangsan urged Lisi that Wangwu should come earlier.’

Other than the subject properties, restructuring phenomena are observed in Mandarin constructions that involve control predicates, which hold a cross-linguistic correlation with non-finite clausal complements ([Paul](#) 2002, [Grano](#) 2012, 2014, 2015; N. [Huang](#) 2018 among others). Let’s take the “aspect lowering” phenomenon (also “experiential lowering” in N. [Huang](#) 2018, “control-aspect correlation”, “aspect under control” in [Grano](#) 2014) as an example.

- (5) a. Lisi xiangxin [wo mai-**guo** zhe zhong baoxian].
 Lisi believe I buy-EXP this type insurance
 'Lisi believes that I have previously bought this kind of insurance.'
- b. Lisi shefa [xiuli-**guo** zhe-tai jiqi].
 Lisi try repair-EXP this-CL machine
 'Lisi had previously tried to repair this machine.'

(N. Huang 2018: 351)

The predicate *xiangxin* 'believe' does not impose any constraint on the temporal relation between the embedded situation and the matrix situation. But *shefa* 'try' is different. It requires the embedded eventuality to be simultaneous with the matrix one. The sentences in (5) illustrate two points. Firstly, the existence of an embedded experiential aspect marker *guo* does not change the temporal requirement of *shefa* 'try'. In general, the experiential marker locates an event it modifies anterior to an evaluation time. In root clauses, the evaluation time will be the utterance time. In complement clauses, the evaluation time will be set by the event time of the matrix event or the subjective *now* of the attitude holder, see J.-W. Lin 2006, Pearson 2016 among others. This is reflected in (5a). *Guo* indicates that my buying this kind of insurance precedes the time of Lisi holding his belief. In contrast, with or without *guo*, in (5b) the temporal relation between trying and repairing does not change. The simultaneity between the two events remains.

The aspect marker in (5b) only states that the trying and the repairing occurred in the past of the utterance time. This reflects the second point of "aspect lowering": the evaluation time of *guo* is provided within the domain of the (potentially) finite subordinate clause in (5a) while in the (potentially) non-finite clause, it is provided within the domain of the matrix clause in (5b). Namely, the aspect marker appears in the embedded clause,

which is supposed to obtain its evaluation time in the domain of the complement, but instead receives a “high” matrix interpretation as if it is “lowered to” the complement from the matrix.

Moreover, the clausal complements of Mandarin control predicates lack not only overt subjects as already shown in (372), but also aspect markers on eventive predicates and most sentence final particles in general. Also, they cannot stand alone as assertions. The above observations parallel the cross-linguistic correlation between finiteness and some of the central properties of a clause, which is hard to believe to be a coincidence.

Languages like Mandarin on the typological spectrum thus provide an interesting angle for us to explore clausal properties pertaining to finiteness. Firstly, it is hard to see how the traditional perception of attributing finiteness to tense or tense and agreement works in Mandarin. The meaning of finiteness and to which extent such a concept is helpful requires re-examination for languages like Mandarin. Secondly, it is unclear which syntactic or semantic properties are responsible for the aforementioned phenomena in Mandarin and how they are related to finiteness. As we will see later in this dissertation, the morphosyntactic diagnostics for (non)finiteness in the literature do not always converge on the same class of constructions. Hence it is likely that some properties diagnosed by these tests are more important in discussing ‘(non)finiteness’ than others, requiring a precise examination of the properties that observations pertaining to (non)finiteness target at.

Following Cristofaro (2007), Bisang (2007) and Wurmbrand et al. (2020), this dissertation argues that there is not a universal syntactic or semantic category of finiteness. As we

will see in the next section, the common definitions of finiteness in the literature hardly survive under the scrutiny of cross-linguistic data. Languages utilize different properties to express finiteness: the ability to license overt subjects, the ability to license nominal case of an overt subject, tense, agreement or special morphological forms in a language etc (Cristofaro 2007, Bisang 2007). Finiteness itself is the outcome of these properties, rather than the trigger of them.

Rather than focusing on whether to label a construction as finite or non-finite in Mandarin, this dissertation pays more attention to the analysis for the empirical facts in tense, aspect and modality (TAM domain) of Mandarin, which is often taken as diagnostics for finiteness in the language. We argue that Mandarin is a tensed language based on a systematic investigation on temporal interpretations in root clauses. It possesses a null-version of the English tense system: a covert present tense and a covert past tense. Mandarin does encode the finite/non-finite distinction syntactically. The property expressing finiteness in Mandarin is tense, which can be detected by the flexibility of temporal interpretations (modeled by the presence of tense), compatibility with future modal *hui* that is syntactically licensed by tense and (potentially) the ability to license overt referentially-independent subjects.

Furthermore, there are three types of complement clauses in Mandarin corresponding to the widely attested classes of complementation: *Proposition*, *Situation* and *Event*. The diagnostics that are often claimed to be finiteness-related in the literature of Mandarin are targeting at clausal (in)dependence, structural complexities and clausal transparency. These properties of clausehood follow the Implicational Complementation Hi-

erarchy (ICH) proposed by Wurmbrand and Lohninger (2020): Proposition \gg Situation \gg Event. Namely, if a language encodes morphosyntactic distinctions among the three types of complements, a complement is always more independent, less transparent and less integrated than complements to its right on the hierarchy. The property denoting finiteness in a language, will also align with this hierarchy. In Mandarin, *Proposition* complements are finite with a [+T] feature on T^0 which is filled by semantic tenses. *Event* complements are non-finite with a [-T] feature on T^0 (or lack TP in the structure). *Situation* complements can have the finite form or the non-finite form, though more often they are non-finite.

1.2. Finiteness cross-linguistically

The morpho-syntactic categories that have been suggested to reflect finiteness include tense, aspect, mood, illocutionary force, person marking, politeness, special forms not used in independent clauses, nominal morphology on the verb (Nikolaeva 2007b, Wurmbrand et al. 2020). Within the Government and Binding and Minimalism frameworks, finiteness is a binary morphosyntactic category for the clause that (i) regulates tense and agreement on the verb, (ii) controls the realization of the subject argument, (iii) creates domains opaque for some syntactic rules, (iv) play a crucial role in the ability of a clause to serve as an independent assertion (Nikolaeva 2007b, McFadden and Sundaresan 2014).

Nikolaeva (2007b) points out that there are well-known cases where the relevant properties do not come together as predicted by the theory. For example, given the existence of inflected infinitives such as European Portuguese (as shown in the sentence in (1))

and Welsh (Raposo 1987, Tallerman 1998), we need to parameterize overt agreement as a factor to identify finiteness. Furthermore, independent nominative subjects also need additional assumptions to identify finiteness, given the fact that independent nominative subjects are licensed in arguably nonfinite clauses defined by uninflected verbs in Québec French infinitival conditionals (Martineau and Motapanyane 1996) and West Flemish adverbial infinitives (Haegeman 1986). Moreover, relating finiteness to creating opaque domains also need modification to account for the fact that in Modern Greek and other Balkan languages some fully inflected subjunctives are syntactically transparent (Felix 1989, Anderson 1997, Roussou 2001). In other words, the morpho-syntactic properties involved in the definition of finiteness are not universal because finiteness has different morpho-syntactic realizations across languages. Nikolaeva (2007b) suggests that a binary understanding of finiteness in formal approaches thus calls for a principled distinction between an abstract binary category that regulates certain syntactic processes and its individual morphological manifestations.

In the influential proposal by Rizzi (1997), finiteness is a theoretical primitive at the highest sentential level (FinP), which is structurally detached from tense or agreement. If clausal finiteness is a syntactic primitive represented as a feature or position, the question from Nikolaeva (2007b) is worthy of consideration: is this category purely syntactic or both syntactic and semantic? The short answer to this question is: It is difficult to connect the concept of finiteness to a specific syntactic category or a semantic property that is adequate for the cross-linguistic variations. For instance, finiteness is often correlated to independent tense or anchoring to the logophoric center of a clause (Bianchi 2003, Adger

2007). Putting the technical details aside, Hoekstra and Hyams (1998), Bianchi (2003) relate finiteness to temporal anchoring. Namely, finiteness has to do with linking the event time or reference time to the speech time. Wurmbrand et al. (2020) argue that this is a possible approach for main clauses, but it does not carry over to embedded clauses. In complement clauses, the embedded event time/reference time is not related to the speech time but evaluated with respect to the matrix tense/event. Even one argues that the embedded event time/reference time is indirectly linked to the speech time via the matrix event, that holds for all complement clauses and is not helpful to tell us why some complements are termed as finite clauses while some are infinitives in languages like English. The same problem also holds for similar ideas that define finiteness as the ability to independently connect the event to the external world (Sybesma 2019), unless we treat the term 'finiteness' as different concepts in main clauses and complement clauses. But handling finiteness in this way raises another question: To which extent does such a treatment show anything in common and consistent of finiteness?

Some researchers also go for a functional definition of finiteness. Specifically, finiteness is associated with the possibility of a sentence to serve as an independent assertion (Amritavalli 2014, Kissonck 2014, Sybesma 2019 among others). This definition can apply broadly to all languages without confining finiteness to a specific morpho-syntactic or semantic property. However, as McFadden and Sundaresan (2014) point out, this proposal is challenged by the fact that clauses are not simply divided into those that can stand alone and those that cannot. They seem to vary in subtle and often complex ways in the extent to which they can qualify as independent root clauses. Hooper and Thompson (1973) test

the independence of a range of embedded clauses in English by investigating the extent to which they can undergo root transformation such as VP preposing, negative constituent preposing, topicalization etc. They show that root-transformations apply most easily to complements of speech predicates, and least easily to direct perception predicates such as *doubt*, *wonder* and *discover*. Clausal independence seems to be a graded, rather than a binary phenomenon that can be tagged as finite vs. non-finite.

The ‘incompleteness’ effect observed in some Mandarin root clauses also reveal the inadequacy of defining finiteness as the capability of being independent assertions. He (1994), Kong (1994), Gu (2008), W.-T. Dylan Tsai (2008), Sybesma (2019) among others document that sentences like the one in (6a), which are inflected for aspectual construals on the surface, still lack the ability to stand alone, yielding a feeling of ‘incompleteness’ for native speakers. Possible morpho-syntactic methods to erase the ‘incompleteness’ include but not limit to: adding sentence-final particles (6b), adding temporal adverbs (6c), changing the objects to a bounded one (6d), subordinate the clause under another clause (6e) etc.

- (6) a. ? Akiu na-le shu.
 Akiu take-Prf book
 ‘Akiu took books.’
- b. Akiu na-le₁ shu le₂.
 Akiu bring-Prf book Prt
 ‘(As for now,) Akiu has taken book.’ (Adding SFP)
- c. Akiu **zuotian** na le shu.
 Akiu yesterday bring PFV book
 ‘Akiu took books this afternoon.’ (Adding temporal adverbs)

- d. Akiu na-le **san-ben** shu.
 Akiu take-Prf three-CL book
 ‘Akiu took three books.’ (Include a bounded object)
- (Tsai 2008: 677-678)
- e. Xiaodi shuo [Akiu na-le shu].
 Xiaodi say Akiu take-PFV book
 ‘Xiaodi said that Akiu took the book/took books.’

On the one hand, Sybesma (2019) suggests that the lack of elements in the ‘time chain’ connecting VP, AspP, TP and CP, or any element not functioning normally on the ‘time chain’ turns a sentence into a nonfinite one and thus leads to incompleteness.³ On the other hand, complements of speech predicates in Mandarin are considered to be finite clauses, a consensus in the literature if one believes that Mandarin encodes finiteness (C.-T. James Huang 1989, Y.-H. Audrey Li 1990, T.- H. Jonah Lin 2011, Sybesma 2017, N. Zhang 2019). If finiteness is defined as the capability to stand alone as an independent assertion, (6a) is non-finite because it is incomplete. But the same clause becomes finite when embedded under a speech predicate in (6e). The functional projection that is supposed to make a sentence nonfinite somehow is not a problem any more in embedded clauses. Such discrepancy is unmotivated.

Another challenge with the definition of independent assertion for finiteness comes from constructions such as imperatives. Nikolaeva (2007a) presents that some types of

³Sybesma (2019) argues that VPs consist of bare activity verbs and bare nouns in general denote habitual (generic) readings, which is stative in nature. Following Katz (1995) and Sun (2014), Sybesma (2019) suggests that a stative denotes a property of time, which cannot be bound by an aspectual operator, which takes the eventuality argument of an eventive as its input. The conflict between the aspectual phrase and the type of predicates leads to the ‘dangling’ of the aspect head, breaking the ‘time chain’ connecting VP, AspP, TP and CP, which ultimately connects the predicate to the extensional situation.

independent clauses prefer nonfinite patterns while others do not. For example, imperatives and hortatives/jussives systematically demonstrate properties that are commonly thought of as diagnostics of nonfiniteness: they tend to have reduced tense/agreement morphology and rarely allow overt subjects. The combination of these properties differ across languages, indicating that they cannot be reduced to a common syntactic source. Other than being independent assertions, the lack of similarity between imperatives and finite declarative clauses further lead to discrepancy of the finite/nonfinite distinction, a result we do not hope for. What we can conclude is that there is a tendency for a finite clause to be able to serve as an independent assertion, but the factors that make an assertion independent or incomplete are not always relevant to finiteness (N. Zhang 2019).

In summary, a functional definition relying on independent assertion or anchoring an event to the extensional situation does not work. Because such a functional approach tells us little about the connection among finiteness in main clauses, finiteness in complement clauses, as well as other independent assertions that prefer a nonfinite morphosyntactic pattern. The vast cross-linguistic variations show that finiteness is not correlated to a common syntactic source or a certain semantic property (Cristofaro 2007, Bisang 2007, Nikolaeva 2007b, Wurmbrand et al. 2020). That means, assumptions that equal finiteness to the existence of a designate syntactic or semantic category such as Tense for all languages are untenable. Similarly, proposals that designate a theoretical primitive of finiteness in the structure (such as Fin head in CP by Rizzi 1997) across languages are also problematic.

Therefore, we follow Cristofaro (2007) and Bisang (2007), Wurmbrand et al. (2020) and

argue that there is no universal category of finiteness. Languages can differ in what properties they utilize to express finiteness. For example, finiteness in South Slavic languages correspond to agreement (Wurmbrand et al. 2020) and in Scottish Gaelic it corresponds to subject licensing (Adger 2007). Moreover, properties/features related to finiteness are not necessarily confined to a particular syntactic position, but can also occur on other clausal heads. Depending on the language, these finiteness features can be at different locations in the structure: V, T or C. For example, Adger (2007) suggests that subject licensing requires tense and agreement features. The two features do not necessarily reside in T or C, but can be in lower position such as V, licensing overt subject in verbal noun clauses, which Adger (2007) argues to be finite. When we talk about finiteness in a language, we need to specify the properties such a language adopts to express finiteness and the categories that encode these properties.

Going back to Mandarin, almost most of the morphosyntactic and semantic properties that are argued to reflect finiteness in the cross-linguistic investigations find their way in the Mandarin literature. Literature on finiteness in Mandarin has different foci in the main clauses and complement clauses (Sybesma 2017). Non-finiteness in main clauses often correlates to ‘incompleteness’ effect (Sybesma 2017, 2019) while non-finiteness in complement clauses usually involve the absence of overt subjects, opaque clausal domains, and/or certain morphosyntactic categories such as tense, aspect, modality, sentence-final particles (C.-T. James Huang 1989, Y.-H. Audrey Li 1990, Hu et al. 2001, T.-H. Jonah Lin 2011, Grano 2015, Paul 2018, N. Huang 2018, N. Zhang 2019, Liao and Wang 2019 among many others). As we conclude in the previous discussion, the incomplete feeling of a

main clause are due to various reasons that are often subtle and complex. Properties leading to the ‘incompleteness’ of a main clause and properties expressing finiteness do not necessarily overlap. Treating finiteness as a property of anchoring the event denoted by the predicate to extensional situations may be possible for main clauses, but tells little about the finite/nonfinite distinction in complement clauses.

1.3. Overview

Given the fact that phenomena claimed to reflect finite/non-finite distinctions largely fall in the domain of tense, aspect and modality (TAM) in Mandarin and because morphology tells little about agreement and case, we take a detour to seek for a detailed, systematic investigation of the TAM system of Mandarin finite root clauses as the first step, before we enter the jungle of the (non)finiteness debate.

The major motivations to investigate the TAM system of root clauses are twofold. On the one hand, the tensed/tenseless distinction is closely related to other central properties of a clause, e.g. the distribution of eventive predicates ([Pesetsky 1992](#), [Bošković 1996](#), [1997](#), [Martin 1996](#), [Wurmbrand 2014](#) among others) and the interpretation of PRO (exhaustive control vs. partial control, see [Landau 2015](#), [Pearson 2016](#) among others). The temporal interpretation of a clause represented by the TAM system thus is an important window for the current goal. Before we can talk about TAM in complements, we need to understand its typical usage in finite clauses as a baseline.

On the other hand, whether Mandarin is tensed or tenseless is still controversial. Recent research has proposed that languages claimed to be superficially tenseless (Black-

foot, St'át'imcets, Atayal, to name a few) are indeed tensed with further investigations (Matthewson 2006, Reis Silva and Matthewson 2007, S. Chen 2018 among others). Following this trend, Sun (2014) and S.Y. Chen (2017a) provide interesting new evidence in favor of a tensed analysis for Mandarin. Given the new evidence and new angle to view tense/tenselessness in languages similar to Mandarin, it is time to re-examine how to capture the temporal phenomena discussed in a tenseless framework in previous research (J.-W. Lin 2006, ?) and those that are not addressed by a tenseless analysis. If Mandarin is analyzed as a tensed language (Sun 2014), then it is worthwhile to investigate its indications on a theory of finiteness based on the commonalities and variations between superficially tenseless languages and obviously tensed languages. However, among the few formal theoretical analyses (J.-W. Lin 2006, ?, Sun 2014), Sun's tensed analysis focuses only on Mandarin constructions with bare predicates. There is a gap in the research of temporal construals in Mandarin along the line of a tensed analysis. Hence we aim to help start filling this gap via a systematic investigation on the TAM system of finite root clauses.

This dissertation is organized as follows. Chapter 1 introduces the topic and reviews major proposals of finiteness in the literature. Theoretical tools and basic assumptions in this dissertation are also presented.

Chapter 2 reveals the picture of temporal interpretations in root clauses denoting non-future readings. This chapter compares Mandarin with English to guide us through the investigation of generic sentences and episodic sentences. Taking into account the internal compactness of the theory and empirical coverage, we compare two tensed anal-

yses for Mandarin: the English-style two-null-tense approach and the St'át'imcets-style non-future tense approach. We demonstrate that even Mandarin shows similarities with St'át'imcets in the constraints of time adverbs and availability of plural eventualities in different temporal locations, Mandarin is not confined to a non-future tense analysis. Instead, a null-version of the English tense system is also feasible in Mandarin based on general assumptions in a constrained, predictable way. In a two-null-tense analysis, Mandarin aspectual system can be handled in a unified way without treating perfective aspect as 'tense-aspect-particles' (Smith and Erbaugh 2005, J.-W. Lin 2006 among others).

Chapter 3 is devoted to root clauses denoting future readings. This chapter investigates sentences with bare predicates denoting future readings (futures, terminology following Copley 2002, 2009) and future sentences with the overt modal *hui* (futures, terminology following Copley 2009). We investigate the following properties related to future expressions in English and Mandarin: compatibility with non-future contexts, constraints on types of eventualities, interaction with tense and aspect (with a focus on the lack of future perfective in Mandarin and lack of past future interpretation of overt future modals in root clauses). We suggest that futurate constructions also contain a covert future modal *PLAN*, which shares the same semantic template with overt future modals. Namely, future modals are analyzed as the combination of a modal component that universally quantifies over accessible worlds and a temporal component that forward-shifts the eventuality.

With the TAM pattern in finite root clauses as our map, we then advance to properties in complement clauses in Chapter 4. For simplicity, we focus only on how complement

clauses encode (non)finiteness, leaving other forms of non-finite constructions (adjunct clauses, relative clauses etc.) for future research. We also save the semantic analysis of Mandarin complement clauses for future investigation, as the complexity of this topic will take us far away from the finiteness discussion.

Chapter 4 investigate the semantic and syntactic properties associated with clausal independence, structural complexities and clausal transparency among the complement clauses in Mandarin. We observe three types of complements: *Propositional*, *Situation* and *Event*. The three classes are determined semantically by their temporal properties and subject referential properties. The *Proposition* complements (e.g. complements of speech predicates) pattern the same as finite root clauses, without temporal restrictions on the embedded event. The *Situation* and *Event* complements (e.g. complements of control predicates) restrict the embedded eventuality to be posterior to or simultaneous with the matrix eventuality. Complementation follows the implicational hierarchy with regard to independence, complexity and transparency: *Proposition* \gg *Situation* \gg *Event* (Wurmbrand and Lohninger 2020).

We propose that the minimal functional projections among the *Proposition* complements, *Situation* complements and *Event* complements are CP, *wolIP* and vP respectively. We argue against proposals that designate a specific clause size for complement clauses and reduce finiteness to clause sizes as in Grano (2012, 2015). *Situation* complements and *Event* complements can project larger-than-expected structures since the bleached complementizer *shuo* is available among the three types of complements.

From temporal and subject referential (in)dependence, distribution of modals and

sentence-final-particles, as well as restructuring, we see a line between *Proposition* complements and the rest two classes. Distribution of epistemic modals and sentence-final-particles are available in *Proposition* complements because *Proposition* complements contain a semantic Operator domain and the existence of CP blocks restructuring (*shuo* is a trivial complementizer that is invisible for (most) syntactic and semantic operations, thus cannot be indicator of the Operator domain). We assume that the property expressing finiteness in Mandarin is tense. Given the similar temporal pattern that *Proposition* complements share with root clauses, we assume that *Proposition* complements contain a TP filled with tenses as root clauses do and are finite. Most future irrealis *Situation* complements do not allow overt future modal *hui* even though it is compatible with the semantic selection of the matrix predicate, we assume that this is due to the lack of tense. For those that allow overt embedded subjects and *hui*, we suggest that they are finite. *Event* complements do not allow *hui* due to their semantic requirement of temporally simultaneous with the matrix event. They consistently disallow overt embedded subjects. Following a Case-driven analysis for the distribution of DP in English, we attribute this fact to incapability to license Case due to the lack of tense. Hence *Event* complements in Mandarin are also non-finite.

Chapter 5 concludes the dissertation and lays out directions for future research.

1.4. Theoretical tools and assumptions

1.4.1. Tense

1.4.1.1. Ontology of time and the neo-Reichenbachian framework

We perceive time as a time line which is made up of linearly ordered moments (for any moments m_1, m_2 , either m_1 precedes m_2 , or m_1 follows m_2 , or m_1 is identical to m_2).

A time argument can denote a moment or an interval. We take a continuous view on time. Namely, the timeline is dense and thus the moments behave like real numbers. The density of time is defined below (von Stechow 2009), where M is the set of moments:

$$(7) \quad \forall m, m'' \in M [m < m'' \rightarrow \exists m' [m < m' < m'']]$$

This project adopts a neo-Reichenbachian framework on tense and aspect, which is widely used in the research of TAM. In this framework, the temporal and aspectual reference of clauses can be described in terms of temporal relations between three time intervals: the evaluation time, the topic time (also called “reference time”) and the eventuality time. The evaluation time is the time relative to which a clause is evaluated. For a root clause, usually the utterance time (s^*) at which a root clause is uttered is the evaluation time. For subordinate clauses, the evaluation time can be the situation time of the matrix predicate or the subjective *now* of the attitude holder, if the matrix predicate is an attitude predicate. The topic time (t_{Top}) is the interval that the uttered clause is about. It can be specified by temporal adverbials, *when*-clauses or be a salient time in the context. Eventuality time of a clause is the time at which the eventuality it describes is temporally located

(represented by the temporal trace of the event, $\tau(e)$). Following Klein (1994), we assume that tense constrains the temporal relation between the evaluation time and the topic time of a clause.

1.4.1.2. The Priorian approach and the referential approach to tense

The two classical treatments of tense involve the Priorian approach (Prior 1957, 1967, Kamp 1971, Montague 1973, Ogihara 1996 among others) and the referential approach (Partee 1973, Enç 1986, Heim 1994, Kratzer 1998 among others). We adopt the referential approach to avoid the potential complexity with the Priorian approach.

The basic idea of treating tense as Priorian operators is that a sentence contains a time-dependent index i at which a sentence is interpreted. Tense operators manipulate this index to get the sentence anchored on the timeline. For instance, the past tense operator on a proposition *Mary be tired* shifts the time at which the proposition holds to a time in the past, obtaining the reading below in (8).

$$(8) \quad \llbracket \text{PAST (Mary be tired)} \rrbracket^i = 1 \text{ iff } \exists t < t_i \text{ and Mary is tired at } t.$$

A problem with the Priorian approach is that it does not produce the right reading for the following sentence in (9) from Partee (1973). In a scenario where the following sentence is uttered halfway down the turnpike, (9) neither means that there exists some time in the past at which I did not turn off the stove (as shown in (10) where “I turn off the stove” is simplified as turn off (I, stove), without taking aspect and event structures into account), nor that there exists no time in the past at which I turned off the stove (as shown in (11)). The sentence clearly refers to a particular context salient time in the past.

(9) I didn't turn off the stove.

(10) a. PAST NEG I turn off the stove.

b. $\exists t[t < t_i \wedge \neg \text{turn off (I, stove) in } t]$

(11) a. NEG PAST I turn off the stove.

b. $\neg \exists t[t < t_i \wedge \text{turn off (I, stove) in } t]$

The Priorian approach can handle (9) if the existential quantifier is contextually restricted to times in a salient interval (Stalnaker 1973, Ogihara 1995). The two possibilities of scope relation between the negation and the existential quantifier yield the readings in (12), indicating that the sentence in (9) is ambiguous. However, "I didn't turn off the stove" does not mean that there is a time in a context salient past interval in which I didn't turn off the stove (the reading in (12a)). Rather, it means that in the context salient past interval, there is no time in which I turned off the stove. In other words, the reading in (12b) is the only reading of (9) and we need to stipulate that negation has to scope over the existential quantifier in the tense.

(12) a. $\exists t[t < t_i \wedge t \text{ is the context salient interval} \wedge \neg \text{turn off (I, stove) in } t]$

b. $\neg \exists t[t < t_i \wedge t \text{ is the context salient interval} \wedge \text{turn off (I, stove) in } t]$

The referential approach will not face the problem that the Priorian approach has to deal with. In the referential approach, tenses are analogous to pronouns. They are variables that can be bound or free over times. Like a pronoun, the denotation of a tense is obtained via an assignment function (g) in a given context (c). A pronoun carries a numerical index and may also carry features (for instance, gender and number features of

English pronouns) that constrain the referent of the pronoun. In (13a), the English pronoun *she* is defined only if the referent of *she* assigned by g is female. Similarly, the English past tense in (13b) carries a numerical index, whose value is assigned by the function g . The past tense also carries a presupposition such that it is only defined if the interval it refers to precedes the context dependent evaluation time t_c .

- (13) a. $\llbracket \text{she}_1 \rrbracket^{g,c}$ is defined iff $g(1)$ is female. Once defined, $\llbracket \text{she}_1 \rrbracket^{g,c} = g(1)$
 b. $\llbracket \text{PAST}_1 \rrbracket^{g,c}$ is defined iff $g(1) < t_c$. Once defined, $\llbracket \text{PAST}_1 \rrbracket^{g,c} = g(1)$

The referential approach does not need further assumptions to handle the scope ambiguity problem that Priorian approach faces. According to the referential approach, the stove-example is not ambiguous. Its meaning is predicted as desired in (14). We thus don't need to say anything about the scope relation between negation and tense. Given these advantages, we go for a referential analysis of tense.

- (14) \neg turn off (I, stove) in $g(1)$, where $g(1)$ is a context salient past interval.

1.4.2. Aspect

Aspectual categories include situation aspect (also known as “lexical aspect”) and view point aspect (also known as “grammatical aspect”). The former refers to the inherent temporal contour of the type of eventuality described by the predicate (e.g. Vendler’s four-way classification of predicates). The latter deals with a perspective on the event that a predicate is used to describe (e.g. perfective and imperfective contrast). Lexical aspect is not a property specific to a single lexical item but can extend to verbal phrases. Therefore,

we follow Bar-el’s (2015) terminology of “aspectual classes” rather than “lexical aspect” to avoid ambiguity.

1.4.2.1. Grammatical aspect

Following Klein (1994), we assume that grammatical aspect constrains the temporal relation between the topic time and the eventuality time of the clause. A commonly accepted (though not uncontroversial) view is that perfective aspect locates the eventuality time within the topic time while imperfective aspect locates the topic time within the eventuality time. This view is reflected in the semantics of grammatical aspect in (15).

- (15) a. $\llbracket \text{IPFV} \rrbracket = \lambda P_{\langle v, t \rangle} \lambda t \exists e [P(e) \wedge t \subseteq \tau(e)]$
 b. $\llbracket \text{PFV} \rrbracket = \lambda P_{\langle v, t \rangle} \lambda t \exists e [P(e) \wedge \tau(e) \subseteq t]$

In (15a), the imperfective aspect takes an argument-saturated predicate, which is a property of eventuality (of type $\langle v, t \rangle$, event semantics to be introduced in the next section), and a time argument (t of type $\langle i \rangle$, the topic time), and locates the time within the runtime of the event ($\tau(e)$). For the perfective aspect in (15b), on the contrary, the eventuality time is included in the topic time. This is also the starting point of our analysis to grammatical aspect in Mandarin. With perfective aspect, we consider an event as a whole. Hence perfective aspect provides an external perspective on the event. With imperfective aspect, we focus on a stage of an event and imperfective aspect thus provides an internal perspective (Comrie 1976).

Languages vary in whether they bear independent morphology to mark grammatical aspect. For instance, Mandarin has overt perfective markers and imperfective markers

while English does not mark perfective aspect independently. English perfective aspect is either considered to be morphologically null (Copley 2009) or assumed to bundle with past tense morphology *-ed* (Smith 1997, Rothstein 2004 among others).

1.4.2.2. Aspectual classes

Vendler (1967) propose four categories of aspectual classes: states, activities, achievements and accomplishments. States are typically described as static unbounded situations, such as *busy, tall, know* etc. Activities are atelic dynamic events, such as *smoke, swim, push a cart* etc. Achievements are typically described as (near-)instantaneous punctual events that result in a change of state, including predicates such as *wake up, arrive, win* etc. Accomplishments are typically described as dynamic telic events that have a natural endpoint, such as *build a house, read a book, cross the road* etc.

Though it is commonly assumed that the inventory of aspectual classes is universal (Van Valin 2006, Chelliah and Willem 2011 among others), it is difficult to categorize aspectual classes across languages. Bar-el (2015) points out three reasons why this process is uneasy: (i) standard tests in English are not applicable in all languages; (ii) even within a language, the tests do not necessarily behave the same across all predicates in a class; (iii) although aspectual classes and grammatical aspect are independent, the circular nature of their interaction is problematic. The fact that the semantics of aspectual classes can vary from language to language suggests that what is universal may not be the classes themselves, but perhaps the smaller building blocks from which event structures are composed (von Stechow and Matthewson 2008). It goes far beyond our goal to

discuss the possible variations in Mandarin aspectual classes. Readers can refer to Bar-el (2015) for an overview of cross-linguistic variations. A sample of Mandarin predicates in the four Vendler aspectual classes is listed below. As (16) shows, we further divide statives into stage-level statives and individual-level statives. Stage-level statives refer to states that are of a temporal stage of the subject while individual-level statives refer to states that are permanent or tendentially stable properties of individuals. The stage-level vs. individual-level distinction is relevant to our discussion about the NONFUT tense approach and the two-null-tenses approach.

- (16) a. activities: *chou-yan* 'smoke', *da lanqiu* 'play basketball', *youyong* 'swim'
- b. accomplishments: *du yi-ben shu* 'read a book', *xie yi-feng xin* 'write a letter', *chi yi-ge pingguo* 'eat an apple'
- c. achievements: *dao* 'arrive', *xing* 'wake up', *ying* 'win'
- d. stage-level statives: *jinzhang* 'nervous', *mang* 'busy', *lei* 'tired'
- e. individual-level statives: *gao* 'tall', *congming* 'smart', *zhidao* 'know'

Among the four aspectual classes, what counts as accomplishments in Mandarin is controversial. Accomplishments are typically described as dynamic telic events that involve an activity and a natural end point. The natural end point is usually introduced either through the inherent result states associated with the predicate (e.g. the state of the object being dead associated with *kill* in English) or by specifying a certain amount of change in one of the arguments of the predicate (e.g. *drink three glasses of water*). The former is called inherent accomplishments and the latter derived accomplishments (Rothstein 2004, A. Zhang 2018). In English, accomplishments in perfective usages in general

entail culmination. Namely, the inherent end point is achieved. That's why cancelling the culmination of 'wrote a letter' in (17) is odd.

- (17) a. Mrs Ramsey wrote a letter.
b. # Mrs Ramsey wrote a letter, but she didn't finish writing it.
c. # Mrs Ramsey wrote a letter and she may still be writing it.

(Smith 1997: 67-68)

In contrast, when marked by perfective aspect marker le_1 , some Mandarin predicates that seem to be counterparts of English accomplishments do not entail the realization of the natural end point, though the culminating reading is preferred. In other words, they allow non-culminating interpretations. In (18a), the change of state (the door from being open to being closed) does not realize at all, denoting a failed attempt reading. The sentence with *xie yi-feng xin* 'write a letter' in (18b) entails that an affected participant undergoes at least some change. Namely, part of the letter must be written and the letter can be unfinished. But le_1 will be infelicitous with 'write a letter' in a scenario where not a single word is written. In other words, the accomplishment also does not necessarily culminate. This is a partial success reading. Both the failed attempt reading and partial success reading are special cases of non-culminating interpretations. However, not all the accomplishments in Mandarin implicate culmination. For instance, resultative compounds entail culmination, as we can see in the example in (18c).

- (18) a. Mali guan-le men, keshi men mei guan-shang.
Mary close-PERF door but door NEG.PERF close-tight
'Mary closed the door, but the door was not closed.'

(failed attempt)

- b. Mali xie-le yi-feng xin, keshi meiyou xie-wan.
Mary write-PERF one-CL letter, but NEG.PERF write-finish
'Mary wrote a letter, but didn't finish.'

(partial success)

- c. # Yuehan da-sui le beizi, keshi beizi meiyou sui-diao.
John hit-break PERF glass but glass NEG.PERF break-DIAO
'John broke the glass, but the glass didn't break.'

(culmination entailment)

Given the complexity of the Mandarin data and the difficulty of categorizing aspectual classes cross-linguistically, what counts as accomplishments in Mandarin is under debate (Tai 1984, A. Zhang 2018 among others). We assume that Mandarin accomplishments contain at least three subcategories: resultative compounds, inherent accomplishments where the natural end point is inherently associated with the predicate and derived accomplishments where the arguably atelic verb takes a quantized object. We postpone the detailed discussion about the three subcategories of accomplishments and non-culminating accomplishments in Chapter 2.

1.4.2.3. Aspect in Mandarin and its syntax

Mandarin has two systems of aspect: preverbal and suffixal (Huang et al. 2009). The preverbal aspect include progressive marker *zai* and perfective marker *you*⁴. Aspect markers attached to verbs as suffixes include the perfective marker *le*₁, experiential marker *guo*

⁴*You* only occurs in the negation form *meiyou*. In some southern dialects of Chinese, *you* can also serve as a perfective marker independently in its positive form.

and durative marker *zhe*. Following the common treatment in the literature, we assume aspectual phrases project above vP. By convention, a clause contains as many AspPs as there are identifiable aspectual markers. It is possible that there is an even more fine-grained hierarchy within aspectual phrases with aspect markers at different height (Gu 1995, Huang et al. 2009). For the current goal of the dissertation, we mostly only focus on sentences with one aspect marker. Therefore, we do not specify the exact syntactic hierarchy of different aspect markers and simply assume that all the aspect markers compete for the same slot in an aspectual phrase.

Following Cheng and Li (1991), Huang et al. (2009), we suggest that there is no overt V to Asp movement in Mandarin. Suffixal aspect markers head the aspectual phrase above vP in LF. The linear order of aspect marker showing up as a suffix is either due to Affix-hopping in PF or covert movement in LF of an aspect marker based generated in vP. The evidence against overt V to Asp movement comes from the relative position of modifiers (Cheng and Li 1991). The sentences with preverbal aspect markers below indicate that manner modifiers must adjoin to v' and below Asp⁰, as the linear order has to be aspect marker > modifiers > verb.

- (19) a. ta **zai** dasheng chang ge.
 he at loud sing song
 'He was singing loudly.'
- b. *ta dasheng **zai** chang ge.
 he loud at sing song
- (20) a. wo **mei-you** qiaoqiao de hui jia.
 I not-have quiet DE return home
 'I din't go home stealthily.'

- b. *Wo qiaoqiao de mei-you hui jia.
 I quiet DE not-have return home

(Cheng and Li 1991, cited from Huang et al. 2009)

Assuming that preverbal aspect markers and suffixal aspect markers are heads of AspP, they locate above vP. If V to Asp movement is available in Mandarin, we should be able to observe the following word order: V-aspectual suffix > modifier. However, this word order is ungrammatical, as we can see from the examples below. Therefore, there is no overt movement from V to Asp.

- (21) a. ta dasheng chang-zhe ge.
 he loud sing-ZHE song
 'He was singing loudly.'

- b. *ta chang-zhe dasheng ge.
 he sing-ZHE loud song

- (22) a. wo qiaoqiao de hui-le jia.
 I quiet DE return-LE home
 'I went home stealthily.'

- b. *wo hui-le qiaoqiao de jia.
 I return-LE quiet DE home

- (23) a. na-ge jiahuo chishoukongquan sha-guo laohu.
 that-CL guy bare-handed kill-GUO tiger
 'That guy once killed a tiger bare-handedly.'

- b. *na-ge jiahuo sha-guo chishoukongquan laohu.
 that-CL guy kill-GUO bare-handed tiger

Huang et al. (2009) suggest that two options can derive the surface structure. Option 1 is that the suffix aspect markers are base-generated as the head of aspectual phrases

and affix hop in PF. The aspect marker is pronounced without any direct consequences in syntax. Option 2 is that the aspect marker is based-generated as the suffix of the verb and V-suffix later covertly moves to Asp^0 in LF, which is subject to constraints of movement. Either approach will be applicable to our analysis since our analysis only assumes that the aspectual suffix scope over vP in LF even though it superficially follows the verb.

1.4.3. Event structures of statives and eventives

This dissertation adopts a neo-Davidsonian framework to analyze predicates. A predicate takes an eventuality argument. We follow the subject internal hypothesis by assuming that the subject is based generated in the Voice phase (vP) and moves to the specifier position of inflectional phrases. For simplification, we ignore the semantic outcome of the movement in the derivation.⁵ We also set aside the debate on how external argument and internal argument are connected to the eventuality argument (Parsons 1990, Kratzer 1996, Lohndal 2014 among others) in semantics. A (non-finite) sentence base with a lexical verb and its argument slot(s) filled appropriately denotes a property of eventuality (of type $\langle v, t \rangle$). For instance, the sentence base “John hit Mary” takes an event argument e in (24a). Its agent is John and its theme is Mary. Sometimes we abbreviate ‘Agent’ as ‘Ag’, ‘Theme’ as ‘Th’ in the formula due to limits of space.

$$(24) \quad a. \quad \llbracket \text{John hit Mary} \rrbracket = \lambda e [\text{hit}(e) \wedge \text{Agent}(e) = j \wedge \text{Theme}(e) = m]$$

⁵Moving the subject will leave a trace and requires lambda abstraction when the subject composes with the rest of the sentence in the derivation in LF. Since this process will not affect the truth value of a sentence, we ignore the movement in syntax when we consider semantics derivations so that we can focus on the interactions in the TAM domain.

b. $\llbracket \text{John be happy} \rrbracket = \lambda s[\text{happy}(s) \wedge \text{Experiencer}(s) = j]$

We also assume that eventualities include states and events (Ramchand 2005). A state argument is represented by s and an event argument is represented by e . Both states and events are eventualities of type $\langle v \rangle$. A stative sentence base “John be happy” denotes a property of eventuality as well in (24b) (Higginbotham 1985, Parsons 1990, Landman 2000 among others). This assumption is different from the idea that eventives and statives are ontologically different (Katz 1995, 2003a). For instance, Katz (1995), Sun (2014) etc. argue that statives denote a property of time (type $\langle i, t \rangle$) while eventives denote a property of eventuality (type $\langle v, t \rangle$). Sun (2014) suggests that the difference between eventives and statives in their argument structures is universal. The outcome of a sentence should be a temporal proposition (type $\langle i, t \rangle$), which means that when supplied with a time argument (of type $\langle i \rangle$), the sentence will denote a truth value. Before an eventive interacts with operators high in the structure, an aspect operator is obligatory to avoid type mismatch since an aspect takes in a property of eventuality and returns a property of time. On the contrary, stative sentences are temporal propositions on their own, hence they can directly combine with time adverbs and no aspect markers are obligatory. Given this assumption, Sun (2014) explains why aspect is obligatory for eventives but not for statives in Mandarin.

We suggest that proposing different structures to statives and eventives face empirical problems. Firstly, if statives are purely propositional and do not take an event argument, we will predict that statives can only be modified by temporal or propositional elements. But statives can be modified by manner or degree phrases like eventives in both English

and Mandarin, demonstrated by the examples in (25) and (26). It is difficult to deal with these modifications without a state argument similar to the event argument in eventives.

- (25) a. John knows Mary well.
b. Mary lives in Boston happily. (English)
- (26) a. Yuehan bu wen yuanyou de xiangxin (zhe) Mali.
John NEG ask reason DE believe DUR Mary
'John usually believes Mary without even asking a question.'
b. Yuehan qingchu de zhidao zhe jian shi.
John clear DE know this CL matter
'John knows this matter well.' (Mandarin)

Secondly, it is productive for Mandarin statives to take resultative complements/degree complements like eventives, as shown in (27). This evidence is also difficult to handle if statives are propositional. In contrast, with the eventuality argument, we have the room to apply operators on the eventuality argument to 'extract' the result or the degree related to an eventuality for further modification.

- (27) a. Zhe hua'r hong de fa zi.
This flower red DE reveal purple
'This flower is/was red to the degree of revealing purple tones in the redness.'
b. Yuehan lei de shuo bu chu hua lai.
John tired DE say NEG out words come
'John is/was too tired to say a word.'

Thirdly, if statives denoting a temporal proposition is universal as Sun (2014) claims, we would predict that they should not be compatible with aspect in other languages as

well due to the same issue of type mismatch. But Romance languages commonly allow statives to be marked by imperfective aspect, which require an explanation if statives are propositional.

Last but not least, for sentences in (28) where statives take durative phrases as complements, like eventives, aspect markers are obligatory. A type-mismatch account that assumes different argument structures for statives and eventives requires further assumptions to account for why all predicates require aspect marking in these cases, unless we treat all predicates in these constructions as eventives (for instance, these predicates are achievements meaning ‘become tired’ and ‘become frustrated’). This solution is possible, but as far as we know, there is no conclusive evidence supporting or against claiming the predicates in (28) to be eventives. The fact is that the durative phrase clearly talks about the duration of a state, which is compatible with the state being the result state of an achievement predicate or the state denoted by a stative predicate. The point we make here is that we can account for these constructions without further assumptions if we don’t assume different argument structures of statives and eventives, since analysis for eventives will just extend to statives with no price.

- (28) a. Yuehan jinzhang-*(le) hen jiu.
John nervous-PERF very long
‘John has/had been nervous for a very long time.’
- b. Yuehan jusang-*(guo) yi duan shijian.
John frustrated-EXP one CL time
‘John has/had been frustrated for some time.’

Therefore, we argue that statives and eventives share the same argument structure

with the same semantic type of $\langle v, t \rangle$.⁶

1.4.4. Modality

Our discussion on modals in this dissertation adopts the framework by Kratzer (1977, 1981, 1991). Modals are quantifiers over worlds. The set of worlds to be quantified over is identified by the conversational backgrounds and ordering sources.

1.4.4.1. The modal base

As is standard in possible worlds semantics, a proposition is a set of possible worlds. Kratzer (1977) suggests that a conversational background f is a function from worlds to sets of propositions which serves as a parameter of interpretation. Though the interpretation of a modal is typically determined by context, it can also be expressed explicitly by linguistic forms. For example, the *must* in (29a) is an epistemic modal while the one in (29b) is a deontic modal. The expression ‘*in view of*’ tells us what kind of information in the context determines the meaning of *must*. Namely, ‘*in view of*’ sets the conversational background for the sentence in which it occurs.

- (29) a. In view of what I know, Mary must be lost.
b. In view of the rules of the secret committee, Mary must leave.

(Portner 2009: 50)

⁶One might then wonder how to account for the Mandarin fact that stative predicates are usually incompatible with aspect markers if we do not go for Sun’s analysis. We propose that overt aspect elements in languages vary in the constraints on the types of predicates they select as complements. For instance, overt aspects in English and Mandarin only select eventives instead of statives as complements while Romance imperfective aspect can select both.

Suppose that the speaker knows p_1, p_2 and p_3 when he/she utters (29a). The conversational background for (29a) will be the set of propositions $f(w) = \{p_1, p_2, p_3\}$. The intersection of the sets of worlds is the set over which the modal quantifies, $\bigcap f(w) = p_1 \cap p_2 \cap p_3$. The worlds in the set of $\bigcap f(w)$, the modal base, are worlds in which all the propositions in the conversational background (p_1, p_2, p_3) are true. In other words, the conversational background provides the accessible worlds for a modal.

In this dissertation, we focus on two types of modal bases: the circumstantial bases and the epistemic bases. A circumstantial base is a set of facts about the actual world. The deontic modal base scoped over by *must* in (29b) is a subcategory of circumstantial modal bases. The totally realistic circumstantial base that includes all the propositions that are true in the actual world is called a metaphysical base (Thomason 1970, Copley 2002, 2009), a concept that we will take on when we come to future modals in Chapter 3. The epistemic modal base includes only the propositions that are known by someone about the actual world. For example, *must* in (29b) takes an epistemic modal base.

1.4.4.2. The ordering source

The modal base alone is not enough to identify the meaning of a modal. The reason is that the set of accessible worlds offered by the conversational background only makes a two-way distinction among worlds: the accessible ones and the inaccessible ones. But we will not be able to have a more fine-grained distinction. Suppose we have the following

conversational background:⁷

- (30) a. Mary should not rob John.
b. Mary robs John.
c. If Mary robs John, then Mary should be punished.
d. It ought to be the case that if Mary does not rob John, then Mary should not be punished.

The propositions in (30) are intuitively compatible with each other in our actual world to serve as a conversational background. The formulation in (31) is based on this conversational background in (30). From (31b) and (31c), we obtain (32a) which says that in all the accessible worlds, Mary is punished. From (31a) and (31d), we obtain (32b) which says that in all the accessible worlds, Mary is not punished. We fail to obtain a set of worlds based on the current conversational background because there is no world such that both 'Mary is punished' and 'Mary is not punished' (i.e. (32c)) holds.

- (31) a. $\Box \neg$ Mary robs John.
b. Mary robs John.
c. Mary robs John \rightarrow \Box Mary is punished.
d. $\Box(\neg$ Mary robs John $\rightarrow \neg$ Mary is punished)

(Portner 2009: 61, following the formulation by Åqvist 1967)

- (32) a. \Box Mary is punished.

⁷This example is adapted from Portner 2009 Chapter 3, the original observations and arguments are from Prior (1958), Chisholm (1963).

- b. $\Box\neg$ Mary is punished.
- c. \Box Mary is punished \wedge $\Box\neg$ Mary is punished.

This example shows that a two-way distinction of accessible and inaccessible worlds is inadequate. In the example, worlds in which there is no robbery are the best; worlds in which John is robbed and Mary is punished are less good and worlds in which John is robbed and Mary is not punished are worst. Our theory of modality should include a component to compare worlds to one another in terms of how well they measure up to an ideal. This is implemented via ordering sources.

Conversational backgrounds not only provide the modal bases, but also act as ordering sources to provide partitions of the accessible worlds into different sets, with the sets ranked as to how good they are with respect to an ideal. The quantification of a modal then is over the best accessible worlds. Therefore, in the aforementioned example, if there is no robbery in the world in which the modal is evaluated, then the best worlds will give us the ideal worlds. But if Mary robbed John in the worlds where the modal is evaluated, these worlds will also be the worlds in which Mary is punished.

In Chapter 3, we will follow the insights of [Copley \(2002, 2009\)](#) and adopt two kinds of ordering sources for the semantics of futurates: bouletic ordering sources and inertial ordering sources. The bouletic ordering sources are based on the commitments of an animate entity and the inertial ordering sources are based on the normality of the course of development for circumstances (see Dowty's (1979) discussion of inertia worlds).

Chapter 2

Non-future Interpretations in Mandarin Root Clauses

2.1. Introduction

To obtain the basic picture of Mandarin root clauses, this chapter starts with a comparison between English and Mandarin. We investigate the generic interpretations and two episodic interpretations (the event-in-progress reading and the event culmination reading) that the four Vendler classes of predicates¹ are able to obtain in present and past contexts. A language faculty may have many ways to express readings that we are targeting at. Thus we focus only on constructions with or without aspect markers because the functional categories that a language specifically uses for these readings (no matter whether such categories are morphologically marked overtly or not) are keys to establish the limits on variations and uncovering semantic universals (if there is any), as Von Stechow and Mathewson (2008) point out. Other than works cited from relevant literature, the data are obtained via translations (in either direction) and judgements about felicity in particular contexts from native speakers of Mandarin (including the author) and English.

Examples of the three readings in English and Mandarin are shown below. Generic readings (GEN) report a regular pattern of a series of episodes. The event-in-progress reading (PROG) exhibits the on-going reading of an event or continuous reading of a state. Namely, the topic time is included in the runtime of the eventuality ($t_{\text{Top}} \subset \tau(e)$, see Chapter 1). The event culmination interpretation is widely observed for perfective constructions, which is often captured by the assumption that the whole eventuality time

¹For simplicity, we focus on clauses with only one predicate, setting aside for future research the problem of serial verb constructions that contain two predicates in a clause.

is included in the topic time ($\tau(e) \subseteq t_{\text{Top}}$, see Chapter 1). However, some languages allow non-culminating readings in constructions with overt perfective aspect marking (Smith 1997, Koenig and Muansuwan 2000, ?, Tatevosov and Ivanov 2009, Altshuler 2014 among others). Therefore, the phrase ‘perfective reading’ (PFV) refers to event culminating or non-culminating readings with perfective marking.

(33) Generic Readings:

- a. John smokes. (English)
- b. Yuehan chou-yan.
John smoke-tobacco
‘John smokes.’ (Mandarin)

(34) Event-in-progress Readings:

- a. John is smoking. (English)
- b. Yuehan xianzai zai chou-yan.
John now PROG smoke-tobacco
‘John is smoking now.’ (Mandarin)

(35) Perfective Readings:

- a. John smoked. (English)
- b. Yuehan chou le yan.
John smoke PFV tobacco.
‘John smoked.’ (Mandarin)

In describing the data in present ‘tense’ context and past ‘tense’ context, even we use the term ‘tense’ for convenience, we do not commit ourselves to a tensed analysis to Mandarin at this moment. Before we spell out our tensed proposal for Mandarin in section

4, 'tense' is a neutral label that stands for present interpretation and past interpretation of sentences, which is thus in quotation marks. The comparison in section 2 and section 3 shows that English and Mandarin have their own ways to express generic readings, event-in-progress readings and perfective readings, revealing the following similarities and variations.

- (36)
- a. The perfective aspect on predicates reports past eventualities. Both languages lack the 'present perfective' reading.
 - b. Both English and Mandarin allow perfective accomplishments with a homogeneous activity affecting an incremental theme to bear non-culminating readings (partial success). Moreover, Mandarin also allows failed attempt readings of some accomplishments in perfective usages.
 - c. The progressive in English can select achievements as complements while Mandarin progressive cannot.
 - d. English perfective aspect is not overt (at least not marked by a specific, independent morpheme) while Mandarin aspects have to be overtly marked in episodic interpretations.

In section 4, we provide a unified analysis to capture the similarity in (36a). We argue that Mandarin is a tensed language with a morphologically null, English-type tense system: a covert PRES and a covert PAST. Moreover, we suggest that the present tense in English and Mandarin requires the topic time to be the instantaneous utterance time. We compare the St'át'imcets-type NONFUT (Matthewson 2006, Sun 2014) with the two-null-tense approach in accounting for a broad range of data: constraints on time adverbs,

plural eventualities in different temporal locations (PEDT) and lack of present perfective. We conclude that both analyses can capture the aforementioned phenomena with the right assumptions, hence Mandarin is not committed to a non-future tense account (cf. Sun 2014). The two-null-tense approach goes with more general assumptions, which serves as a better hypothesis. Section 5 focuses on the variation in (36b). We demonstrate that the partial success reading is more common while failed attempt reading is not always present cross-linguistically, based on data from English, Hindi, Mandarin and Russian. We argue that non-culminating readings do not stem from the perfective aspect in Mandarin. Non-culmination should be accounted for via a separate partitive operator (cf. Koenig and Muansuwan 2000, Altshuler 2014).

2.2. The present ‘tense’ readings

For Mandarin sentences that lack tense morphology, we specify the present context by adding temporal adverbial *muqian* ‘nowadays’ for present generic readings and *xianzai* ‘now’ for episodic readings. Intuitively, the word ‘now’ means an interval that contains the utterance time. Therefore, it is ambiguous between a relatively long period of time and a short interval that the utterance time occupies. When we take *xianzai* ‘now’ to specify present episodic readings, we adopt the meaning that denotes a very short interval. Furthermore, we adopt the ‘telephone context’ that forces an episodic present ‘tense’ interpretation to help detect the interaction between present ‘tense’ and different aspect markers in Mandarin, following the methodology of Reis Silva and Matthewson (2007) for Blackfoot (Algonquian, also superficially tenseless).

2.2.1. Generic readings

English predicates with tense morphology alone² and Mandarin bare predicates without aspect markers can denote generic readings. Without any time adverbs, Mandarin bare predicates denote a present generic reading by default. Individual-level statives are inherently generic (Chierchia 1995). Other than individual-level statives and some activities (*da lanqiu* ‘play basketball’, *chi pingguo* ‘eat apples’ etc.) as the examples in (37) and (38) show, predicates usually need quantificational adverbials³ such as *mei-tian* ‘every day’, *tian-tian* ‘every day’ or extra context to support a generic reading, as is demonstrated in the examples in (39)-(41).

(37) activity:

a. John smokes.

(English)

²The function of English present tense is controversial in a couple of contexts: play-by-play narration in sports reports, stage instructions and historical (or narrative) discourses. The present tense in the following two examples cited from Anand and Toosarvandani (2017) does not exhibit Utterance Indexicality (describes eventualities that are simultaneous with the time of utterance) and Stativity (only compatible with stative predicates, including derived ones such as habituals). We believe that English present tense in these contexts plays a different role from its canonical use in an isolated root clause. Hence we will not discuss these issues in this dissertation. Readers can refer to Anand and Toosarvandani (2017) and references therein for details.

(1) a. *Play-by-play present*

(USA vs. New Zealand, 2015 Women’s Soccer Friendlies)

Commentator: Wambach leads it back and now Krieger has it. Tobin Heath goes far.

(<http://www.youtube.com/watch?v=Kqe9n7zvnnw>, 1:40:55)

b. *Historical present*

I couldn’t believe it! Just as we arrived, up comes Ben and slaps me on the back as if we’re life-long friends. “Come on, old pal,” he says, “Let me buy you a drink!” I am telling you, I nearly fainted on the spot. (Quirk et al., 1985: 181)

³There are constraints on compatibility between predicates and the type of quantificational adverbs. For example, *xie yi-feng xin* ‘write a letter’ goes well with *meitian* ‘every day’ but is odd with *changchang* ‘often’. It is not our goal to provide an analysis to quantificational adverbs, hence we set aside such details.

- b. (Muqian) Yuehan chou yan.
nowadays John smoke tobacco.
'Nowadays John smokes.'
(Mandarin)

(38) individual-level stative⁴

- a. John is tall. (English)

- b. Xianzai Yuehan hen gao.
now John very tall
'John is very tall now.'
(Mandarin)

(39) accomplishment:

- a. ? John writes a letter.

- b. John writes a letter every day. (English)

- c. ? Yuehan (muqian) xie yi-feng xin.
John nowadays write one-CL letter

- d. Yuehan (muqian) mei-tian xie yi-feng xin.
John nowadays every-day write one-CL letter
'Nowadays John writes a letter everyday.'
(Mandarin)

(40) achievement:

- a. ? John wakes up.

- b. John wakes up at 7 a.m. (English)

- c. * Muqian Yuehan xing.
nowadays John wake-up

- d. Muqian Yuehan mei-tian qi dianzhong xing.
nowadays John every-day seven o'clock wake-up

⁴*Muqian* 'nowadays' somehow is a bit unnatural with *gao* 'tall'. Therefore, we replace it with *xianzai* 'now'. Of course, *xianzai* 'now' with individual-level statives means a relatively long period of time.

'Nowadays John wakes up at 7 a.m. every day.' (Mandarin)

(41) stage-level stative:

a. John is (often) busy. You have to plan early if you want to have a meeting with him. (English)

b. Muqian Yuehan hen mang. Pingshi hen nan jian-de-dao ta.
Nowadays John very busy. at-usual very difficult see-DE-arrive 3SG
'John is very busy nowadays. Usually it is difficult to see him (even once).'

(Mandarin)

2.2.2. Event-in-progress readings

In both English and Mandarin root clauses, event-in-progress readings have to be marked by aspect overtly for eventives. In English, the predicate is marked by progressive *-ing* (shown in examples in (44)) while in Mandarin, the predicate is marked by progressive marker *zai*. Another imperfective marker, *zhe*, which is usually called the durative marker, is degraded in root clauses.⁵

Statives denote a continuous reading of the states without relying on any overt aspectual morphology. In the English examples in (42a) and (43a), both stage-level statives and individual-statives can denote the continuation of the state at the utterance time without any overt aspect marking. Individual-level statives and most stage-level statives such as

⁵Tsai (2008) first points out the 'incompleteness' of root clauses with *zhe* and attributes the incompleteness to lack of tense anchoring with *zhe* alone. We do not have a full analysis to *zhe* yet. For a syntactic discussion on *zhe*, readers can refer to Djamouri and Paul (2018) in which they argue that *zhe* is not an aspectual suffix on a par with other aspect markers. For a semantic discussion about *zhe*, see Lin (2002) for details.

'tired' in progressive are infelicitous.

(42) stage-level stative:

- a. John is tired.
- b. *John is being tired.

(43) individual-level stative:

- a. John is tall.
- b. *John is being tall.

(44) a. John is smoking.

- b. John is reading a book.
- c. John is waking up.

Mandarin shows a similar pattern. Individual-level statives and stage-level statives are odd with progressive marker and durative marker, as illustrated by the examples below.

(45) individual-level stative:

- a. Yuehan xianzai hen gao.
John now very tall
'John is now very tall.'
- b. *Yuehan xianzai zai gao.
John now PROG tall
- c. *Yuehan xianzai gao-zhe.
John now tall-DUR

(46) stage-level stative:

- a. Wo xianzai hen lei.
1SG now very tired
'I am very tired now.'
- b. *Wo xianzai zai lei.
1SG now PROG tired
- c. *Wo xianzai lei-zhe.
1SG now tired-DUR

Progressive marking on statives in English and Mandarin can sometimes coerces the statives to bear an activity interpretation. The English cases⁶ in (47) do not describe a regular state but rather have a reading of 'acting to be or trying to be in a certain manner'.

- (47)
- a. Bill is being (very) unreasonable.
 - b. John is being (very) ridiculous.
 - c. Mary is being (very) cautious.
 - d. You are being (very) polite!

Similarly, imperfective markers on statives are in general odd in Mandarin except for statives like *mang* 'busy', shown in (48). But we do not think *mang* 'busy' with imperfective markers is a case of coercion like English because the two readings have different syntactic distributions. The activity reading occurs in contexts where *mang* is modified by the progressive aspect marker ((48b)). The stative usage of *mang* is modified by the degree adverb *hen* 'very' ((48)a). The ungrammaticality of sentences in (49) shows that *mang* 'busy' is better treated as ambiguous between a verb denoting an activity 'be busy doing something/with something' and an adjective denoting a stative reading 'be busy'.

⁶We thank C.-T. James Huang for pointing out these data in our personal communication.

- (48) a. Yuehan **hen** mang.
 John very busy
 'John is very busy.'
- b. Yuehan **zai** mang.
 John PROG busy
 'John is busy doing something.'
- c. ? Yuehan mang **zhe**.
 John busy DUR
 'John is busy with something.'
- (49) a. * Yuehan **zai hen** mang.
 John PROG very busy
- b. * Yuehan **hen mang zhe**.
 John very busy DUR

Sun (2014) observes that when denoting episodic readings, Mandarin root clauses with eventive predicates have to be marked by aspect. Bare activities and accomplishments in (50a) and (51a) are odd. They need to be marked by the progressive marker, shown in (50b) and (51b).

- (50) activity:
- a. ?? Wo xianzai chou-yan.
 1SG now smoke-tobacco.
 'Now I am smoking.'
- b. Wo xianzai **zai** chou-yan.
 1SG now PROG smoke-tobacco.
 'Now I am smoking.'
- c. ? Wo xianzai chou-**zhe** yan.
 1SG now smoke-DUR tobacco.
 'I am smoking.'

(51) accomplishment:

- a. ?? Wo xianzai xie yi-feng xin.
1SG now write one-CL letter
'I am writing a letter.'
- b. Wo xianzai **zai** xie yi-feng xin.
1SG now PROG write one-CL letter
'I am writing a letter.'
- c. ? Wo xianzai xie-**zhe** yi-feng xin.
1SG now write-DUR one-CL letter.
'I am writing a letter.'

Other than the obligatoriness of aspect marking for eventives denoting episodic readings, Mandarin imperfective markers fail to combine with achievements. Though (52a) is grammatical with the imperfective marker *zhe*, it doesn't mean that the achievement event is in progress as its English counterpart means. It means that the continuance of the state of being awake. For other achievements like *si* 'die' and *ying bisai* 'win the match', they are ungrammatical to be marked by imperfective markers, as shown in (53). Therefore, we assume that *xing* is lexically ambiguous between an achievement reading 'wake-up' and a stative reading 'awake'. Mandarin imperfective markers do not select achievements as complements.

- (52)
- a. Xianzai, Yuehan xing-zhe.
now John wake-up-DUR
'Now John is awake.'
 - b. * Xianzai, Yuehan zai xing.
now John PROG wake-up
 - c. Zuotian banye, Yuehan xing le.
yesterday midnight John wake-up PFV

'John woke up yesterday midnight.'

- (53) a. *Ta zai si.
3SG PROG die
- b. *Ta si-zhe.
3SG die-DUR
- c. *Ta zai ying bisai.
3SG PROG win match
- d. *Ta ying-zhe bisai.
3SG win-DUR match

Moreover, English progressive is able to denote futurate readings with future time adverbs while Mandarin can't, shown in the examples below. We will leave the details of the variation about future readings in the next chapter.

(54) activity:

- a. John is meeting with Mary soon.
- b. *Yuehan henkuai zai jian Mali.
John soon PROG see Mary
'John is meeting with Mary soon.'

(55) achievement:

- a. John is leaving tomorrow.
- b. *Ta mingtian zai likai.
3SG tomorrow PROG leave
'He is leaving tomorrow.'

2.2.3. Perfective readings

English does not bear perfective morphology that is distinct from tense morphology. English perfective aspect thus is either treated as a functional category with null morphology or bundles with past tense morphology. English present tense on eventives neither denotes an event-in-progress reading nor an event culmination reading. For example, the sentences in (56a-c) fail to denote episodic interpretations. That is, 'John smokes' cannot mean 'John is smoking' or 'John finishes smoking within the utterance time'. Sentences with statives in (56d-e) means that the state holds at the utterance time and continues. Namely, it is an event-in-progress reading rather than a culminating reading, too.

- (56) a. * John smokes. (episodic reading) (activity)
b. * John writes a letter. (episodic reading) (accomplishment)
c. * John wakes up. (episodic reading) (achievement)
d. John is busy. (stage-level stative)
e. John is tall. (individual-level stative)

The fact that English does not allow present perfective is also reflected in the telephone context, which forces the topic time to overlap with the utterance time, targeting at the episodic present 'tense' reading (Reis Silva and Matthewson 2007). In the context in (57), statives (57a) and eventives with progressive marking in present tense (57b-c) are natural answers while present tensed (if we assume English perfective is morphologically null) or past tensed sentences (if we assume English perfective bundles with past tense) are infelicitous.

(57) Context: Your friend calls you on the phone and asks you to meet with her right now.

You respond by saying 'I can't meet with you right now because...'

- a. I'm hungry.
- b. I'm cooking.
- c. I'm building a house.
- d. # I cook/cooked.
- e. # I build/built a house.
- f. # I wake/woke up.

As we mentioned in the previous section, Mandarin root clauses with eventive predicates have to be aspectually marked when denoting episodic readings. There are two perfective aspect markers in Mandarin: perfective aspect marker *le* and experiential marker *guo*. This dissertation focuses on *le*. Readers can refer to Lin (2006, 2007) for a comparison between Mandarin perfective marker and experiential marker. The perfective aspect marker *le* is a verbal suffix, which is also called *le*₁ in the literature. *le*₁ has a homophone *le*₂, a sentence-final particle whose function is still unclear. We do not distinguish *le*₁ and *le*₂ in eliciting the examples but will specify the two in the glossing.

In the telephone context, similar to English, the most natural answer is marked by progressive marker *zai*, except stage-level stative that do not need any aspect markers. For the sentence with bare stative *lei* 'tired' in (58a), the most natural interpretation is that the state holds at the utterance time and continues. In other words, it is an imperfective reading rather than a perfective one.

(58) Context: *Your friend calls you on the phone and asks you to meet with her right now.*

You respond by saying 'I can't meet with you right now because...'

- a. Wo xianzai hen lei.
1SG now very tired
'I am now very tired.' (stage-level stative)
- b. Wo xianzai zai chou-yan.
1SG now PROG smoke-tobacco.
'Now I am smoking.' (activity)
- c. Wo xianzai zai xie yi-feng xin.
1SG now PROG write one-CL letter
'I am writing a letter.' (accomplishment)

In contrast, the sentences in (59a-c) with perfective aspect marker le_1 are odd in the same context. With the time adverb *xianzai* 'now', eventives with le_1 alone are odd. (59a-b) with le_1 on eventives are only acceptable in the telephone context if a sentence final particle le_2 is added. For sentences with intransitives like *xing* 'wake-up' in (59c), le is not only verb-final but also sentence-final, hence it is possible that this le is a combination of le_1 and le_2 . Even with le_1 and le_2 , the examples in (60) are still odd in the telephone context because they are interpreted as 'it is the result of the past event that is relevant to the reason of my being unable to meet my friend'. This reading is best captured by the English present perfect in the translations of (60) and (59c). This is consistent with the observations in the literature that le_1 on eventives reports a past event (Lin 2003, 2006, Smith and Erbaugh 2005, Bittner 2014, Sun 2014).

(59) Context: *Your friend calls you on the phone and asks you to meet with her right now.*

You respond by saying 'I can't meet with you right now because...'

- a. ?? Xianzai wo chou-le yan.
 now 1SG smoke-PFV tobacco
 (activity)
- b. ?? Xianzai wo du-le yi-ben shu.
 now 1SG read-PFV one-CL book
 'Now I have read a book.'
 (accomplishment)
- c. # Xianzai wo xing-le.
 now 1SG wake-up-PFV
 'Now I have woken-up.'
 (achievement)
- (60) a. Xianzai wo chou-le yan le.
 now 1SG smoke-PFV tobacco SFP
 'I have smoked.'
 (activity)
- b. Xianzai wo du-le yi-ben shu le.
 now 1SG read-PFV one-CL book SFP
 'Now I have read a book.'
 (accomplishment)

Though statives are in general incompatible with progressive marking, many statives (adjectives and mental verbs) can combine with perfective marker *le*₁ to obtain an inchoative reading, as shown in (61) below. Again, like sentences with eventive predicates in (59a-c), the change of state denoted by these sentences culminated before the speaker uttered the sentence.

- (61) a. Xianzai wo zhidao le zhe-jian shi.
 now 1SG know PFV this-CL matter
 'I have gotten to know this matter now.'
- b. Xianzai Hua'r hong le.
 now flower red PFV
 'The flowers has become red.'

From the discussion above, we conclude that both eventives and statives fail to gain

an event culminating reading in present ‘tense’ in English and Mandarin. Perfective on eventives reports past events.

2.2.4. Interim summary

The comparison between English and Mandarin root clauses in present ‘tense’ are summarized in Table 2.1. “∅” means no aspectual marking in Mandarin and no other morphological markings except tense morphology in English. Since individual statives are inherently generic, they are not relevant to episodic readings such as progressive and perfective readings, thus are marked as “NA” in Table 2.1.

Table 2.1: Root clauses in the present ‘tense’: English vs. Mandarin

English Present	GEN		PROG		PFV		Mandarin Present
	English	Mandarin	English	Mandarin	English	Mandarin	
John smokes.	∅ : ✓	∅ : ✓	PROG: -ing	IMPF: <i>zai/?zhe</i>	*	*	Wo chou-yan. 1SG smoke-tobacco
John writes a letter.	∅ : ✓	∅ : ? (adv: ✓)	PROG: -ing	IMPF: <i>zai/?zhe</i>	*	*	Wo xie yi-feng xin. 1SG write one-CL letter
John wakes up.	∅ : ? (adv: ✓)	∅ : ? (adv: ✓)	PROG: -ing	*	*	*	Wo xing. 1SG wake-up
John is busy.	∅ : ? (adv: ✓)	∅ : ? (adv: ✓)	∅ : ✓	∅ : ✓	*	*	Wo hen mang. 1SG very busy 'I am very busy'
John is tall.	∅ : ✓	∅ : ✓	NA	NA	NA	NA	Wo hen gao. 1SG very tall. 'I am very tall.'

The results show more similarities than variations. To express generic interpretations, English relies on tense morphology alone and Mandarin makes use of bare forms of predicates. Other than individual-level statives that are inherently generic, most predicates in both languages need quantificational adverbs or extra context to support a generic reading, especially for Mandarin. To denote episodic readings, Mandarin root clauses with eventives are obligatorily marked by aspect. Both languages require progressive marking to denote event-in-progress reading and fail to denote a culminating reading (perfective

reading) in present ‘tense’.

2.3. The past ‘tense’ readings

The past context in Mandarin is specified by temporal adverbials such as *zuotian* ‘yesterday’ (in an episodic context) or *yiqian* ‘in the past’ (in a generic context). The patterns of root clauses in past ‘tense’ are the same as those in present ‘tense’ for generic readings and progressive readings. Hence we will not repeat the data here.

For perfective readings, stage-level statives in English simple past and past temporal adverbials with stage-level statives in Mandarin are able to describe a scenario in which the states held at the reference time but did not continue, as illustrated in (62). In English, individual-level statives such as *tall* and *smart* in past tense trigger ‘life-time effect’. Past tense inflection on an individual-level stative in (63a) indicates that the state that denotes stable properties and usually lasts through the lifespan of a person does not hold now, which leads to the implicature that the person is dead. In (63b), with past time adverbs, we do obtain the implication that the state of John being tall does not hold now for Mandarin, but that may be because John underwent some life-changing events such as accident, sickness or death. We do not observe a preference for ‘death’ implicature in Mandarin.

(62) stage-level stative:

- a. John was busy yesterday. (English)
- b. Yuehan zuotian hen mang.
John yesterday very busy
‘John was very busy yesterday.’ (Mandarin)

(63) individual-level stative:

a. John was tall. (English)

b. Yuehan yiqian hen gao.
John in-the-past very tall

'John was very tall in the past.' (Mandarin)

2.3.1. The culmination pattern of eventives

Mandarin eventives need to be aspectually marked by le_1 to denote a perfective reading in past 'tense'. Past perfective sentences in Mandarin differ from English in their culmination patterns. Smith (1997, 1999) argues that English perfective activities in past tense are interpreted as terminated events when expressed in isolation, as shown in (64). Examples in (65) show that when conjoined with assertions of continuation, the activity sentences are infelicitous. Mandarin perfective activities are the same. Given the context in (66), the sentence with perfective aspect le_1 in (66a) is infelicitous. In such a context, (66b) with the progressive *zai* is the most natural description.

(64) a. Lily worked.

b. The dancers rehearsed.

(65) a. # Lily worked and she may still be working.

b. # The dancers rehearsed and they may still be rehearsing.

(Smith1999: 488)

(66) Context: *John was smoking 10 minutes ago and kept smoking from then till the time when the speaker uttered the sentence.*

- a. # Yuehan shi fenzhong qian chou-le yan, meiyou jianduan, xianzai
 John ten minute ago smoke-PFV tobacco NEG.PFV break now
 hai zai chou.
 still PROG smoke
 ‘#John smoked 10 minutes ago, now he is still smoking without a break.’
- b. Yuehan shi fenzhong qian zai chou-yan, xianzai hai zai chou.
 John ten minute before PROG smoke-tobacco now still PROG smoke
 ‘John was smoking ten minutes ago and is still smoking.’

Similarly, both English achievements in simple past and Mandarin achievements with *le*₁ entail culmination, as demonstrated by the oddness of cancelling the culmination in (67) and (68) below:

- (67) a. # John won the match and he is still wining.
 b. # John won the match, but he didn’t win. (English)
- (68) a. # Gangcai gongjiaoche dao le, hai zai lai de lu-shang.
 a-moment-ago bus arrive PFV still LOC come DE way-on
 ‘# The bus arrived a moment ago and was/is still on its way.’
- b. # Gangcai gongjiaoche dao le, keshi hai mei-you dao.
 a-moment-ago bus arrive PFV, but still NEG.PERF arrive
 ‘# The bus arrived a moment ago, but still had/has not arrived.’
- c. # Gangcai Yuehan xing le, hai zai xing de guocheng
 a-moment-ago John wake-up PFV still LOC wake-up DE process
 zhong.
 in-middle
 ‘# John woke up a moment ago, and is still in the process of waking up.’
- d. # Gangcai Yuehan xing le, cong na-shi qi hai zai shui.
 a-moment-ago John wake-up PFV from that-time up still PROG sleep
 ‘# John woke up a moment ago, from that time on he is still sleeping.’

(Mandarin)

The two languages show different culmination patterns for perfective accomplishments. English accomplishments in simple past entail culmination in general (shown in (69)) except predicates like those in (70) that allow non-culminating readings. Tatevosov and Ivanov (2009) suggest that the predicates in (70) denote sets of events that are consist of incrementally related but not inherently ordered subevents (see Section 2.9 for details).

- (69) a. # Mrs Ramsey wrote a letter, but she didn't finish writing it.

(Smith 1997: 67-68)

- b. * I built the house for two weeks.

- c. # I opened the door for five minutes (and then gave up).

(From Susan Rothstein, cited from Tatevosov and Ivanov 2009: 121)

- (70) a. Ali plowed the field for two hours (and then went home for lunch).

- b. I read this book for two weeks (before giving up half way through).

- c. I sewed this dress for two days.

(From Susan Rothstein, cited from Tatevosov and Ivanov 2009: 121)

The Mandarin picture is more complex. Three possibilities are observed, shown in the examples below.

- (71) a. Mali guan-le men, keshi men mei guan-shang.
Mary close-PFV door but door NEG.PERF close-tight
'Mary closed the door, but the door was not closed.'

(failed attempt)

- b. Mali xie-le yi-feng xin, keshi meiyou xie-wan.
Mary write-PFV one-CL letter, but NEG.PERF write-finish

'Mary wrote a letter, but didn't finish.'

(partial success)

c. Yuehan da-sui le beizi, #keshi beizi meiyou sui-diao.
John hit-break PFV glass but glass NEG.PERF break-off

'John broke the glass, but the glass didn't break.'

(culmination entailment)

Mandarin accomplishments include at least three subcategories: inherent accomplishments, derived accomplishments and resultative compounds. The possible readings for the three subcategories with le_1 are as follows:

(a) Inherent accomplishments such as *kai* 'open', *guan* 'close', *tuo* 'take off' allow failed attempt readings. Namely, the change of state encoded in the accomplishment does not realize, as illustrated in (71a). Inherent accomplishments are uncommon in Mandarin because modern Mandarin is highly analytic (Huang 2014). The inherent result of an accomplishment is usually overtly realized as a morpheme in the resultative compound.

(b) Mandarin resultative compounds such as *da-sui* 'hit-break', *pao-lei* 'run-tired', *ca-ganjing* 'wipe-clean' consist of two morphemes: the first morpheme describes the action and manner, the second morpheme describes the result. Resultatives marked with le_1 entail culmination, as demonstrated in (71c).

(c) Derived accomplishments take quantized objects which are often incremental themes of the event, such as *chi yi-ge pingguo* 'eat one apple', *xie yi-feng xin* 'write a letter', *du yi-ben shu* 'read a book'. Some derived accomplishments allow partial success readings but not failed attempt readings. Namely, they entail that an affected participant undergoes at least some change. An example is given in (71b). This subcategory overlaps a lot with

the English accomplishments that allow partial success readings. Moreover, the form of the object also play an important role in the ease of obtaining the partial success reading. [Bittner \(2014\)](#) observes that if the object is specified by a numeral *liang* ‘two’, the culmination is entailed and can no longer be cancelled, reproduced in (72a) with our glossing. Though we agree with the judgement of Bittner’s consultants for (72a), some work also reports acceptance of partial success readings with numeral specified objects (A. [Zhang 2018](#)), demonstrated in (72b). However, the bigger the number is, the harder it is to get the partial success reading, as shown by the sentence in (72c).

- (72) a. Wo zuotian xie le liang-feng xin, #keshi mei xie-wan.
 1SG yesterday write PFV two-CL letter but NEG.PFV write-finish
 ‘I wrote two letters yesterday, # but didn’t finish them.’

(Bittner 2014: 251)

- b. Wo chi-le san-ge pingguo, mei chi-wan.
 1SG eat-PFV three-CL apple, NEG.PFV eat-finish
 ‘I ate three apples, but did not finish.’

(Zhang 2018: 190)

- c. Wo chi-le wu-ge pingguo, #mei chi-wan.
 1SG eat-PFV five-CL apple, #NEG.PFV eat-finish
 ‘I ate five apples, but did not finish.’

Without further context, the most natural reading for inherent accomplishments and derived accomplishments marked by le_1 is the event culmination reading. The culmination pattern of inherent accomplishments and resultative compounds is confirmed by experimental work by [Hout et al. \(2017\)](#). [Hout et al. \(2017\)](#) tested seven transitive change-of-state verbs (namely, inherent accomplishments) among Basque, Dutch, English, Spanish and Mandarin: ‘break’, ‘open’, ‘shut’, ‘destroy’, ‘blow out’, ‘cover up’, ‘take off’. The

results show that Mandarin resultative compounds (*qiao-sui* 'hit-break') are firmly rejected for failed attempt readings by adults (20, mean age: 33;5) and 5-year-olds (20, mean age: 5;3). However, there is more acceptance of failed attempt situations in Mandarin inherent accomplishments among 5-year-olds (12%) and adults (38%).

2.3.2. Interim summary

The pattern of past 'tense' in two languages are shown in Table 2.2.

Table 2.2: Root clauses in the past 'tense': English vs. Mandarin

English Past	GEN		PROG		PFV		Mandarin Past
	English	Mandarin	English	Mandarin	English	Mandarin	
John smoked.	∅ : ✓	∅ : ✓	PROG: -ing	IMPF: <i>zai/?zhe</i>	∅ : ✓	PFV: <i>le/guo</i>	Yuehan chou-yan. John smoke-tobacco
John wrote a letter.	∅ : ✓	∅ : ? (adv: ✓)	PROG: -ing	IMPF: <i>zai/?zhe</i>	∅ : ✓	PFV: <i>le/guo</i> (non-culminating accomplishments)	Yuehan xie yi-feng xin John write one-CL letter
John woke up.	∅ : ? (adv: ✓)	∅ : ? (adv: ✓)	PROG: -ing	*	∅ : ✓	PFV: <i>le/guo</i>	Yuehan xing John wake-up
John was busy.	∅ : ✓	∅ : ✓	∅ : ✓	∅ : ✓	∅ : ✓	∅ : ✓	Yuehan hen mang. John very busy 'John was very busy.'
John was tall.	∅ : ✓ (lifetime effect)	∅ : ✓ (lifetime effect)	NA	NA	NA	NA	Yuehan hen gao. John very tall. 'John was very tall.'

The same as the pattern in present 'tense', English simple past and Mandarin bare eventives can denote generic readings, which usually require quantificational adverbs and the right contexts. Individual statives in past 'tense' trigger the life-time effect, indicating that the property of the subject no longer holds at the utterance time. Unlike English life-time effect that implicates death in past tense, Mandarin just implicates that the situation no longer holds at present when a past context is provided for an individual-level stative. Individual-level predicates are generic in nature, hence they are not applicable for a past progressive reading or an episodic culmination interpretation (marked as NA in Table 2.2).

Event-in-progress readings need to be marked by progressive in both languages. The

main difference between English and Mandarin in the past ‘tense’ is that English accomplishments in simple past entail culmination except for predicates that involve a homogeneous activity affecting an incremental theme. Mandarin accomplishments in the past ‘tense’ with perfective aspect le_1 yield culmination entailment or implicature (i.e. non-culminating interpretations are possible) depending on the subtype of accomplishments and the form of objects.

2.3.3. Generalizations

The full picture of root clauses in present ‘tense’ and past ‘tense’ in English and Mandarin is summarized in Table 2.3.

Table 2.3: Root clauses in the present and past ‘tense’: English vs. Mandarin

English Present	GEN		PROG		PFV		Mandarin Present
	English	Mandarin	English	Mandarin	English	Mandarin	
John smokes.	∅ : ✓	∅ : ✓	PROG: -ing	IMPF: <i>zai/?zhe</i>	*	*	Wo chou-yan. 1SG smoke-tobacco
John writes a letter.	∅ : ✓	∅ : ? (adv: ✓)	PROG: -ing	IMPF: <i>zai/?zhe</i>	*	*	Wo xie yi-feng xin. 1SG write one-CL letter
John wakes up.	∅ : ? (adv: ✓)	∅ : ? (adv: ✓)	PROG: -ing	*	*	*	Wo xing. 1SG wake-up
John is busy.	∅ : ? (adv: ✓)	∅ : ? (adv: ✓)	∅ : ✓	∅ : ✓	*	*	Wo hen mang. 1SG very busy 'I am very busy'
John is tall.	∅ : ✓	∅ : ✓	NA	NA	NA	NA	Wo hen gao. 1SG very tall. 'I am very tall.'
English Past	GEN		PROG		PFV		Mandarin Past
	English	Mandarin	English	Mandarin	English	Mandarin	
John smoked.	∅ : ✓	∅ : ✓	PROG: -ing	IMPF: <i>zai/?zhe</i>	∅ : ✓	PFV: <i>le/guo</i>	Yuehan chou-yan. John smoke-tobacco
John wrote a letter.	∅ : ✓	∅ : ? (adv: ✓)	PROG: -ing	IMPF: <i>zai/?zhe</i>	∅ : ✓	PFV: <i>le/guo</i> (non-culminating accomplishments)	Yuehan xie yi-feng xin John write one-CL letter
John woke up.	∅ : ? (adv: ✓)	∅ : ? (adv: ✓)	PROG: -ing	*	∅ : ✓	PFV: <i>le/guo</i>	Yuehan xing John wake-up
John was busy.	∅ : ✓	∅ : ✓	∅ : ✓	∅ : ✓	∅ : ✓	∅ : ✓	Yuehan hen mang. John very busy 'John was very busy.'
John was tall.	∅ : ✓ (lifetime effect)	∅ : ✓ (lifetime effect)	NA	NA	NA	NA	Yuehan hen gao. John very tall. 'John was very tall.'

Now we obtain a general idea about non-future interpretations in English and Mandarin. The detailed comparison between the two languages confirm a generalization made in the literature on Mandarin temporal interpretation (Klein et al. 2000, Tsai 2008,

Bittner 2014, Sun 2014). That is, it is empirically untenable to claim that Mandarin bare predicates on their own are sufficient to obtain the desired temporal interpretation. We confirm the observations by Klein et al. (2000), Tsai (2008), Sun (2014) among others that the Mandarin bare predicates in root clauses is constrained in a similar way as English does. Bare predicates that are grammatical in root clauses are either statives or eventives aiming for a generic reading, usually with the help of quantificational adverbs and contexts.

An interesting parallelism between the two languages is the lack of present perfective reading (i.e. the event culminates in the moment of utterance), which we will soon offer an analysis in the next section. An interesting contrast between English and Mandarin is that Mandarin not only allows partial success readings and culmination entailment of perfective accomplishments as English does, but also allow failed attempt reading. These patterns are correlated to the properties of the eventuality. Section 5 is devoted to a closer investigation on these properties.

Another two systematic differences between English and Mandarin in non-future interpretations concern aspect. English imperfective aspect is independently realized while perfective aspect is not. Mandarin aspects, on the contrary, are overtly realized as imperfective aspect and perfective aspect markers, which obligatorily mark eventives for episodic readings in root clauses. Moreover, English progressive can mark many achievements while Mandarin progressive does not in general. Last but not least, English progressive forms on eventives can denote future reading while Mandarin progressive forms on eventives do not.

2.4. Previous analyses

Temporal interpretations in a superficially tenseless language have long been the interest of linguists. Though there is a large body of works on the interaction among temporal interpretations, aspect markers and aspectual classes in Mandarin (Chao 1968, Li and Thompson 1981, Kong 1986, Huang 1988, X. Liu 1988a, Y. Liu 1988b, Dai 1994, Smith 1997, Klein et al. 2000, J.-W. Lin 2003, 2006, Wu 2003, Smith and Erbaugh 2005, Bittner 2014, Sun 2014 among many others), which are impossible and probably unrewarding to review all in details, there are not many analyses in a formal framework that thoroughly investigate the language in a systematic manner.

In this section, we review four analyses that provide a formal account for Mandarin temporal interpretations based on (relatively) comprehensive investigations of root clauses: the telicity-dependent approach (Lin 2006), boundedness-dependent approach (Smith and Erbaugh 2005, Smith 2008), the aspect-based dynamic approach (Bittner 2014) and the non-future tense approach (Sun 2014). Sun (2014) only discuss temporal interpretations in root clauses with bare predicates, while the remaining three analyses also discuss temporal interpretations in embedded clauses. Moreover, Smith and Erbaugh (2005) and Bittner (2014) investigate temporal construals in narrative discourses. For the purpose of this dissertation, the review of these approaches is not exhaustive but selective in illustrating only the relevant proposals on root clauses that are directly related to the current discussion.

2.4.1. J.-W. Lin (2006): A telicity-dependent approach

J.-W. Lin (2006) claims that Mandarin has neither a semantic tense nor a syntactic tense. Lin's proposal has two prominent components: a. deriving temporal readings of "tenseless" VPs via the assumption of "Default Viewpoint Aspect"; b. treating Mandarin perfective aspect (including perfective aspect marker and experiential marker) as a tense-aspect-particle.

Bohnenmeyer and Swift (2004) investigate the correlation between telicity of the predicates and their aspectual references in German, Inuktitut and Russian. Following Klein (1994), Bohnemeyer and Swift (2004) define perfective and imperfective as in (73).

- (73) a. $PRV: = \lambda P \lambda t_{TOP} \exists e [P(e) \wedge \tau(e) \leq_T t_{TOP}]$
b. $IMPF: = \lambda P \lambda t_{TOP} \exists e [P(e) \wedge t_{TOP} <_T \tau(e)]$

(Bohnenmeyer and Swift 2004: 280)

" \leq_T " stands for the temporal inclusion relation in (73a), equivalent to " \subseteq " in many other analyses including ours. Similarly, " $<_T$ " is equivalent to " \subset ". The perfective aspect encodes inclusion of the temporal trace of the event and gives rise to the realization of the whole event. The imperfective aspect requires that the topic time is within the runtime of the event, hence only entails partial realization of the event. Via a scalar implicature mechanism on 'event realization', they argue that aspectually unmarked sentences with telic predicates have a default perfective view point aspect while atelic predicates have a default imperfective view point aspect. Based on Bohnemeyer and Swift (2004), J.-W. Lin's proposal of Default Viewpoint Aspect works as follows. Firstly the default view

point aspect of telic predicates (i.e. accomplishments and achievements) is perfective and the default view point aspect of atelic predicates (i.e. states and activities) is imperfective. Secondly, if the default topic time is the utterance time ($t_{\text{top}} = s^*$), imperfective aspect corresponds to present reading and perfective aspect corresponds to past reading. In J.-W. Lin (2006), the denotations of perfective and imperfective aspect are demonstrated as in (74). Though J.-W. Lin's proposal is not formulated with neo-Davidsonian semantics, the denotations in (74) can be easily reformulated as in (75).

- (74) a. PFV: = $\lambda P_{\langle i,t \rangle} \lambda t_{\text{Top}} \lambda t_0 \exists t [t \subseteq t_{\text{Top}} \wedge P(t) \wedge t_{\text{Top}} < t_0]$
 b. IMPF: = $\lambda P_{\langle i,t \rangle} \lambda t_{\text{Top}} \exists t [t_{\text{Top}} \subset t \wedge P(t)]$

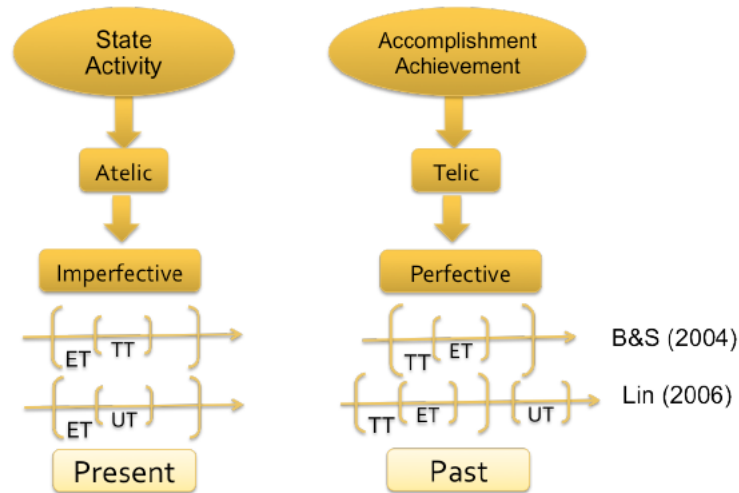
(J.-W. Lin 2006: 6)

- (75) a. PFV: = $\lambda P_{\langle v,t \rangle} \lambda t_{\text{Top}} \lambda t_0 \exists e [P(e) \wedge \tau(e) \subseteq t_{\text{Top}} \wedge t_{\text{Top}} < t_0]$
 b. IMPF: = $\lambda P_{\langle v,t \rangle} \lambda t_{\text{Top}} \exists e [P(e) \wedge t_{\text{Top}} \subset \tau(e)]$

The most obvious difference between (75) and (73) is that the perfective aspect in (75a) is treated as a tense-aspect-particle. On the one hand, the tense-aspect-particle maintains the inclusion relation between the event time and the topic time ($\tau(e) \subseteq t_{\text{Top}}$) as a classic perfective aspect does. On the other hand, it also adds a precedence constraint on the relation between the topic time and an evaluation time t_0 that needs to be supplied by the context or by overt elements in the sentence ($t_{\text{Top}} < t_0$), like a past tense in tensed languages does. Sun (2014) depicts J.-W. Lin's proposal of default view point aspect in the flow chart in Figure 2.1.

In Figure 2.1, B & S (2004) stands for the proposal by Bohnemeyer and Swift (2004), which adopts a standard treatment of perfective and imperfective aspect (ET = Event

Figure 2.1: Default Viewpoint Aspect



(Sun 2014: 80)

Time, TT = Topic Time). J.-W. Lin’s proposal supplies the topic time with utterance time (UT = Utterance Time) in imperfective aspect and yields a present continuous reading. The case for perfective requires the event time to be within the topic time and the topic time to precede the utterance time, obtaining a past reading. It is important to note that even J.-W. Lin (2006) claims that Mandarin is a tenseless language without a T node in syntax or a tense operator in semantics, the analysis he proposes is still a tensed analysis because the grammar still encodes the constraints on the relation between the topic time and the utterance time via the tense-aspect-particle. Matthewson (2006) comments that if Lin’s proposal is on the right track, Mandarin is a tensed language in which tense bundles with other elements instead of being independently expressed by a tense morpheme. J.-W. Lin (2006) suggests that the default view point aspect and a tense-aspect-particle treatment of perfective aspect are adequate to capture the data below.

- (76) a. Zhangsan hen mang.
Zhangsan very busy

'Zhangsan is very busy.'

- b. Ni da lanqiu ma?
you play basketball Q
'Do you play basketball?'

(77) a. Zhangsan dapuo yi-ge huaping.
Zhangsan break one-CL vase
'Zhangsan broke a vase.'

- b. Ta dai wo qu taibei.
he take me go Taipei
'He took me to Taipei.'

(J.-W. Lin 2006: 3)

J.-W. Lin (2006) suggests that predicates in (76) are atelic (*mang* 'busy' denotes a state and *da lanqiu* 'play basketball' denotes an activity) and the sentences obtain a present reading. The predicates in (77) are telic (*da-po yi-ge huaping* 'break a vase' denotes an achievement and *dai wo qu taibei* 'take me to Taipei' is an accomplishment) and the sentences obtain a past reading.

But the telicity-dependent proposal does not make the right predictions. Recall that in the previous sections, we confirm the generalization that in root clauses, eventives denoting an episodic reading are marked by aspect obligatorily (Klein et al. 2000, Sun 2014). Bare eventives in a root clause either yield generic readings or are ill-formed if no quantificational adverbs or extra contextual information exists. This generalization is not captured by the telicity-dependent approach. Firstly, as Sun (2014) points out, even though both sentences in (76) denote a present reading, (76a) denotes a episodic reading and (76b) denotes a generic reading, which is not captured by the telicity-dependent approach. Sec-

only, the observation that bare telic predicates obtain a past reading is problematic. Sun (2014) points out that the grammaticality of the sentence in (77a) is controversial. Some speakers do not accept it while some speakers do. For those who accept this sentence, still a perfective aspect marker is preferred. For the sentence in (77b), though a past tense reading is available or marginal for our consultants, a more prominent future-oriented reading is obtained, sharing the same judgement with the Mandarin speakers that Sun (2014) consulted. Namely, the sentence in (77b) means “he will take me to Taipei” instead of “he took me to Taipei”. It is noteworthy that the predicate in (77b) is a verb series construction with the verb *qu* ‘go’, which is common to encode future eventualities in many other languages (Sun 2014). For the speakers that Sun (2014) consulted, the past episodic reading can only be obtained by adding an aspect marker *le*₁ or *guo*, as shown in (78).

- (78) Ta dai wo qu le/guo taibei.
 3SG take 1SG go PFV/EXP Taipei.
 ‘He took me to Taipei.’ (Sun 2014: 82)

Thirdly, the telicity-dependent approach says nothing about the restrictions on compatibility with temporal adverbs for stative sentences or derived stative sentences (bare eventives denoting generic readings). Sun (2014) observes that bare stative predicates and bare eventive predicates can be modified by past or present time adverbs, but cannot combine with future time adverbs freely. Some bare sentences allow future-oriented readings with future time adverbs, others require an overt modal. For example, the stative sentences in (79) and (80) can combine with present time adverbs *xianzai* ‘now’ and *zhei-ji-ge-yue* ‘these months’ or past time adverbs *gangcai* ‘just now’ and *nianqing shi* ‘when someone is young’, but cannot combine with future time adverbs *mingtian* ‘tomorrow’

and *mingnian* ‘next year’ without a future modal such as *hui* and *jiang*.

- (79) a. Lulu xianzai hen jusang.
Lulu now very frustrated
‘Lulu is very frustrated now.’
- b. Lulu gangcai hen jusang.
Lulu just.now very frustrated
‘Lulu was very frustrated just now.’
- c. Mingtian Lulu ***(hui)** hen jusang.
tomorrow Lulu MOD very frustrated
‘Tomorrow, Lulu will be very frustrated.’ (states)

(Adapted from Sun 2014: 163-165)

- (80) a. Gulong zhei-ji-ge-yue chouyan.
Gulong this-many-CL-month smoke
‘Gulong smokes these months.’
- b. Gulong nianqing shi chouyan.
Gulong youth time smoke
‘Gulong used to smoke when he was young.’
- c. Mingnian Zhongguo dui ***(jiang)** hen-shao shu-qiu.
next.year China team MOD very-few lose-ball
‘The Chinese team will rarely lose next year.’ (habituals)

(Sun 2014: 168-171)

In summary, the telicity-dependent approach correctly captures the temporal interpretations of bare statives when there is no time adverb in the sentence. Namely, without any time adverbs, the default interpretation for a stative sentence is the present reading. But this approach does not make the correct predictions for eventives: the correlation be-

tween aspect marking and episodic readings is not captured. Moreover, the non-future temporal constraints on time adverbs for stative sentences is not born out.

2.4.2. **Smith and Erbaugh (2005): A boundedness-dependent approach**

The boundedness-dependent approach is similar to the telicity-dependent approach in several ways, but it provides more flexibilities. Smith and Erbaugh (2005), Smith (2008) suggest that Mandarin is a tenseless language in which aspectual, lexical, adverbial information and pragmatic principles all contribute to the interpretation of temporal location. ‘Tense’ in Smith and Erbaugh (2005), Smith (2008) means morphological tense instead of a semantic tense operator. They claim that in the absence of explicit temporal forms (aspect markers not included), aspectual viewpoint (perfective, imperfective, neutral etc.) and situation types (states, activities, accomplishments, achievements, semelfactives⁷) determine the default pattern of interpretation. Contexts, lexical and adverbial information (future-oriented modals, future oriented verbs, time adverbs, aspectual adverbs etc.) can lead to non-default interpretations. The default pattern of interpretation (also called a ‘temporal schema’ by Smith and Erbaugh 2005) is as below.

- (81) a. Unbounded situations are located in the present.
- b. Bounded events are located in the past.

⁷Semelfactives refers to atelic instantaneous eventualities such as *cough* and *flap a wing*. Semelfactives are different from achievements because achievements involve an endpoint of the event, but semelfactives do not. For example, the achievement ‘reach the top’ ends as soon as the agent arrives at the top, but the semelfactive *cough* consists of a series of instantaneous actions of coughing, which can end if the agent coughs once or continue like an activity without an endpoint.

According to Smith and Erbaugh (2005), bounded situations are temporally closed by implicit or explicit bounds while unbounded situations are ongoing, temporally open. Zero-marked sentences have a neutral viewpoint aspect that gives enough information to allow either an open or a closed interpretation. The concept of boundedness depends on both aspectual viewpoint and situation type (aspectual class). Specifically, atelic eventualities and verb constellations marked by imperfective markers are unbounded. Telic eventualities and verb constellations marked by perfective markers are bounded. Semelfactives denote single-stage events and each single stage is a bounded situation. Therefore, the default temporal interpretation for semelfactives is the past reading. From the way of defining boundedness and the default interpretation pattern in (81), the boundedness approach is similar with the telicity approach. The flexibility provided by the boundedness approach is that (81) offers the default interpretation of zero-marked clauses, but additional information in a clause can override the default, as the “Temporal schema principle” in (82) illustrates.

(82) Temporal schema principle:

In a zero-marked clause, interpret a verb constellation according to the temporal schema of its situation type, unless there is explicit or contextual information to the contrary.

For example, Smith and Erbaugh (2005) suggests that if a telic event is expressed in a context suggesting the present, it may be taken as future or an ongoing present interpretation. The verb in (83b) is the remnant of an ellipsis process, which stands for a telic

event 'go to school'⁸ Smith and Erbaugh (2005) argue that the zero-marked telic event clause has an ongoing present interpretation or a future reading in answer to a question that explicitly expresses an ongoing event. The default past reading of a telic event is overridden by the context.

(83) A: Women (jintian) qu bu qu xuexiao?
1PL today go NEG go school?
'Are we going to school (today)?'

B: Qu.
go
'[We're] going.' (Adapted from Smith and Erbaugh 2005: 729)

Though the boundedness-dependent approach by Smith and Erbaugh (2005) has more flexibilities than the telicity-dependent approach, it still faces the same problems. This approach says nothing about the correlation between aspect marking and episodic readings. Even though Smith and Erbaugh (2005) state that generic/habitual readings of constructions modified by quantificational phrases such as *mei-ci* 'every time', *changchang* 'often' are stative and thus obtain a present reading, the possibility of generic readings with bare eventives is not considered. Also, the boundedness approach will allow future time adverbs to override the default reading of stative sentences, which is not true since there is a non-future constraint on time adverbs for stative sentences.

⁸The original example in Smith and Erbaugh (2005) is *qu* 'go'. But this example is difficult to be taken as a zero-marked telic event. Hence we replace it with *qu xuexiao* 'go to school'.

2.4.3. Bittner (2014): An aspect-based dynamic approach

Bittner (2014) analyzes temporal references in Mandarin direct speech and indirect speech discourses in a compositional framework that combines Categorical Grammar with a dynamic logic. The framework she adopts is quite different from other analyses reviewed in this section. It goes far beyond our current goal to compare the dynamic framework with other formal frameworks since they go with completely different assumptions and theoretical techniques: e.g. a Mandarin sentence is a unit of discourse, not a syntactic sentence; aspectual classes are classified in a non-Vendler way; perfective aspect *le* is analyzed as a punctual aspect that picks out a significant point (the culmination point or the start point) of the top-ranked eventuality with a significant point of the topic state etc. However, Bittner's work reveals important insights that are relevant for the TAM system of Mandarin root clauses. We try to summarize the relevant observations by Bittner (2014) without getting too much involved in the technical details.

Bittner (2014) suggests that tensed systems (e.g. English and Polish) draw the main cut between past versus non-past reference, whereas tenseless systems (e.g. Mandarin and Kalaallisut) draw it between non-future versus future reference. A Mandarin sentence marked by a full stop is an aspectual topic-comment sequence. It introduces a state as a topic (topic state), followed by one or more comments. Reference to the future of the speech act in the speech world can be expressed by means of a context-setting temporal noun that can introduce a future time interval such as *mingtian* 'tomorrow'. Though Bittner offers an analysis for future sentences with and without future modals (termed as prospective modal (PRE) in Bittner 2014) in (84), it is unclear why statives and

generic eventives in (79) and (80) are odd even with future time adverbs, which in principle should be good according to Bittner's proposal. Moreover, not all eventives are able to license a future reading with time adverbs alone (see details in the forthcoming review of Sun 2014), a fact which is not captured in Bittner (2014).

- (84) a. Lisi mingtian yingjing likai le Nanjing.
 Lisi tomorrow already leave PNC Nanking
 'Lisi will have already left Nanking by tomorrow.'

(Wu 2003, cited from Bittner 2014: 254)

- b. Gang da shui-shen, na haizi kuai yao moding le.
 urn big water-depth that kid soon PRE drown PNC
 'The urn contained a lot of water, and soon the child was drowning.'

- c. Lisi hui dai ta qu kan yisheng.
 Lisi PRE carry her go see doctor
 'Lisi is going to take her to a doctor.'

(Bittner 2014: 254-255, her glossing)

2.4.4. Sun (2014): A NONFUT tense approach

Sun (2014) investigates temporal interpretations of bare predicates in Mandarin root clauses and makes the following generalizations:

- (85) a. Root clauses with no overt aspect describe states or report regularities.
 b. All stative predicates can appear without aspect.
 c. Eventive predicates that appear without overt aspect cannot have their temporal reference fixed by an adverb alone.

- d. Bare stative predicates and bare eventive predicates denoting states or derived states (habitual readings) can be modified by past or present time adverbs, but cannot combine with future time adverbs freely.
- e. Some bare sentences allow future-oriented readings with future time adverbs, others require an overt modal.

The generalizations in (85a-c) are reconfirmed in our comparison between English and Mandarin in previous sections. To account for the above generalizations, Sun (2014) proposes a tensed analysis with the following components:

- (86) a. Statives denote a property of time while eventives denote a property of eventualities.
- b. Eventives denoting episodic readings are obligatorily marked by aspect in Mandarin.
- c. Constructions with bare eventives denoting a generic reading has a covert operator Q that quantifies over eventualities and yields the generic reading.
- d. Constructions with bare eventives denoting a future reading has a covert future modal PLAN to shift the topic time to the future.
- e. Mandarin has a morphologically null tense, NONFUT, which constraints the context-salient time supplied for the sentence to be non-future intervals.

In Chapter 1, we have already stated the problems of treating statives as propositional. Therefore, we will not repeat our arguments here. Now let us take a closer look at NONFUT. Following Matthewson's (2006) proposal for St'át'imcets, Sun accounts for the

generalization in (85e) by defining a non-future tense as in (87):

$$(87) \quad \llbracket \text{NONFUT} \rrbracket^{s,c} = \lambda t : t < t_c \text{ or } t \supseteq t_c. t$$

A non-future tense in (87) takes in a time argument and returns the same argument if this time satisfies the presupposition: it precedes a context salient time t_c or includes t_c . The first component of the disjunction in the presupposition corresponds to a past tense reading and the second component of the disjunction corresponds to a present tense reading. The non-future tense makes a distinction between future and non-future, but is unspecified between past and present. This constraints the time adverbs in a stative sentence to be in the past or present, but not future.

For those sentences that can denote a future oriented reading without any overt future modals, which is termed as “futures” (Smith 1991, Copley 2002 among others), Sun follows Copley (2002, 2009) and argues that Mandarin contains a covert future modal PLAN in these cases. Though Sun does not provide the exact denotation of PLAN, she points out that like futurate sentences in English and French, Mandarin futurate sentences also require the eventuality to be plannable and under control, as illustrated by the sentences below.

- (88) a. The Red Sox play the Yankees tomorrow.
b. # The Red Sox defeat the Yankees tomorrow.
c. The Red Sox **will** defeat the Yankees tomorrow.

(Copley 2009: 15-20)

- (89) a. Zhongguo dui mingtian bisai.
China team tomorrow play

'The Chinese team plays tomorrow.'

- b. # Zhongguo dui mingtian ying.
China team tomorrow win

Intended: 'The Chinese team will win tomorrow.'

- c. Zhongguo dui mingtian **hui** ying.
China team tomorrow FUT win

'The Chinese team will win tomorrow.'

(Adapted from Sun 2014: 218)

In (88a) and (89a), an event of 'The Red Sox play the Yankees' or 'The Chinese team plays' can be scheduled, but the result of the match in (88b) and (89b) is usually unable to be planned. These cases are infelicitous with a future reading without a modal. However, the overt future modal does not have such a restriction on the type of eventualities, as the sentences in (88c) and (89c) demonstrate. This constraint on eventualities is due to the semantics of the covert future modal PLAN.

Sun's analysis for Mandarin is appealing in covering a large amount of empirical facts that are not covered by previous tenseless analyses and creating the connection between superficially tenseless languages (St'át'imcets, Gitksan, Blackfoot, to name just a few) and tensed languages. But this analysis also faces challenges.

One challenge comes from plural eventualities that do not allow different temporal locations, in contrast to the prediction of a non-future tense. Sun (2014) suggests that some sentences with plural eventualities located in more than one temporal location (PEDT henceforth), as shown in (90). The English translations are provided by us, which are not presented in the original sentences from Sun (2014).

- (90) a. Niudun he Huojin dou dui wuli ganxingqu.
 Newton and Hawking DOU to physics interest
 'Newton was interested in physics and Hawking is interested in physics.'
- b. Gulong he Moyan dou chouyan.
 Gulong and Moyan DOU smoke
 'Gulong smoked and Moyan smokes.'
- c. Qian-tian he jintian Lulu dou hen jusang.
 before-day and today Lulu DOU very frustrated
 'Lulu was very frustrated the day before yesterday and she is very frustrated today.'

(Adapted from Sun 2014: 205)

The subjects of the first two examples in (90) are in the form of coordinating a deceased person (*Newton* and *Gulong*) and a living one (*Hawking* in 2014 and *Moyan*). We call this type of constructions 'PEDT with coordinated subjects', abbreviated as 'Subject PEDT'. Sun claims that (90a) can be truthfully uttered in 2014 to convey that Newton was interested in physics (during his lifetime in the 17th-18th century) and Hawking is interested in physics throughout a period including the utterance time in 2014.

Similarly, (90b) means Gulong smoked (during his lifetime in the 20th century) and Moyan smokes in a period including the present. The sentence in (90c) bears an adjunct which is a coordination of a past time adverb and a present time adverb, which can specify the runtime of a state denoted by the single predicate in the sentence. We term this type of constructions 'PEDT with coordinated adjuncts', abbreviated as 'Adjunct PEDT'. Sun suggests that the examples in (90) support a non-future tense analysis for Mandarin rather than two covert tenses (present tense and past tense) because the latter does not allow two

different temporal locations. This is verified by the fact that the English counterparts of the sentences in (90) cannot use either present or past tense inflection on the predicate.

The problem arises when it comes to the following sentences with a similar construction as those in (90a-b).

- (91) a. Huojin he Yang Zhenning dou hen lei.
Hawking and Yang Zhenning DOU very tired
'Hawking and Zhenning Yang were tired./# Hawking and Zhenning Yang are tired./# Hawking was tired and Zhenning Yang is tired.'
- b. John he Fred dou hen e.
John and Fred DOU very hungry
'John and Fred are very hungry./John and Fred were very hungry./# John was very hungry and Fred is very hungry.'

The sentence in (91a) also involves a coordination structure with one deceased person and one living person as the subject. The only difference is that the predicate is a stage-level predicate *hen lei* 'very tired' while the predicates in (90a-b) are both individual-level predicates which denote stable, long-lasting properties. In principle, if the non-future tense in (87) is able to provide a non-future interval that can fit in a past state and a present state, we would predict (91a) to be felicitous as the sentences in (90a-b). But as long as we know that Hawking passed away in 2018 and Zhenning Yang is alive in 2020, (91a) is odd. (91a) can only be felicitous if we are talking about a time in the past (corresponding to the English sentence 'Hawking and Zhenning Yang were very tired') but not a state of being tired at the utterance time. Moreover, it does not allow different temporal locations (corresponding to the English sentence 'Hawking was very tired and Zhenning Yang is

very tired'), showing a different pattern from the sentences in (90).

The sentence in (91b) is the Mandarin counterpart of St'át'imcets (92a) given the context in (92). St'át'imcets is argued to bear a non-future tense which provides a large enough interval to cover both a stretch of time in the past as well as the time of the utterance. In a context depicted below, the stative predicate can be bare or optionally marked by an imperfective aspect marker *wa7*. Interestingly, (92a) can denote two starving states at different time while the Mandarin sentence in (92b) cannot.

(92) Context: Last year, John didn't go fishing, so he had no dried salmon last winter. Then summer came, and he went fishing. He got a lot of dried salmon. Fred didn't go fishing, so Fred has no dried salmon now.

- a. (wa7) zúqw-cen s-John múta7 s-Fred
(IMPF) die-foot NOM-John and NOM-Fred
'John and Fred were/are starving.' (not at the same time).

(Matthewson 2006: 682)

- b. # John he Fred dou hen e.
John and Fred DOU very hungry
'John and Fred are very hungry./John and Fred were very hungry./#John was very hungry and Fred is very hungry.'

The sentences in (92) suggest that some piece of argumentation is missing in Sun's proposal. On the one hand, if Sun is on the right track, NONFUT in Mandarin is more constrained than the one in St'át'imcets. What makes different time locations available for (90) has to be blocked in sentences in (91). The question is why and how. On the other hand, the sentences in (91) perform the same pattern as English does, as demonstrated in

(93). The constraint of either present or past interpretations seem to support the two-null-tense approach which is rejected by Sun based on the sentences in (90).

- (93) a. Hawking and Zhenning Yang #are/were very tired.
b. John and Fred are/were starving. (at the same time)

Now we see the tension between the two sets of data. The first set of data in (90) (Subject PEDT and Adjunct PEDT) favors a non-future tense approach. The second set of data in (91) challenges the non-future tense account and seems to favor a two-null-tenses approach. This tension is not resolved by Sun's proposal.

2.4.5. Interim summary

In this section, we have reviewed three tenseless accounts and one tensed proposal for Mandarin. The telicity-dependent approach and boundedness-dependent approach correctly capture the temporal interpretations of stative predicates. The aspect-based dynamic approach observes the cut between future and non-future. But the tenseless accounts fail to capture the constraints on temporal adverbs with stative sentences and the relation between aspect marking and episodic readings.

The non-future tense approach does capture the future vs. non-future distinction shown by the constraints on time adverbs in stative sentences. But the analysis proposed by Sun (2014) is inadequate to account for the fact that some stative sentences with plural eventualities allow different temporal locations while some prohibit such a reading. The

pattern of plural eventualities is summarized in (94).⁹

- (94) a. Sentences with individual-level statives allow Subject PEDT.
b. Sentences with stage-level statives disallow Subject PEDT.
c. Sentences with stage-level statives allow Adjunct PEDT.

In summary, previous discussion reveals three properties of Mandarin root clauses that call for a comprehensive analysis, summarized as in (95). In the next section, we investigate the potentials of the non-future tense approach and the two-null-tense approach in accounting for these phenomena.

- (95) a. Lack of present perfective: perfective marker *le*₁ reports a past event and is incompatible with present ‘tense’.
b. Non-future constraints on time adverbs: temporal adverbs on stative sentences (including lexical statives and derived statives such as habituals) are restricted to present or past time adverbs. Future time adverbs cannot be selected freely.
c. PEDT is licensed in coordinated adjuncts with stage-level statives and coordinated subjects with individual-level statives, but is blocked in coordinated

⁹Bare eventives denoting generic readings are also individual-level statives. Hence generic sentences also show the same pattern, as shown in the example in (90b). Individual-level statives in general are odd when modified by temporal adverbs (Chierchia 1995), especially those that denote short intervals, demonstrated by the examples below. Hence we do not consider structures with individual-level statives and a coordinated adjunct consisting of different time adverbs.

- (1) a. ?? John was tall yesterday/last month/a year ago. (Chierchia 1995: 177)
b. # Zuo₁tian Gulong (jingchang) chouyan.
yesterday Gulong often smoke-cigarette

(Sun 2014: 138)

subjects with stage-level statives.

2.5. Analysis 1: Extension of St'át'imcets-like NONFUT to Mandarin

This section focuses on how the two approaches, i.e. the non-future tense approach vs. the two-null-tense approach, account for Mandarin PEDT, a mixed picture intertwined with the properties of predicates.

2.5.1. Reinterpretations of Matthewson (2006) for St'át'imcets with NON-FUT

Sun's (2004) proposal about non-future tense is inspired by Matthewson's (2006) treatment for St'át'imcets¹⁰. The imperfective aspect morpheme is the auxiliary *wa7* in St'át'imcets, shown by the sentence in (96a). When a sentence is not marked by *wa7*, Matthewson (2006) argues that it is marked by a morphologically null perfective aspect, which denotes a culminating reading. If the predicate shows the subinterval property,¹¹ which Matthew-

¹⁰The abbreviations for St'át'imcets in Matthewson (2006) are summarized below: CONJ = conjunctive subject, DET = determiner, ERG = ergative, IMPF = imperfective, MOD = modal, NEG = negation, NOM = nominalizer, OBJ = object, PL= plural, POSS = possessive, SG = singular, SUBJ= indicative subject

¹¹The sub-interval property is defined as in (1).

(1) A predicate *p* of times has the subinterval property iff for all times *t*, for all subintervals *t'* of *t*, the truth of *p*(*t*) entails the truth of *p*(*t'*). (Dowty 1979)

Matthewson (2006) argues that other than statives and activities, accomplishments in St'át'imcets also possess the sub-interval property because they do not entail culmination when marked by the null perfective aspect. For more details, please refer to Matthewson (2006).

son (2006) claims to apply for statives, activities and accomplishments in St'át'imcets, the sentence marked with the null perfective aspect can also denote a progressive reading, demonstrated by the example in (96b).

- (96) a. (wa7) zúqw-cen s-John múta7 s-Fred
 (IMPF) die-foot NOM-John and NOM-Fred
 'John and Fred were/are starving.' (not at the same time).

(Matthewson 2006: 682)

- b. matq [kw s-Mary].
 walk [DET NOM-Mary]
 'Mary walked /Mary is walking.'

(Matthewson 2006: 680)

St'át'imcets shows a similar pattern with Mandarin in its constraint on time adverbs with eventualities. In (97), a bare predicate is compatible with present time adverbs or past time adverbs. But the same construction cannot be modified by future time adverbs in (98). The future modal *kelh* is required, as shown by the examples in (99).

- (97) a. táyt-kan lhkúnsa.
 hungry-1SG.SUBJ now
 'I am hungry now.'
- b. k'ác-an'-lhkan i-nátcw-as.
 dry-DIR-1SG.SUBJ when.PAST-one.day.way.-3CONJ
 'I dried it yesterday.'
- c. sáy'sez'-lhkan t-tsilkstásq'et-as.
 play-DIR-1SG.SUBJ when.PAST-Friday-3CONJ
 'I played on Friday.'

- (98) a. * táyt-kan natacw/zánucwem.
 hungry-1SG.SUBJ one.day.away/next.year
 ‘I will be hungry tomorrow/next year.’
- b. * k’ác-an’-lhkan natacw/zánucwem.
 dry-DIR-1SG.SUBJ one.day.away/next.year
 ‘I will dry it tomorrow/next year.’
- c. * sáy’séz’-lhkan natacw/zánucwem.
 play-DIR-1SG.SUBJ one.day.away/next.year
 ‘I will play tomorrow/next year.’

- (99) a. táyt-kan **kelh**.
 hungry-1SG.SUBJ *kelh*
 ‘*I was hungry/* I am hungry/ I will be hungry.’
- b. k’ác-an’-lhkan **kelh**.
 dry-DIR-1SG.SUBJ *kelh*
 ‘*I dried it/*I am drying it/I will dry it.’
- c. sáy’séz’-lhkan **kelh**.
 play-DIR-1SG.SUBJ *kelh*
 ‘*I played/*I am playing/I will play.’

Moreover, St’át’imcets also allows PEDT. Other than the stative example in (92), we cite another example with a bare accomplishment (marked by the null perfective aspect) in (100). In (100), the house building by Theresa culminated before the utterance and thus is located in the past. The house building by Charlie is still ongoing and thus is located in a present interval.

- (100) Context: Your friends Theresa, Charlie and Marie are taking a building class and they wanted to each build a doghouse. Theresa has already finished hers and Charlie is in the middle of his. Marie hasn’t started hers yet and she probably

won't do it at all. Now another friend calls. She doesn't know what they were planning to build or whether they've done it yet. She asks (a) and you can reply with (b).

a. *stam' ku mýs-en-as i snek'wnuk'wa7-lhkálh-a*
 what DET build-DIR-3ERG DET.PL friend(PL)-1PL.POSS-DET
 'What did our friends build/are our friends building?'

b. *mays-en-ítas kw s-Theresa múta7 s-Charlie i*
 build-DIR-3PL.ERG DET NOM-Theresa and NOM-Charlie DET.PL
sqax7-álhcw-a, t'u7 cw7aoy t'u7 kw s-máys-en-as ku stam' kw
 dog-house-DET but NEG but DET NOM-build-DIR-3ERG DET what DET
 s-Marie.
 NOM-Marie

'Theresa and Charlie built/ are building doghouses, but Marie hasn't built anything.'

(accomplishment)

Matthewson argues that if the St'át'imcets tense system were a null version of an English-like one, with contrasting PRES and PAST, then the single tense morpheme in (100) would have to be either a PRES or a PAST. It would be impossible to have a single tense morpheme covering both past and present reference times. But a non-future tense will be able to provide a reference time large enough to cover both a stretch of time in the past as well as the time of the utterance. Hence Matthewson proposes the following denotation to the non-future tense.

(101) $[[\text{TENSE}_i]]^{g,c}$ is only defined if no part of $g(i)$ is after t_c . If defined,

$$[[\text{TENSE}_i]]^{g,c} = g(i)$$

(Matthewson 2006: 680)

The denotation in (101) says that the non-future tense carries an index i like a pronoun,

which is assigned a context-determined interval via the assignment function g , as long as no part of the interval $g(i)$ is after a context salient time t_c , which is usually the utterance time s^* . Note that Matthewson’s definition for NONFUT is stricter than Sun’s definition, repeated in (102). NONFUT in Sun (2014) allows the reference time to stretch into the future given the looser condition of present ‘ $t \supseteq t_c$ ’ while Matthewson’s definition does not allow such an option.

$$(102) \quad \llbracket \text{NONFUT} \rrbracket^{g,c} = \lambda t : t < t_c \text{ or } t \supseteq t_c. t$$

Given that neither Matthewson (2006) nor Sun (2014) lays out the exact derivation of PEDT, we will reinterpret Matthewson’s proposal in our notational system and provide a derivation for these constructions.

2.5.1.1. A partitive approach to St’át’incets perfective aspect

The first piece of the analysis is the denotation of the perfective aspect. Matthewson (2006) suggests the analysis for St’át’incets perfective in (103), which requires the runtime of an event to be within a time interval t . This denotation is a traditional Klein-style perfective aspect, which is the same as the English null perfective. It accounts for the culminating interpretation of perfective sentences naturally but does not capture the progressive reading that is also available to perfective sentences, unless we assume that $\tau(e)$ does not denote a complete event in St’át’incets.

$$(103) \quad \llbracket \text{PFV} \rrbracket = \lambda P_{\langle v, st \rangle} \lambda t \lambda w \exists e [P(e)(w) \& \tau(e) \subseteq t]$$

For instance, according to (103), a sentence with a telic event such as the accomplishment ‘build a doghouse’ in (100) will have the reading in (104) if it is marked by the

perfective. The denotation in (104) requires the existence of a doghouse and a dog-house building event in the actual world. However, an on-going doghouse building event does not necessarily develop into a complete doghouse building event, as we can see from the fact that the past progressive English sentence in (105a) does not entail the past perfective sentence in (105b), a well-known property of imperfectivity, i.e. the imperfective paradox.

(104) $\lambda w \exists e [\text{build}(e)(w) \wedge \text{Agent}(e)(w) = \text{Charlie} \wedge \text{Theme}(e)(w) = \text{doghouse} \wedge \tau(e) \subseteq g(i)],$
 $g(i) \leq t_c.$

- (105) a. Charlie was building a doghouse.
 b. Charlie built a doghouse.

Therefore, based on the perfective data in Mathewson (2006), we propose a different analysis for perfective aspect in St'át'imcets, following the partitive approach by Altshuler (2014) for the so-called 'neutral aspect'.

- (106) a. $[[\text{PFV}]] = \lambda P_{\langle v, st \rangle} \lambda t \lambda w \exists e [e \text{ in } w \wedge \tau(e) \subseteq t \wedge \exists e' \exists w' : \langle e', w' \rangle \in \text{CON}(e, w) [P(e')(w')]]$
 b. $\text{CON}(e, w)$ is the continuation branch of e in w iff $\text{CON}(e, w)$ is the smallest set of pairs of events and worlds $\langle e', w' \rangle$ such that:
 (i) the history of w' is the same as the history of w up to and including $\tau(e)$
 (ii) w is a reasonable option for e in w
 (iii) e is a stage of e' ($e \leq_{\text{stage}} e'$)

We treat the null aspect in St'át'imcets as a 'neutral aspect', which has a mixed nature of a standard Klein-style perfective aspect and a progressive aspect. To understand the

denotation in (106), let's explain the notion of 'stage', 'continuation branch' and 'reasonable option'. To be a stage, a part has to be big enough and share enough with an event so that it is recognized as a less developed version (Landman 1992) or the stage is a complete event itself (Rothstein 2004, Tatevosov and Ivanov 2009, Altshuler 2014). A continuation branch (Landman 1992) of e in w_0 is the smallest set of pairs of reasonable worlds of w_0 and continuing events of e in these worlds.

The continuation branch of an event e in a world w_0 is constructed according to the following instructions. Follow the development of e in w_0 and put every event of which e is a stage in the continuation branch. Take the maximal event of which e is a stage in w and go to the closest world w' in which this event continues, namely, this maximal event is a stage of a larger event, if there is one. If w' is not a reasonable option for e in w , then stop; otherwise we follow the development of this event in w' until we reach the maximal event in w' . Again, we go to the closest world in which this event continues, until there is a world w in which the event culminates.

To decide whether a world is a reasonable option, we pay attention to what is internal to e in w_0 . Based on those internal properties, if there is a reasonable chance that e could continue as far as it does in w , then w is a reasonable option for w_0 . Take the sentence in (107) as an example (Landman 1992).

(107) Mary was wiping out the Roman army.

Suppose that Mary, a person of moderate physical capacities, is battling the Roman army. She managed to kill a couple of soldiers before she gets killed, but the sentence in (107) is clearly false in our scenario. The reason is that the world in which Mary succeeds

in wiping out the Roman army is not a reasonable option of the actual world. In the case of (107), what is internal to the event of Mary's killing a couple of Roman soldiers is Mary's physical capacities, in a closest world that the stage in the actual world develops, Mary may be able to kill a few more soldiers, but we will not reach a world in which Mary succeeds in wiping the Roman army.

The semantics in (106) says that the perfective aspect takes an intensional property of eventualities P , a world w and a time t , returns truth if there is an event e in the actual world w_0 , which is a stage of another event e' . The runtime of e is located within t . This component dealing with the event e in the actual world is like a standard perfective aspect. But (106) also has the ingredient that is familiar in a Dowty-style progressive analysis. Namely, the event that satisfies P is not located in the actual world but is located in the accessible worlds on the continuation branch.

Given the fact that a stage can be a less-developed version of a complete event or a maximal stage that equals to the culminating event itself, the partitive approach captures the non-culminating reading when the stage e is a proper part of e' and the culminating reading when the stage equals to e' , as summarized in (108).

(108) a. If $e = e'$, a normal perfective reading obtains:

$$\lambda t \lambda w \exists e [P(e)(w) \wedge \tau(e) \subseteq t]$$

b. If $e \sqsubseteq e'$, a 'progressive' reading obtains:

$$\lambda t \lambda w \exists e [e \text{ in } w \wedge \tau(e) \subseteq t \wedge \exists e' \exists w' : \langle e', w' \rangle \in \text{CON}(e, w) [P(e')(w')]]$$

Under Matthewson's assumption that the temporally unmarked form of the predicate is marked by the same covert perfective aspect, the two eventualities described in the

doghouse building context in (100), corresponding to the English translations ‘Theresa built a doghouse’ and ‘Charlie is building a doghouse’, then can be represented by the two denotations in (109) respectively.

- (109) a. $\lambda w \exists e [\text{build}(e)(w) \wedge \text{Agent}(e)(w) = \text{Theresa} \wedge \text{Theme}(e)(w) = \text{doghouse} \wedge \tau(e) \subseteq g(i)], g(i) \leq t_c.$
- b. $\lambda w \exists e [e \text{ in } w \wedge \tau(e) \subseteq g(i) \wedge \exists e' \exists w' : \langle e', w' \rangle \in \text{CON}(e, w) [\text{build}(e')(w') \wedge \text{Agent}(e')(w') = \text{Charlie} \wedge \text{Theme}(e')(w') = \text{doghouse}]], g(i) \leq t_c$

Theresa’s building has culminated in the actual world, namely, $e = e'$. Hence there is a complete building event by Theresa in w within a non-future time $g(i)$. Charlie’s building is in progress, thus the event in the actual world is a proper stage, $e \sqsubseteq e'$. This stage will continue to be a full doghouse building if everything proceeds normally. But there is no complete doghouse building in the actual world, as (109b) suggests.

2.5.1.2. Accounting for PEDT in St’át’imcets

The St’át’imcets data under discussion are repeated below. The states in (110a) and the accomplishments in (110b) are located in different temporal locations. Morphologically, (110b) is marked by a covert perfective aspect and (110a) can be optionally marked by the imperfective morpheme *wa7*.

- (110) a. (wa7) zúqw-cen s-John múta7 s-Fred
 (IMPF) die-foot NOM-John and NOM-Fred
 ‘John and Fred were/are starving.’ (not at the same time).
- b. mays-en-ítas kw s-Theresa múta7 s-Charlie i
 build-DIR-3PL.ERG DET NOM-Theresa and NOM-Charlie DET.PL

sqax7-álhcw-a, t'u7 cw7aoy t'u7 kw s-máys-en-as ku stam' kw
 dog-house-DET but NEG but DET NOM-build-DIR-3ERG DET what DET
 s-Marie.
 NOM-Marie

'Theresa and Charlie built/ are building doghouses, but Marie hasn't built anything.'

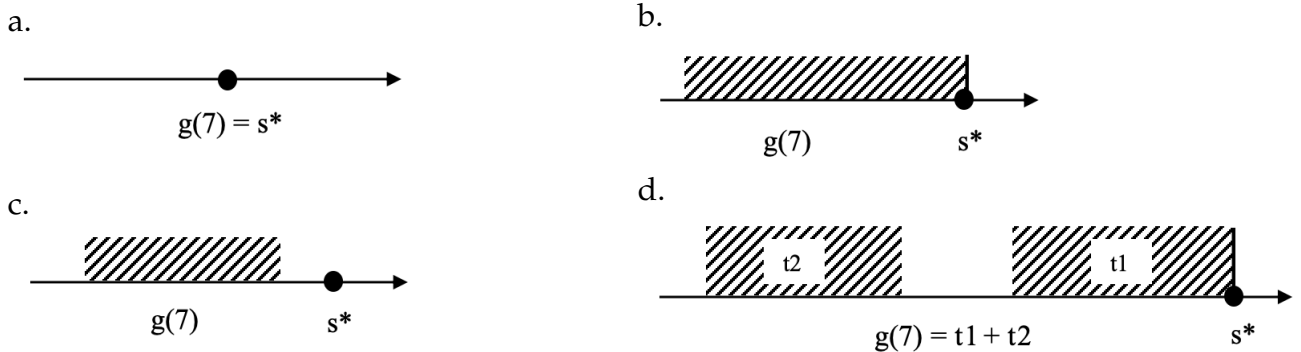
The semantics for NONFUT by Matthewson (2006) is repeated in (111). To avoid confusions with other indexical elements, we replace the alphabetical subscript i with a numerical subscript on the tense operator (i.e. $g(7)$ instead of $g(i)$). For simplifications, we reform the presupposition of NONFUT as $g(7) \leq t_c$.

(111) $[[\text{TENSE}_i]]^{g,c}$ is only defined if no part of $g(i)$ is after t_c . If defined,

$$[[\text{TENSE}_i]]^{g,c} = g(i) \quad (\text{Matthewson 2006: 680})$$

According to (111), the reference time $g(7)$ provided by NONFUT allows four possibilities, depicted by the figures in (112).

(112) Four possibilities of $g(7)$ given NONFUT



We assume that the utterance time (represented as s^*) to be an instantaneous moment (Bennett and Partee 1978), thus is represented by a bullet point. (112a) represents an instantaneous present situation in which $g(7)$ is identical to the utterance time. (112b)

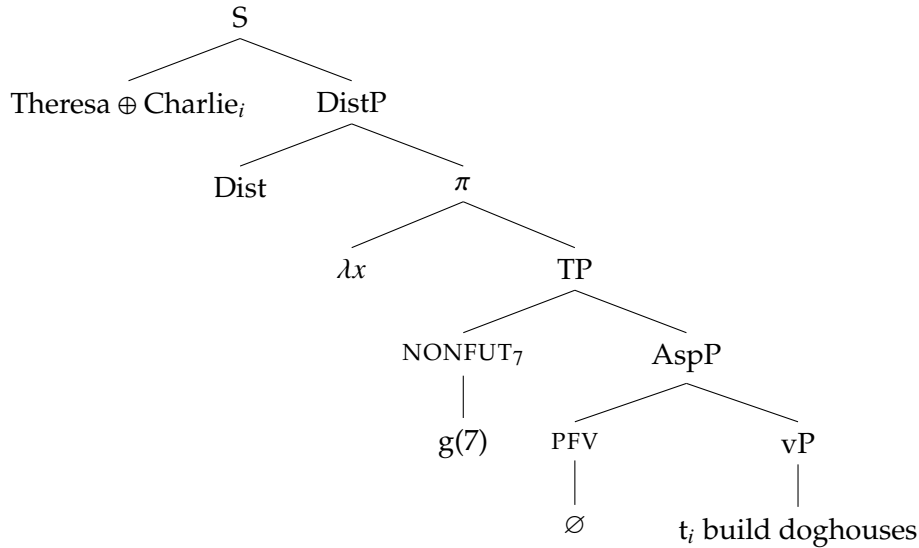
depicts an interval that stretches from the past and its right boundary coincides with s^* . $G(7)$ consists of the shaded rectangle and s^* . (112c) illustrates a past interval ($g(7)$ corresponds to the shaded rectangle) in which every moment precedes the s^* . The fourth possibility in (112d) is that $g(7)$ can consist of two discontinuous intervals t_1 and t_2 , with t_1 totally precedes s^* and t_2 partially or totally overlaps with s^* . Strictly speaking, this possibility in (112d) is the additional flexibility offered by a NONFUT tense than a PRES/PAST tense does. An instantaneous present tense can provide a $g(7)$ in (112a) while a prolonged present tense that only requires a non-future interval that overlaps with s^* can offer a $g(7)$ in (112b). A past tense, with no doubt, offers a $g(7)$ depicted in (112d). It is the possibility in (112b) and (112d) that makes NONFUT interesting to us when it comes to PEDT.

To correctly locate the member of the coordinated subject for the plural eventualities, we propose a distributive operator *Dist*, following Schwarzschild (1996). The distributive operator in (113) takes in a property P and an argument x , returns true if for every y that is a subpart of x and is an atom, $P(y)$ holds.

$$(113) \quad \llbracket \text{Dist} \rrbracket = \lambda P \lambda x \forall y [(y \sqsubseteq x \wedge \text{Atom}(y)) \rightarrow P(y)]$$

To account for the perfective sentence in (110b), we assume the LF in (114).

$$(114)$$



The LF focuses only on the scope relations among different elements, ignoring the word order at the surface. Any syntactic account that derives the right word order and agreement relations can be adjusted accordingly. The *Dist* operator operates on TP. The coordinated subject moves out of vP and lands on top of the distributive operator. The trace left by the coordinated subject will be latter lambda abstracted above TP, yielding the right property for the distributive operator. In order to make our discussion accessible to the reader, in the following discussion we get rid of the details of representing the thematic roles in a neo-Davidsonian manner. For example, the full denotation of the bare verb phrase ‘Theresa build doghouses’ in (115a) is simplified as in (115b).

- (115) a. $\lambda e \lambda w [\text{build}(e)(w) \wedge \text{Agent}(e)(w) = \text{Theresa} \wedge \text{Theme}(e)(w) = \text{doghouses}]$
 b. $\lambda e \lambda w [\text{build doghouses}(e, th, w)]$

Given the ingredients at hand, i.e. the perfective aspect in (106), the NONFUT in (111) and the distributive operator in (113), the sentence in (110b), repeated in (116a), obtains the denotation in (116b). The step-by-step derivation of the sentence is presented in

(116d).

(116) a. mays-en-ítas kw s-Theresa múta7 s-Charlie i
 build-DIR-3PL.ERG DET NOM-Theresa and NOM-Charlie DET.PL
 sqax7-álhcw-a.
 dog-house-DET

‘Theresa and Charlie built/ are building doghouses.’

b. (116a) = $\forall y[(y \sqsubseteq th \oplus ch \wedge \text{Atom}(y)) \rightarrow$

$\exists e[e \text{ in } w \wedge \tau(e) \subseteq g(7) \wedge \exists \langle e', w' \rangle \in \text{CON}(e, w)[\text{build doghouses}(e', y, w')]]]$, iff $g(7) \leq$

t_c

c. $\exists e[\text{build doghouses}(e, th, w) \wedge \tau(e) \subseteq g(7)] \wedge \exists e[e \text{ in } w \wedge \tau(e) \subseteq g(7) \wedge \exists \langle e', w' \rangle \in$
 $\text{CON}(e, w)[\text{build doghouses}(e', ch, w')]]]$, iff $g(7) \leq t_c$

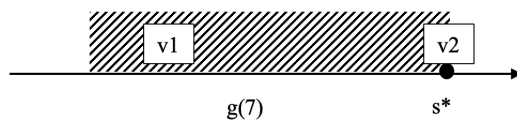
d.

$$\begin{array}{c}
 \forall y[(y \sqsubseteq th \oplus ch \wedge \text{Atom}(y)) \rightarrow \\
 \exists e[e \text{ in } w \wedge \tau(e) \subseteq g(7) \wedge \exists \langle e', w' \rangle \in \text{CON}(e, w)[\text{build doghouses}(e', y, w')]] \\
 \hline
 \text{Theresa} \oplus \text{Charlie}_i \quad \lambda x \forall y[(y \sqsubseteq x \wedge \text{Atom}(y)) \rightarrow \\
 \exists e[e \text{ in } w \wedge \tau(e) \subseteq g(7) \wedge \exists \langle e', w' \rangle \in \text{CON}(e, w)[\text{build doghouses}(e', y, w')]]] \\
 \hline
 \text{Dist} \quad \lambda x \exists e[e \text{ in } w \wedge \tau(e) \subseteq g(7) \wedge \\
 \exists \langle e', w' \rangle \in \text{CON}(e, w)[\text{build doghouses}(e', x, w')]] \\
 \hline
 \lambda x \quad \exists e[e \text{ in } w \wedge \tau(e) \subseteq g(7) \wedge \\
 \exists \langle e', w' \rangle \in \text{CON}(e, w)[\text{build doghouses}(e', x, w')]] \\
 \hline
 \text{NONFUT}_7 \quad \lambda t \lambda w \exists e.[e \text{ in } w \wedge \tau(e) \subseteq t \wedge \\
 \exists \langle e', w' \rangle \in \text{CON}(e, w)[\text{build doghouses}(e', x, w')]] \\
 \hline
 g(7) : g(7) \leq t_c \quad \text{PFV} \quad \lambda e \lambda w [\text{build doghouses}(e, x, w)] \\
 \hline
 \lambda P_{\langle y, st \rangle} \lambda t \lambda w \exists e.[e \text{ in } w \wedge \tau(e) \subseteq t \wedge t_i \text{ build doghouses} \\
 \exists \langle e', w' \rangle \in \text{CON}(e, w)[P(e')(w')]]
 \end{array}$$

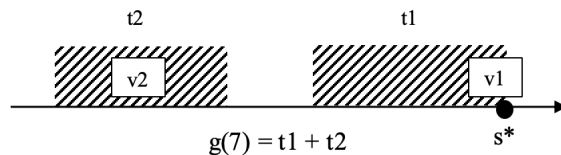
(116b) says that for all the atoms that is part of the collective entity ‘Theresa and Charlie’, there is a stage of doghouse building in the actual world and the runtime of this stage is within a non-future interval $g(7)$. Given the scenario in which Theresa finished

building and Charlie is still in progress, the partitive analysis for St'át'imcets perfective correctly captures this reading, demonstrated in (116c). It correctly states that there is a doghouse building by Theresa in the actual world w , and there is stage of doghouse building by Charlie. The analysis is able to provide two cases of $g(7)$ that satisfy the scenario. Namely, $g(7)$ can be an interval that stretches from the past and overlaps with s^* depicted in (117a), or the sum of two discontinuous intervals that consist of a component totally in the past of s^* and a component whose right boundary coincides with s^* , depicted in (117b). $v1$ and $v2$ correspond to the runtimes of two different eventualities.

(117) a.



b.

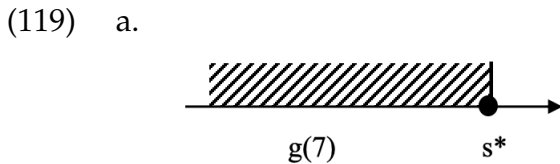


Now let us turn to the stative sentence in (110a), repeated in (118a). According to Matthewson (2006), the imperfective aspect marker $wa7$ is optional. Suppose that the unmarked stative predicate bears a perfective aspect, the target reading (different temporal locations) will follow the same derivation as the doghouse building example in (110b) does. But the existence of $wa7$ indicates imperfectivity, hence we assume a very simple denotation for $wa7$ in (118b), which locates the reference time t in the runtime of an even-

tuality.¹² If we follow the same structure as perfective sentences, the desired reading is not born out. Instead, we will obtain the reading in (118c), which in contrast, prohibits different temporal locations.

- (118) a. (wa7) zúqw-cen s-John múta7 s-Fred
 (IMPF) die-foot NOM-John and NOM-Fred
 ‘John and Fred were/are starving.’ (not at the same time).
- b. $\llbracket wa7 \rrbracket = \lambda P_{\langle v, st \rangle} \lambda t \lambda w \exists e [P(e)(w) \wedge t \subseteq \tau(e)]$
- c. $\exists s [\text{be starving}(s, j, w) \wedge g(7) \subseteq \tau(s)] \wedge \exists s [\text{be starving}(s, f, w) \wedge g(7) \subseteq \tau(s)]$, iff $g(7) \leq t_c$

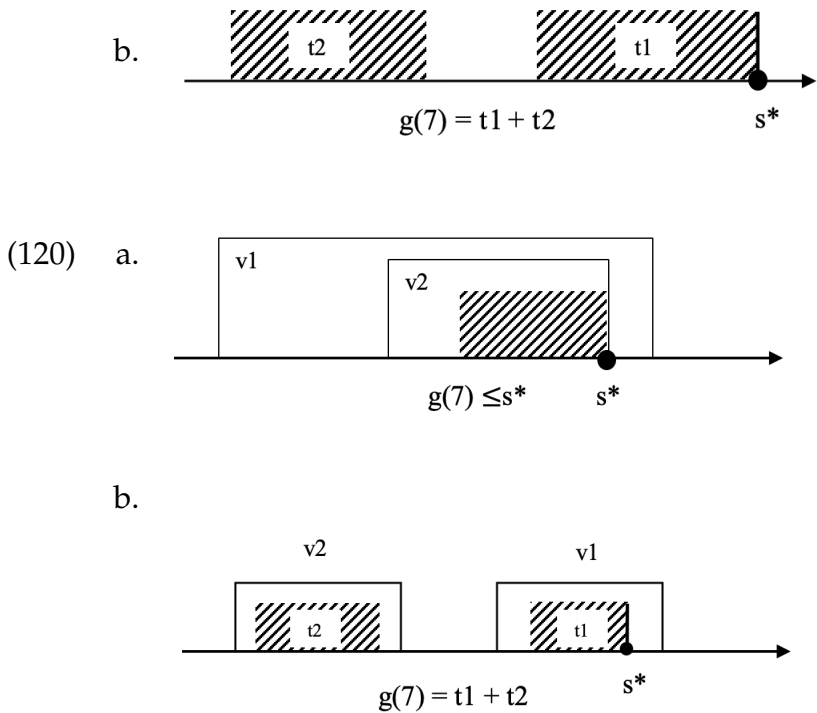
(118c) means that there is a state of John being starving in w and the runtime of the state includes $g(7)$. There is also a state of Fred being starving in w whose runtime includes $g(7)$. In other words, both states hold at the time provided by $g(7)$. The reason why different temporal locations are prohibited is that no matter which option we go for $g(7)$ (i.e. the scenarios shown in (119)), $g(7) \subseteq \tau(s)$ has to hold, leading to the overlap of the two states, as the figure in (120a) shows.



¹²Another possibility for the denotation of *wa7* is a looser version for stative predicates: it only requires the runtime of the state to overlap with the reference time, represented by the operator ‘o’ in the following denotation.

(1) $\llbracket wa7 \rrbracket = \lambda P_{\langle v, st \rangle} \lambda t \lambda w \exists e [P(e)(w) \wedge t \circ \tau(e)]$

If we go for this semantic analysis for *wa7*, then we will not need any further assumptions (for example the ‘Split’ operator soon to be discussed) to obtain the desired reading of different temporal locations for plural eventualities. But this denotation is an irregular one, hence requires further investigation in St’át’imcets to test its empirical coverage.



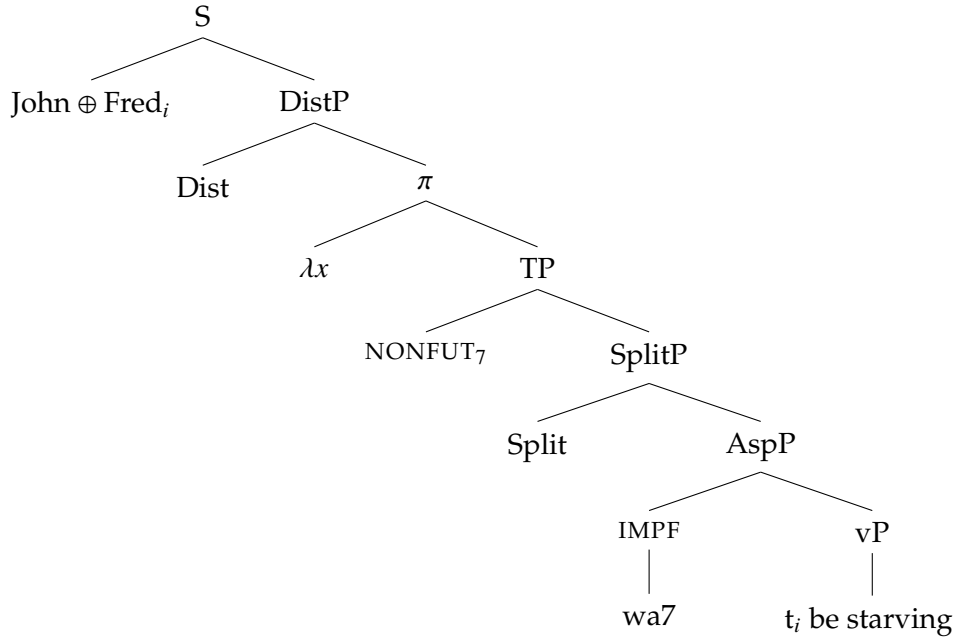
Nonetheless, the reading *St'át'imcets* allows is the one depicted in (120b), with two different times t_1 and t_2 in the runtime of the two states. To capture the target reading, we propose a covert *Split* operator to pick out different components of $g(7)$. The *Split* operator in (121) is a weaker version of the distributive operator *Dist*. It takes a property P and an argument x , returns true if there is a contextually-determined subpart of x such that P holds for this subpart. In the *St'át'imcets* case under discussion, x is the time picked out by the non-future tense.

(121) a. $[[\text{Split}]]^c = \lambda P \lambda x \exists y [y \sqsubseteq x \wedge \text{Part}_{c,x}(y) \wedge P(y)]$

b. $\text{Part}_{c,x}(y)$ means y is a contextually-determined part of x .

We assume the LF in (122) for the imperfective sentence in (118a). The difference between an imperfective LF and a perfective LF is that the imperfective sentence has a *Split* operator on top of the aspectual phrase to 'split' $g(7)$.

(122)



Based on the LF in (122), we obtain the denotation in (123a). The reading in (123a) can be notated in another way in (123b). (123b) says that there is a context-determined subpart of $g(7)$ that is included in a starving state of John in w and there is also another context-determined subpart of $g(7)$ that is included in a starving state of Fred in w . This is exactly what we want, a scenario depicted in (123c). The step-by-step derivation of the sentence is demonstrated in (124).

(123) a. $\forall y[y \leq j \oplus f \wedge \text{Atom}(y) \rightarrow$

$\exists t \exists s[t \sqsubseteq g(7) \wedge \text{Part}_{c,g(7)}(t) \wedge \text{be starving}(s, y, w) \wedge t \subseteq \tau(s)]]$

b. $\exists t \exists s[t \sqsubseteq g(7) \wedge \text{Part}_{c,g(7)}(t) \wedge \text{be starving}(s, j, w) \wedge t \subseteq \tau(s)] \wedge \exists t \exists s[t \sqsubseteq g(7) \wedge \text{Part}_{c,g(7)}(t) \wedge \text{be starving}(s, f, w) \wedge t \subseteq \tau(s)]$

c.

marked by overt aspect markers. However, Mandarin is also different from St'át'imcets in many ways. The most apparent difference is their aspectual systems.

St'át'imcets only has an overt imperfective aspect marker and lacks overt perfective marking. The perfective aspect is morphologically null and is assumed to apply in sentences not marked by the imperfective. In contrast, Mandarin has both overt perfective aspect and imperfective aspect markers, which are obligatory for eventives denoting episodic readings. These overt Mandarin aspect markers select eventives as complements, hence stative predicates are usually unmarked by aspect markers unless the statives are coerced to be eventives.

The difference in aspectual system affects the phenomena related to PEDT. Roughly speaking, this type of phenomenon is tested in sentences not overtly marked by aspect morphology. In St'át'imcets, all types of predicates can bear an aspectually null form in episodic cases. In Mandarin, only statives do not bear overt aspectual forms. Therefore, PEDT is observed among accomplishments, activities and statives in St'át'imcets¹³ while in Mandarin this pattern is only observed for stative sentences.

Moreover, Mandarin reveals a distinction between stage-level statives (s-level statives hereafter) and individual-level statives (i-level statives hereafter), a pattern untested in St'át'imcets. That is, Subject PEDT is available for i-level statives but is blocked for s-level statives, no matter if the plural subject incorporates a deceased entity or not. The Mandarin generalizations are repeated in (125).

¹³Matthewson (2006) does not get into the details of achievements, hence we are only concerned about the data that we have a clear idea about from Matthewson's work.

- (125) a. Subject(deceased + alive) + i-level stative allows PEDT.
- b. Adjunct(past time adverb + present time adverb) + s-level stative allows PEDT.
- c. Subject(deceased + alive) + s-level stative blocks PEDT and only allows a past reading.
- d. Subject(alive + alive) + s-predicate blocks PEDT and only allows either present or past reading.

Before we can test the boundary of the non-future tense analysis, we first spell-out our assumptions on the two types of statives and the structure of the stative sentences under discussion.

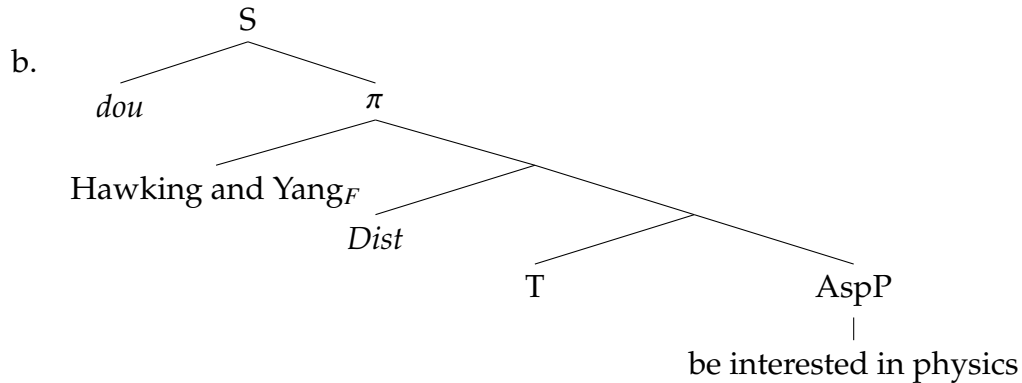
2.5.2.1. The set up: *dou*, i-level statives and s-level statives

In this dissertation, we adopt a unified analysis for statives and eventives by assuming a neo-Davidsonian event structure for them. The direct consequence for such an assumption is that like eventives, a stative predicate needs an operation to existentially close the eventuality argument. For an event, existential closure is encoded in the semantics of aspect markers. We assume that even though a Mandarin stative sentence is not marked by an overt aspect marker, there is a covert default imperfective aspect that existentially closes the eventuality argument, i.e. the state argument. This is a revival of the default view point aspect in a telicity-dependent approach by J.- W. Lin (2006). The semantics of the default imperfective aspect is a standard one, as repeated in (126).

$$(126) \quad \llbracket \text{IMPFV} \rrbracket = \lambda P_{\langle v, st \rangle} \lambda t \lambda w \exists e [P(e)(w) \wedge t \subseteq \tau(e)]$$

Sentences with a distributive reading in Mandarin often require the particle *dou* (J.-W. Lin 1998, Giannakidou and Cheng 2006, M. Xiang 2008, Liao 2011, Liu 2017, Y. Xiang 2020 among others). Various approaches to *dou* are proposed in the literature, treating *dou* as a distributor (J.-W. Lin 1998), a maximizer (Giannakidou and Cheng 2006, M. Xiang 2008) or an exhaustification operator (Liao 2011, Liu 2017, Y. Xiang 2020). We follow the insights of the exhaustification camp and assume that the distributive reading in a construction with *dou* comes from a covert distributive operator rather than *dou*. Given this assumption, nothing in our analysis hinges on the concrete analysis for *dou*. It is treated as a focus particle and the calculation of alternatives is irrelevant for our purpose. Therefore, in the following discussion, the derivation of the generalizations in (125) omits the the exhaustification contribution of *dou*. The basic structure for a sentence with a coordinated subject and *dou* in (127a) is demonstrated in (127b).

- (127) a. Huojin he Yang Zhenning dou dui wuli ganxingqu.
 Hawking and Yang Zhenning DOU to physics interest
 ‘Hawking and Zhenning Yang are interested in physics.’



Now we turn to i-level predicates and s-level predicates. Our assumptions for the two subcategories of statives mainly lean on Magri (2009). Magri provides a scalar-implicature analysis on a large set of data relevant to i-level and s-level predicates with

very few assumptions on the predicates, a welcoming property for us to keep our discussion as theoretical neutral as possible. Musan (1997), Magri (2009) suggest that both s-level predicates and i-level predicates have a Davidsonian argument that ranges over times (contra Kratzer 1988). Magri (2009) further suggests that there is no difference with respect to the position where their subjects are base-generated in syntax (contra Kratzer 1988, Diesing 1992) and there is no difference with respect to their syntactic features (contra Chierchia 1995).

The differences between s-level predicates and i-level predicates are: (i) individual-predicates are homogeneous in the (context-sensitive) life span of an individual; (ii) the time argument (i.e. the temporal trace of the state) of the two types is bound in different ways. Magri (2009) defines the homogeneity property of i-level predicates as in (128).

- (128) For every individual $d \in D_e$ and for every world $w \in W_{ck}$ compatible with common knowledge: if there is a time $t' \in T$ such that $\llbracket X \rrbracket^w(d, t')$, then $\llbracket X \rrbracket^w(d, t)$ for every time t such that $\mathbf{in}^w(d, t)$.

$\lambda t. \mathbf{in}^w(d, t)$ stands for a set of times that is within the life span of an individual d at a world w . (128) states that for the property denoted by an i-level predicate X , if there is a time that X holds for d , then X holds for every time throughout d 's life. Apparently a property lasting throughout one's lifetime ($\mathbf{in}^w(d, t)$) is too strong. For i-level predicates such as 'from America', (128) is true. The property of a person's nationality may even lasts beyond their lives. But for i-level predicates such as 'tall', it is not. Tall men can be short kids. As Magri suggests, a more precise way to formalize the relative long time that an i-level predicate holds is $\mathbf{C}_X^w(d, t)$: a subset of the whole life span of d , which depends

on the specific i-level predicate X and the context. The intuition that we want to capture is that i-level predicates holds for a relatively long time than s-level predicates, hence we simplify $\mathbf{C}_X^w(d,t)$ as $\mathbf{in}^w(d,t)$.

Moreover, the time argument of s-level predicates and i-level predicates is bound differently. Magri (2009) proposes that i-level predicates can only be bound by a covert generic operator GEN , an insight from Chierchia (1995). S-level predicates can be bound in two ways. The temporal trace of a s-level predicate is bound by an existential operator when the sentence denotes an episodic reading. When an s-level predicate is used for a habitual reading, the temporal trace is bound by a covert generic operator GEN (Chierchia 1995).

The exact semantics for the generic operator is a controversial and complex topic. We will not try to spell-out the details of GEN , but just focus on the general line we would like to take. We basically treat the generic operator as a quantificational adverb with a special modal character (Krifka et al. 1995, Chierchia 1995). The semantics we adopt for GEN is illustrated in (129).

$$(129) \quad \llbracket \text{GEN} \rrbracket = \lambda P_{\langle v, st \rangle} \lambda t \lambda w \forall t' \forall w' \forall s [t \circ t' \wedge \mathbf{in}^w(x, t') \wedge \Delta_{w,t}(x, s, w')] \exists s' [s \circ s' \wedge P(x, s', w') \wedge \tau(s') \subseteq t']$$

GEN acts as a universal quantifier over times, worlds and eventualities. The content in the first bracket specifies the restrictor of GEN and the content in the second bracket illustrates the scope. $\Delta_{w,t}$ stands for the contextually supplied felicity conditions for the state to hold. GEN takes in an argument of eventuality P , a time t and a world w , for all the times t' that overlaps with t and are within the life span of the subject x , for all

the worlds w' that are maximally similar to the world w where the felicity conditions for P to happen are met in w at t , for all the states that hold in w' , there is a state s' of P overlapping with s , and its runtime is within t' . Let us take a simple example in (130) to illustrate the definition of GEN. The sentence in (130a) with a structure in (130b) has a denotation in (130c).

- (130) a. John is tall.
 b. $[\text{TP John}_i [\text{AspP GEN } [t_i \text{ is tall}]]]$.
 c. $\forall t' \forall w' \forall s [t_c \circ t' \wedge \mathbf{in}^{w_0}(j, t') \wedge \Delta_{w_0, t}(x, s, w')] \exists s' [s \circ s' \wedge \text{tall}(j, s', w') \wedge \tau(s') \subseteq t']$

For 'John is tall' to be true, some minimal conditions have to be met: John is alive, John is mature enough to be considered tall (Baby John was hard to be considered as tall), nothing that might change his height happens. (130) is true if for all the times t' that overlap with the utterance time and are within John's life time, when all the felicity conditions that allow 'John being tall' to happen are met in w' , in those worlds there is always a state of John being tall within t' . In other words, (130) captures the relatively stable, long lasting property of 'tall' by saying for any time in John's life span that overlaps with the topic time, when everything goes in a normal way, John is tall. For simplification, $P(x, s, w') \wedge \tau(s) \subseteq t'$ will be presented as $P(x, s, t', w')$, meaning the state of P holds for x at t' in w' .

The meaning of an episodic sentence with an s-level predicate is simpler. The sentence in (131a) with a structure in (131b) has a denotation in (131c). The state argument is existentially closed by a covert imperfective aspect IMPF. 'John is happy' means that there is a state of John being happy in w_0 and t_c is included in the runtime of the state.

- (131) a. John is happy.
 b. $[\text{TP John}_i [\text{AspP IMPF } [t_i \text{ is happy}]]]$.
 c. $\exists s[\text{happy}(j, s, w_0) \wedge t_c \subseteq \tau(s)]$

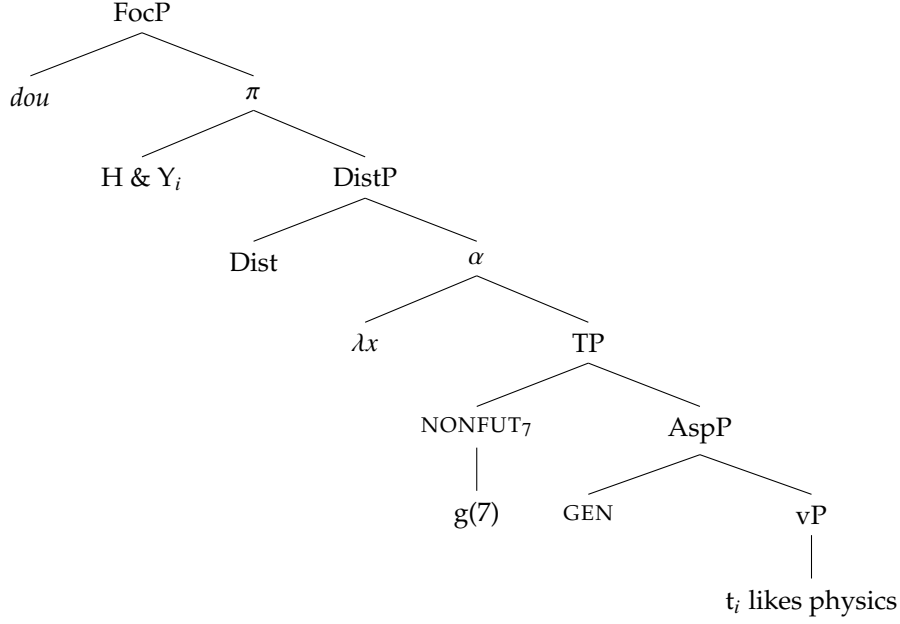
2.5.2.2. Subject PEDT with i-level statives and Adjunct PEDT

This section is devoted to showing how a non-future tense approach in St'át'imcets extends to Mandarin in order to account for PEDT. The data are repeated below.

- (132) a. Huojin he Yang Zhenning dou xihuan wulixue.
 Hawking and Yang Zhenning DOU like physics
 'Hawking and Zhenning Yang like physics.'
 b. Zuotian he jintian Lulu dou hen jusang.
 yesterday and today Lulu DOU very frustrated
 'Lulu was frustrated yesterday and she is frustrated today.'

The construction with a plural subject has the structure in (133). Based on the step-by-step derivation in (134), we obtain the denotation of (132a) in (134g). (134g) is a reformulation of (134f). It says that for all the time within Hawking's lifetime in which all the felicity conditions are met, Hawking likes physics. The same situation also holds for Yang.

(133)

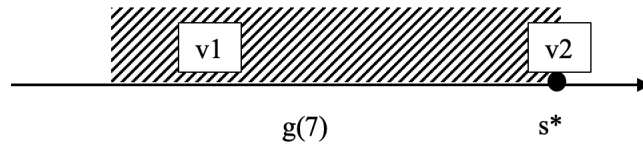


- (134) a. $[[vP]] = \lambda s \lambda w [\text{like physics}(s, x, w)]$
- b. $[[AspP]] = \lambda t \lambda w \forall t' \forall w' \forall s [t \circ t' \wedge \mathbf{in}^w(x, t') \wedge \Delta_{w,t}(x, s, w')] \exists s' [s' \circ s \wedge \text{like physics}(s', x, t', w')]$
- c. $[[TP]] = \forall t' \forall w' \forall s [g(7) \circ t' \wedge \mathbf{in}^{w_0}(x, t') \wedge \Delta_{w_0, g(7)}(x, s, w')] \exists s' [s' \circ s \wedge \text{like physics}(s', x, t', w')]$
- d. $[[\alpha]] = \lambda x \forall t' \forall w' \forall s [g(7) \circ t' \wedge \mathbf{in}^{w_0}(x, t') \wedge \Delta_{w_0, g(7)}(x, s, w')] \exists s' [s' \circ s \wedge \text{like physics}(s', x, t', w')]$
- e. $[[DistP]] = \lambda x \forall y [(y \sqsubseteq x \wedge \text{Atom}(y)) \rightarrow \forall t' \forall w' \forall s [g(7) \circ t' \wedge \mathbf{in}^{w_0}(y, t') \wedge \Delta_{w_0, g(7)}(y, s, w')] \exists s' [s' \circ s \wedge \text{like physics}(s', y, t', w')]]$
- f. $[[\pi]] = \forall x [(x \sqsubseteq h \oplus y \wedge \text{Atom}(x)) \rightarrow \forall t' \forall w' \forall s [g(7) \circ t' \wedge \mathbf{in}^{w_0}(x, t') \wedge \Delta_{w_0, g(7)}(x, s, w')] \exists s' [s' \circ s \wedge \text{like physics}(s', x, t', w')]]$
- g. $[[132]] = \forall t' \forall w' \forall s [g(7) \circ t' \wedge \mathbf{in}^{w_0}(h, t') \wedge \Delta_{w_0, g(7)}(h, s, w')] \exists s' [s' \circ s \wedge \text{like physics}(s', h, t', w')] \wedge \forall t' \forall w' \forall s [g(7) \circ t' \wedge \mathbf{in}^{w_0}(y, t') \wedge \Delta_{w_0, g(7)}(y, s, w')] \exists s' [s' \circ s \wedge \text{like physics}(s', y, t', w')]$

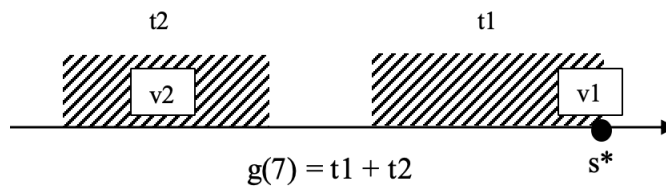
Given the current assumptions, i-level predicates only require the runtime of the state to be within the life span of the experiencer and overlaps with the topic time. The proposal in (134) successfully derives PEDT as long as NONFUT returns a large enough inter-

val. Both options of $g(7)$ demonstrated in the figures below will properly captures PEDT.

(135) a.

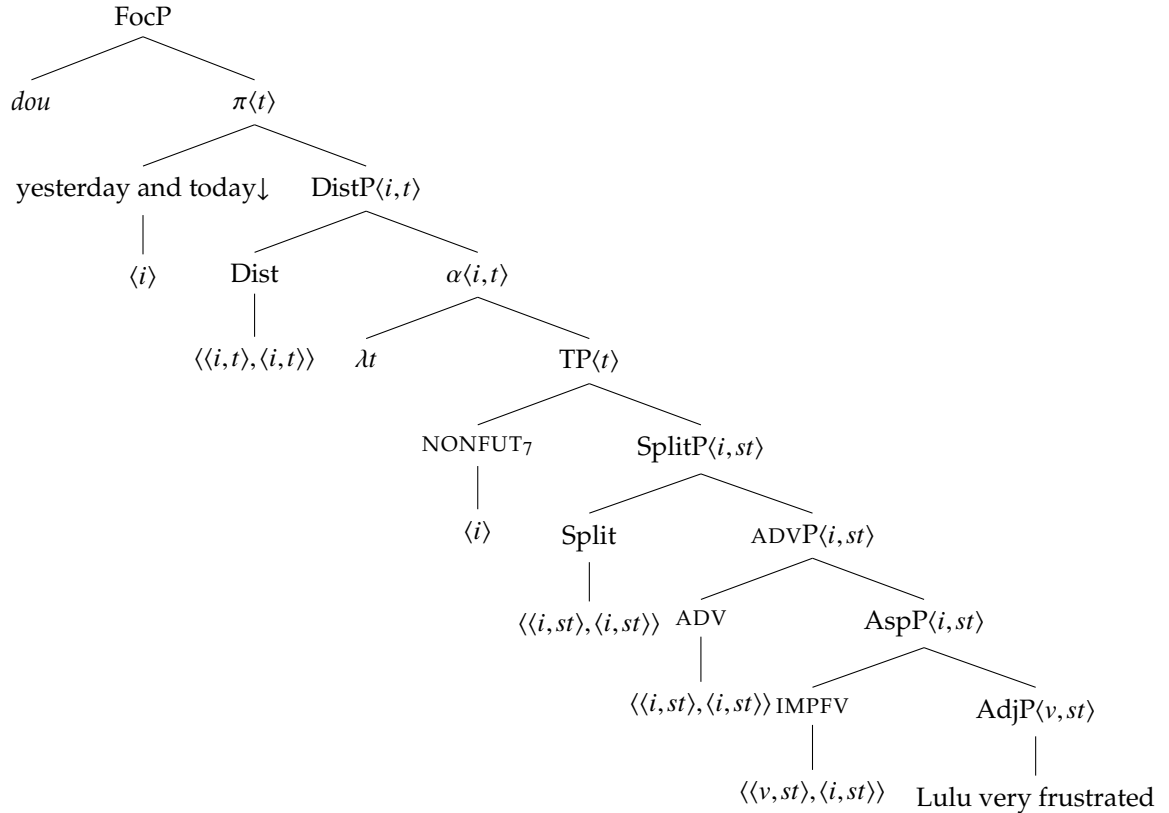


b.



To account for Adjunct PEDT with a past time adverb and a present time adverb, we propose the structure in (136) for (132b). The semantic type of each element is presented in the tree.

(136)



Like St'át'imcets imperfective sentences, the structure in (136) has not only a *Dist* operator but also a *Split* operator. The *Dist* operator has a slightly different semantics from the one that distributes plural subjects. It bears the semantics in (137). It takes a property of time P and a time argument t and returns true if for any contextually-split subpart of t, P holds for this subpart.

$$(137) \quad \llbracket \text{Dist} \rrbracket = \lambda P \lambda t \forall t' [(t' \sqsubseteq t \wedge \text{Part}_{c,t}(t')) \rightarrow P(t')]$$

We also make some assumptions about adverbial phrases in the structure in (136). Frame adverbs such as 'yesterday', 'today' denote a property of time. We assume that the coordination of them 'yesterday and today' also denotes an intensional property of time, as shown in (138a). In (136), 'yesterday and today' is type-shifted (marked by ↓) to a time

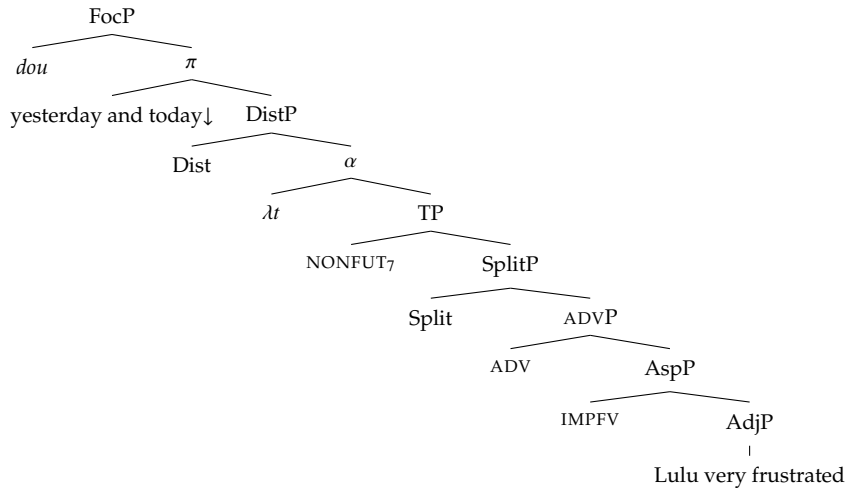
argument that denotes an interval equal to the sum of yesterday and today, yielding a type $\langle i \rangle$ with the semantics in (138b).

- (138) a. $\llbracket \text{yesterday and today} \rrbracket = \lambda t \lambda w [t \sqsubseteq \text{yesterday} \oplus \text{today in } w]$
 b. $\llbracket \text{yesterday and today} \downarrow \rrbracket = t: t = \text{yesterday} \oplus \text{today}$

We further assume that there is a covert operator ADV with the semantics in (139). This operator creates a free variable t_{adv} in its propositional argument. This free variable serves as a place-holder which will latter be lambda-extracted and supplied with the time argument denoted by ‘yesterday and today \downarrow ’. With these assumptions in hand, the derivation of (132b) is demonstrated in (140).

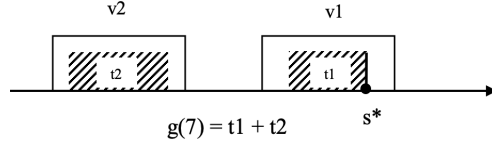
- (139) $\llbracket \text{ADV} \rrbracket = \lambda p_{\langle i, st \rangle} \lambda t \lambda w [p(t)(w) \wedge t \sqsubseteq t_{\text{adv}}]$

- (140) a.



- b. $\llbracket \text{AdjP} \rrbracket = \lambda s \lambda w [\text{frustrated}(s, l, w)]$
 c. $\llbracket \text{AspP} \rrbracket = \lambda t \lambda w \exists s [\text{frustrated}(s, l, w) \wedge t \subseteq \tau(s)]$
 d. $\llbracket \text{ADVP} \rrbracket = \lambda t \lambda w \exists s [\text{frustrated}(s, l, w) \wedge t \subseteq \tau(s) \wedge t \sqsubseteq t_{\text{adv}}]$

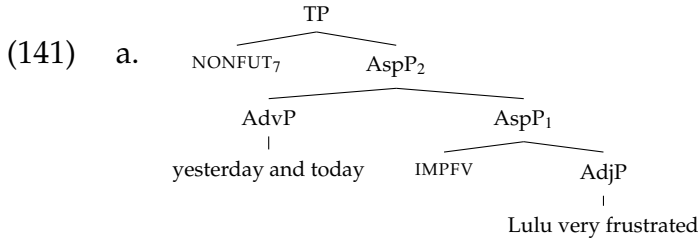
- e. $[[\text{SplitP}]] = \lambda t \lambda w \exists y [(y \sqsubseteq t \wedge \text{Part}_{c,t}(y)) \wedge \exists s [\text{frustrated}(s, l, w) \wedge y \subseteq \tau(s) \wedge y \sqsubseteq t_{\text{adv}}]]$
- f. $[[\text{TP}]] = \exists y [(y \sqsubseteq g(7) \wedge \text{Part}_{c,g(7)}(y)) \wedge \exists s [\text{frustrated}(s, l, w_0) \wedge y \subseteq \tau(s) \wedge y \sqsubseteq t_{\text{adv}}]]$
- g. $[[\alpha]] = \lambda t_{\text{adv}} \exists y [(y \sqsubseteq g(7) \wedge \text{Part}_{c,g(7)}(y)) \wedge \exists s [\text{frustrated}(s, l, w_0) \wedge y \subseteq \tau(s) \wedge y \sqsubseteq t_{\text{adv}}]]$
- h. $[[\text{DistP}]] = \lambda t \forall t' [(t' \sqsubseteq t \wedge \text{Part}_{c,t}(t')) \rightarrow \exists y [(y \sqsubseteq g(7) \wedge \text{Part}_{c,g(7)}(y)) \wedge \exists s [\text{frustrated}(s, l, w_0) \wedge y \subseteq \tau(s) \wedge y \sqsubseteq t']]]$
- i. $[[\pi]] = \forall t' [(t' \sqsubseteq \text{yesterday} \oplus \text{today} \wedge \text{Part}_{c,\text{yesterday} \oplus \text{today}}(t')) \rightarrow \exists y \exists s [(y \sqsubseteq g(7) \wedge \text{Part}_{c,g(7)}(y)) \wedge \text{frustrated}(s, l, w_0) \wedge y \subseteq \tau(s) \wedge y \sqsubseteq t']]]$
- j.



The reference time offered by $g(7)$ is an interval that is large enough to cover the sum of yesterday and today. The sentence in (132b), according to (140i), says that for any contextually-split subpart of ‘yesterday \oplus today’, namely an interval of ‘yesterday’ and an interval of ‘today’, a state of Lulu being frustrated exists. The runtime of the state includes a contextually-split time within $g(7)$ and this time is either in the interval of ‘yesterday’ or in ‘today’. We correctly captures Adjunct PEDT in sentences like (132b), illustrated by the figure in (140j).

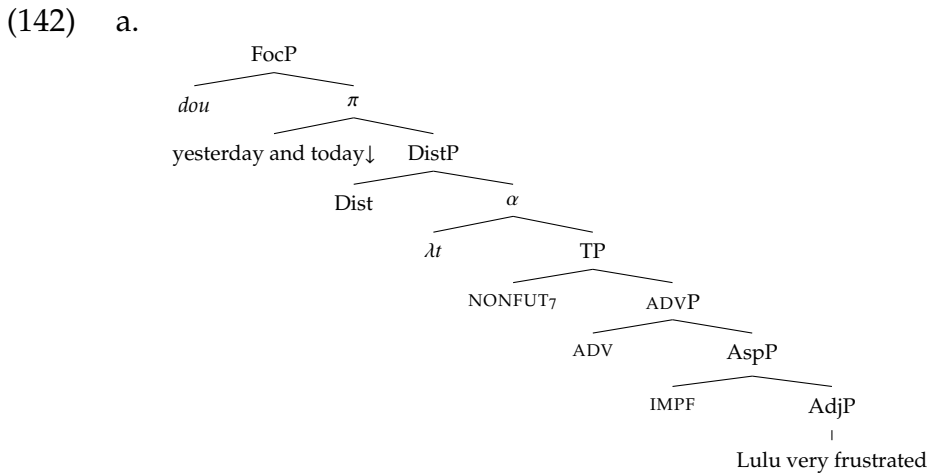
It is worthy to note that the *Split* operator is necessary to derive the desired reading. Despite the fact that *dou* can be analyzed in many different ways, previous studies of *dou* (J.-W. Lin 1998, M. Liu 2017, Y. Xiang 2020) reach a consensus that the existence of *dou* and the distributive reading indicate the presence of a distributor, being overt or covert. Hence the structure of (132) cannot be the one in (141) with no distributor, even though the

structure in (141a) correctly describes the desired scenario in which the state of frustration held for yesterday and is holding at the utterance time today, as the denotation shows in (141b).



b. $\llbracket \text{TP} \rrbracket = \lambda w \exists s [\text{frustrated}(s, l, w) \wedge g(7) \subseteq \tau(s) \wedge g(7) \sqsubseteq \text{yesterday} \oplus \text{today}]$

In the following structure with *dou* and a covert *Dist* but no *Split*, we obtain the denotation in (142b).



b. $\llbracket \text{132b} \rrbracket = \forall t [t \sqsubseteq \text{yesterday} \oplus \text{today} \wedge \text{Part}_{c, \text{yesterday} \oplus \text{today}}(t) \rightarrow \exists s [\text{frustrated}(s, l, w) \wedge g(7) \subseteq \tau(s) \wedge g(7) \sqsubseteq t]]$

' $g(7) \sqsubseteq t$ ' in (142b) suggests that $g(7)$ cannot be a superset of t , hence it has to be within one of the contextually-divided part of 'yesterday and today'. If $g(7)$ is a proper sub-part of 'yesterday \oplus today', for example, $g(7) = \text{yesterday}$, ' $g(7) \subseteq \tau(s) \wedge g(7) \sqsubseteq t$ ' in (142b)

is satisfied. But $g(7)$ is not within another contextually-divided part ‘today’, hence the requirement of the *Dist* operator is not satisfied. This is an unwelcome result.

If $g(7)$ equals to ‘yesterday \oplus today’, then ‘ $g(7) \subseteq \tau(s)$ ’ successfully captures the reading that the state lasts in $g(7)$ but ‘ $g(7) \sqsubseteq t$ ’ in which t is a contextually-split subpart of ‘yesterday \oplus today’ is contradictory because an element cannot be a subpart of its own subpart unless ‘ $t = g(7)$ ’ holds. In the most special case ‘ $t = g(7)$ ’, the context does not split the coordinated adjunct at all. This means the distributive operator in (142) is redundant and the distributive reading indicated by the existence of *dou* is gone. The sentence in (132b) is thus equal to a sentence with the structure in (141a), which is incorrect.

In a word, in all the possible circumstances allowed by the structure in (142) without a *Split* operator, we fail to obtain the desired reading of (132b). Thus a *Split* operator cannot be ruled out to achieve Adjunct PEDT.

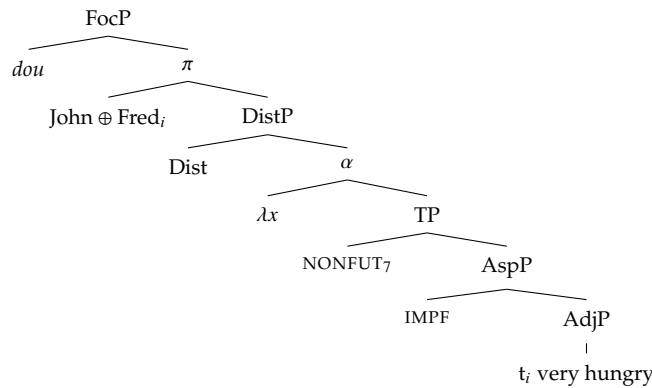
2.5.2.3. Subject PEDT blocking effect of s-level statives

When we spell-out our analysis for PEDT in St’át’incets, we point out that an imperfective sentence is predicted to exclude PEDT unless a *Split* operator exists. In Mandarin, s-level statives prohibit Subject PEDT. The Mandarin pattern is born out based on a very simple assumption: *Split* is blocked in these constructions, in contrast to St’át’incets.

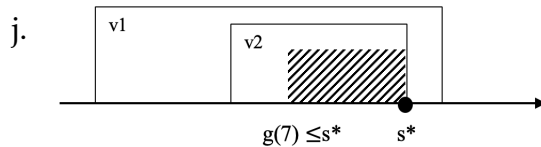
For example, the sentence in (143a) with a structure in (143b) obtains the denotation in (143i) via the step-by-step derivations from (143c-h). In (143i), the fact that $g(7)$ has to be totally in the runtime of the two states leads to a consequence of overlapping states, as demonstrated in (143j). Therefore, PEDT is excluded.

- (143) a. John he Fred dou hen e.
 John and Fred DOU very hungry
 'John and Fred are very hungry./John and Fred were very hungry./#John
 was very hungry and Fred is very hungry.'

b.



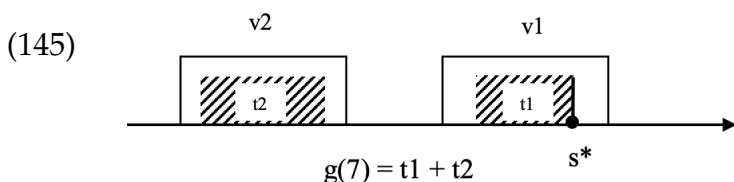
- c. $\llbracket \text{AdjP} \rrbracket = \lambda s \lambda w [\text{very hungry}(s, x, w)]$
 d. $\llbracket \text{AspP} \rrbracket = \lambda t \lambda w \exists s [\text{hungry}(s, x, w) \wedge t \subseteq \tau(s)]$
 e. $\llbracket \text{TP} \rrbracket = \exists s [\text{hungry}(s, x, w) \wedge g(7) \subseteq \tau(s)]$
 f. $\llbracket \alpha \rrbracket = \lambda x \exists s [\text{hungry}(s, x, w) \wedge g(7) \subseteq \tau(s)]$
 g. $\llbracket \text{DistP} \rrbracket = \lambda x \forall y [(y \sqsubseteq x \wedge \text{Atom}(y)) \rightarrow \exists s [\text{hungry}(s, y, w) \wedge g(7) \subseteq \tau(s)]]$
 h. $\llbracket \pi \rrbracket = \forall x [(x \sqsubseteq j \oplus f \wedge \text{Atom}(x)) \rightarrow \exists s [\text{hungry}(s, x, w) \wedge g(7) \subseteq \tau(s)]]$
 i. $\exists s [\text{hungry}(s, j, w) \wedge g(7) \subseteq \tau(s)] \wedge \exists s [\text{hungry}(s, f, w) \wedge g(7) \subseteq \tau(s)]$



Similarly, we obtain the reading in (144b) for the sentence in (144a), reformulated in (144c). The same argumentation also holds: $g(7) \subseteq \tau(s)$ being true for both states of the two experiencers precludes the scenario in (145) without *Split*. This leads to either present or

past reading but not a PEDT reading of one state in the past and one state in the present.

- (144) a. Huojin he Yang Zhenning dou hen lei.
 Hawking and Yang Zhenning DOU very tired
 ‘Hawking and Zhenning Yang were tired./#Hawking and Zhenning Yang
 are tired/# Hawking was tired and Zhenning Yang is tired.’
- b. $\forall x[(x \sqsubseteq h \oplus y \wedge Atom(x)) \rightarrow \exists s[\text{tired}(s, x, w) \wedge g(7) \subseteq \tau(s)]]$
- c. $\exists s[\text{tired}(s, h, w) \wedge g(7) \subseteq \tau(s)] \wedge \exists s[\text{tired}(s, y, w) \wedge g(7) \subseteq \tau(s)]$



Specifically, the coordinated subject in (144a) involves a dead subject. A stative predicate like ‘tired’ presuppose that its argument x is located at every time in which the predicate holds of x (Musan 1997, Magri 2009). A deceased subject is not located at the utterance time (present), hence present interpretation is odd for (144a) but past interpretation is fine.

2.5.3. Cross-linguistic implications: the applicable conditions of NON-FUT

Now that we have successfully derived Subject PEDT for i-level statives and Adjunct PEDT, and we also correctly rule out Subject PEDT for s-level statives in Mandarin, it is rewarding to reflect on why and how the current approach succeeds. Table 2.4 summarizes the PEDT patterns and key ingredients of the current analysis for Mandarin and

St'át'imcets.

Table 2.4: Current analysis for PEDT in Mandarin and St'át'imcets

	Mandarin	St'át'imcets
Pattern of PEDT	subject (deceased & alive) + i-level statives adjunct (past & present) + s-level statives * coordinated subject + s-level statives	subject (alive + alive) + statives/eventives
Aspect marking	covert IMPFV	overt IMPFV (<i>wa7</i>) on s-level statives covert PFV on s-level statives/eventives
Relevant operators	[NONFUT, GEN, <i>Dist</i>]: subject + i-level statives [NONFUT, IMPFV, <i>Dist</i> , <i>Split</i>]: adjunct + s-level statives [IMPFV, <i>Dist</i>]: * subject + s-level statives	[NONFUT, PFV, <i>Dist</i>]: subject + statives/eventives [NONFUT, IMPFV, <i>Dist</i> , <i>Split</i>]: subject + <i>wa7</i> + statives

Table 2.4 shows that NONFUT is powerful for two types of language data:

- (146) a. PEDT occurs in constructions in which the event time falls within the topic time, such as perfective sentences in St'át'imcets.
- b. PEDT occurs in constructions in which the event time overlaps with but not totally includes the topic time, such as i-level statives in Mandarin.

The reason why NONFUT well-accounts for these data is that in circumstances shown in (146), the plural eventualities do not need to overlap and NONFUT provides a large enough interval that covers a past time and a present time (either *g(7)* stretches to the past and continues to present or *g(7)* is the sum of two discontinuous parts of the timeline).

The type of predicates is another factor that has an impact on licensing PEDT, with Mandarin as an example. Given a single NONFUT tense in the construction with a coordinated subject, i-level predicates license with PEDT because the time argument associated with an i-level predicate is bound by a generic operator. GEN only loosely requires the time argument of a i-level predicate to overlap with the reference time, satisfying (146b). On the contrary, the time argument associated with a s-level stative is bound by an existential quantifier encoded in the imperfective aspect. The standard imperfective

semantics leads to a scenario of state-overlapping, excluding PEDT. Therefore, the type of predicates plays a role in licensing PEDT.

When it comes to cases in which the topic time is fully within the runtimes of eventualities (e.g. imperfective s-statives with a coordinated subject in St'át'imcets or s-statives with a coordinated adjunct in Mandarin), the distributive operator *Dist* alone cannot locate the plural eventualities in different temporal locations on the timeline, due to the inclusion relation between the runtime and the event time encoded in an imperfective aspect. We will predict that PEDT is excluded, as the Mandarin case of s-statives with a coordinated subject shows. This prediction does not rely on what kind of reference time the tense operator supplies. In other words, NONFUT does not help in this circumstance.

St'át'imcets reveals a different pattern from Mandarin in allowing PEDT in imperfective sentences with s-level predicates. Potentially, whether a language allows the *Split* operator to license PEDT is parametric. The *Split* operator takes care of the dislocation of the reference time before the subjects get distributed to the right eventuality, which is allowed in St'át'imcets but is blocked in Mandarin. It is worthy to note that *Split* is not totally excluded in Mandarin. At least in Adjunct PEDT, *Split* is necessary. This raises a problem for the current approach: what blocks the *Split* operator in cases with a coordinated subject and an s-level stative, like St'át'imcets does? Semantically, there is nothing that derives such a blocking effect for coordinated subjects but not for coordinated adjuncts. This has to be stipulated.

In summary, our investigation on how a NONFUT analysis accounts for PEDT in Mandarin and St'át'imcets shed slights on the properties favoring a NONFUT tense approach.

If PEDT is mostly observed in perfective constructions or constructions that only require a loose overlapping relation between event time and topic time, NONFUT is a successful theoretical choice. Otherwise, a NONFUT will require other operators such as *Split* to capture PEDT.

2.6. Analysis 2: Extension of the English-like two tenses to Mandarin

In this section, we suggest that the St'át'imcets-like non-future analysis for PEDT is not the only way for Mandarin. The English-like two-tense-approach can also capture the data under discussion. As a working hypothesis, we assume the following semantics for PRES and PAST in English and Mandarin. The Mandarin tense system is a morphologically null version of the English system.

- (147) a. $[[\text{PRES}_7]]^{c,w,g} = g(7) : g(7) = t_c$
 b. $[[\text{PAST}_7]]^{c,w,g} = g(7) : g(7) < t_c$

The PRES (Bennett & Partee 1978) in (147a) returns t_c . In a matrix clause, t_c is often the instantaneous utterance time s^* , thus the present in (147a) is an instantaneous present. The PAST in (147b) requires $g(7)$ to precede t_c .

2.6.1. Subject PEDT with i-level statives

For the St'át'imcets-type PEDT, a NONFUT tense is simple and successful. At the first sight, the two-null-tense approach does not provide the possibility of two different tem-

poral locations in the topic time, which seems to be hard to capture PEDT. But for the Mandarin-type PEDT, we do see the connection with English, a language that apparently possesses two tenses.

Subject PEDT involves a coordinated subject consisting of a deceased and a living person. Taking these constructions as evidence favoring a NONFUT tense makes two assumptions: i. the temporal projection of a noun referring to the dead must be in the past; ii. the temporal projection of the nominal domain is the same as the verbal domain. The second assumption is not necessarily true (Enç 1982, Tonhauser 2006). The temporal interpretations of the nominal domain need not be identical to the time at which the verbal domain (or the proposition) is interpreted. For example, in (148a), the verbal predicate 'be in jail' holds at the utterance time, but the property of being a 'fugitive' for the subject is only true several days ago before they were put back in jail. Similarly, the predicate in (148b) 'be born' was included in 1945 prior to the utterance time, but the property of being a father only begins to hold in a time after the speaker's birth. Therefore, a deceased experiencer does not mean that the predicate associated with it has to be in past tense.

(148) a. [context: Some prisoners escaped and were chased by the police for several days. One day, the sheriff announces:]

Every fugitive is now in jail. (Enç1981: 38)

b. My father was born in 1945. (Tonhauser 2006: 167)

In fact, in English, a dead individual is compatible with present tensed predicates, especially when the predicate is i-level. For example, the entities in the following examples are distinct, but the predicates in (149) are inflected in present tense.

- (149) a. Mammoths first appeared in Africa 3 million to 4 million years ago, and are believed to be cousins, rather than ancestors, of modern elephants. But while they **have** 58 chromosomes and elephants 56, research has shown only a 5 percent genetic difference between the species.

(Mittwoch 2008b: 168 footnote 1)

- b. Dinosaurs **are** a group of reptiles that dominated the land for over 140 million years (more than 160 million years in some parts of the world).

(google: <https://www.nhm.ac.uk/discover/what-are-dinosaurs.html>)

Other than that, English also allows “historical present” in which present tense is used in a past narration discourse, as the example in (150) illustrates.

- (150) I couldn’t believe it! Just as we arrived, up **comes** Ben and **slaps** me on the back as if we’re life-long friends. “Come on, old pal,” he **says**, “Let me buy you a drink!” I’m telling you, I nearly fainted on the spot.

(Quirk et al. 1985: 181)

An account for the English examples in (149) and (150) is possible to extend to Mandarin. We admit that a sentence with an i-level predicate and a coordinated subject involving a deceased and a living person in English is odd, as the sentences in (151) show. Some speakers marginally accept the sentence in (151b).

- (151) a. # Washington and Obama are tall.
b. # Einstein and Zhenning Yang are interested in physics.

We do not have a full story to explain the variations between English and Mandarin

for this type of constructions at this stage. It should be stressed that our central concern here is showing that Subject PEDT with i-level predicates is not a strong argument against the two-null-tense analysis. English possesses two tenses and it has a rich body of phenomena that argue against the key assumption which a NONFUT analysis would pursue in this type of constructions. How the analysis that explains the variations should be, remains a matter of ongoing research. We suspect that Mandarin present tense is likely to have properties different from English present besides being morphologically null, as it is well-documented in the literature that present tense in tensed languages vary in many dimensions (Comrie 1976, Ojihara 1996 among others).

2.6.2. Adjunct PEDT: a syntactic account

Mandarin allows Adjunct PEDT, demonstrated by the repeated example below.

- (152) Zuotian he jintian Lulu dou hen jusang.
 yesterday and today Lulu DOU very frustrated
 ‘Lulu was frustrated yesterday and she is frustrated today.’

This option is not available in English, if tense is inflected on the predicate, illustrated by the examples in (153). The time adverb ‘today’ can refer to a time that precedes the utterance time and is within ‘today’, hence (153a) is compatible with past tense. But the coordinated adjunct with a past time adverb and ‘now’ is odd with a single tense (either past tense or present tense) in (153b). Different tenses are required as (153c) shows.

- (153) a. John *is/was tired *the day before yesterday and today*.
 b. John *is/*was tired *the day before yesterday and now*.

- c. John **was** tired *the day before yesterday* and he **is** tired *now*.

But when tense is not inflected on the predicate, coordination of different time adverbs are also available in English. For instance, the infinitive predicate in (154a) and the bare form of the predicate in the small clause in (154b) are both compatible with a coordinated adjunct that involves a past time and a present time.¹⁴

- (154) a. Everyone considered Obama *to be very lucky* **when he was elected as a senator and today as a former president**.

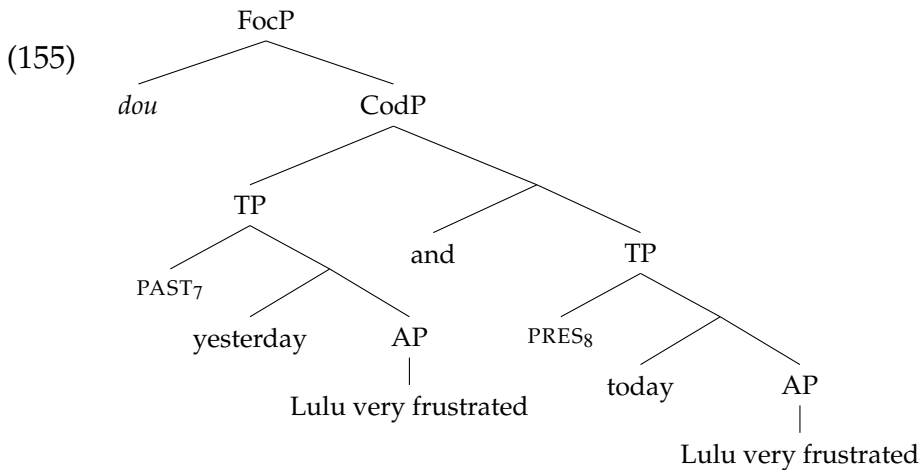
- b. Everyone considered Obama *lucky* **as a child and as an adult**.

This observation emphasizes one important difference between English and Mandarin if both languages bear two tenses. The more flexibilities shown by Mandarin is due to the null form of tense operators. English is more constrained when the two different morphological forms of tenses surface. In tenseless cases, it also allows the interpretational flexibility similar to Mandarin. This point will become important when we spell-out our analysis for the sentence in (152).

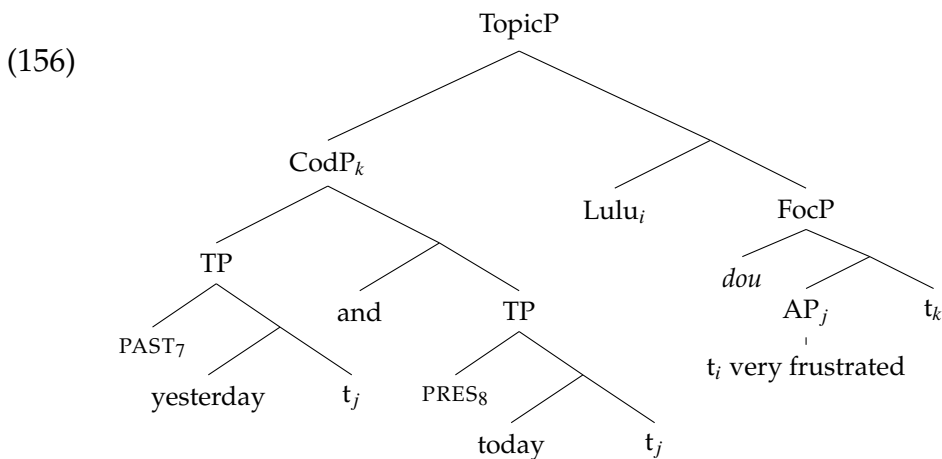
If the sentence in (152) contains only one tense operator, there is no way to derive the right interpretation because the only reference time supplied by the tense operator is either present or past. Neither *Dist* nor *Split* will succeed in creating a past time interval and a present time interval. Therefore, we make a different assumption: the sentence in (152) has two covert tenses.

¹⁴We thank Gennaro Chierchia for suggesting these data to us.

A possible syntactic solution¹⁵ is to assume the base structure in (155) for (152). The structure in (155) is a coordination of two clauses with different time adverbs and tenses. The adjective phrase is the same in both clauses. Given that both tenses are morphologically null, we do not see any difference in the two predicates.



The adjectival phrases *Lulu hen jusang* ‘Lulu very frustrated’ in the two coordinated clauses undergo across-the-board (ATB) movement and lands below *dou*, leaving a trace t_j in each TP, as demonstrated in (156).



¹⁵This idea owes to Genaro Chierchia in our personal communication.

In a sentence with a distributive reading, a subject is always preceding *dou* in Mandarin, as illustrated by the examples below in (157). Hence we assume that the functional head¹⁶ above *dou* in this type of structure syntactically bears an EPP feature that needs to be checked by a DP. This motivates the subject ‘Lulu’ in the moved adjective phrase to further move to the Spec of the functional projection headed by *dou*, leaving a trace t_i . Lastly, the remnant of the coordinated construction CodP is topicalized via remnant movement, leaving a trace t_k . The topicalization of remnant movement is driven by information structure. *Dou* is associated with the alternatives of the conjunction and maintains its semantics as those suggested by Liao (2011), M. Liu (2018) or Y. Xiang (2020).

- (157) a. Tamen dou zou le.
 3PL DOU leave SFP
 ‘They dou left.’
- b. *dou Tamen zou le.
 DOU 3PL leave SFP

Despite the surface structure, in LF the moved elements is reconstructed. The reading of (152) is derived as if the all the moved elements are put back to their original positions in (155) and we obtained the desired reading in (158). (158) says that there is a state of Lulu being frustrated that includes a context-salient time $g(7)$ and $g(7)$ is within yesterday. There is also a state of Lulu being frustrated that includes t_c and t_c is within today.

¹⁶We do not propose an EPP feature on *dou* is because the sentence below with an even-like inference does not require a subject before *dou*. Capitalization indicates stress.

(1) Dou [WU_F-dian]-le.
 DOU five-o’clock-ASP
 ‘It is five o’clock.’ (\rightsquigarrow *It’s too late.*)

(Yimei Xiang 2020: 175)

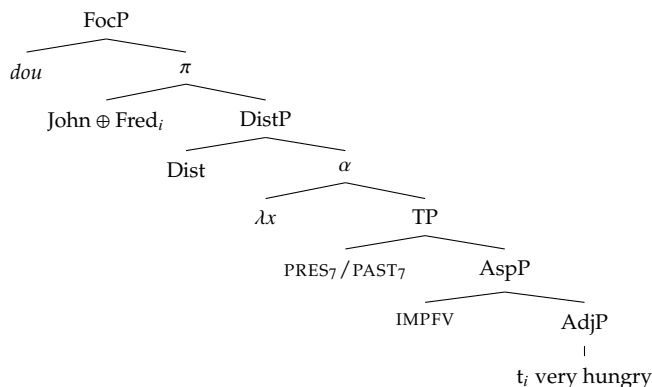
$$(158) \quad \llbracket 152 \rrbracket^{c,g,w} = \exists s[\text{frustrated}(l, s, w_0) \wedge g(7) \subseteq \tau(s) \wedge g(7) \sqsubseteq \text{yesterday}] \wedge \exists s[\text{frustrated}(l, s, w_0) \wedge g(8) \subseteq \tau(s) \wedge g(8) \sqsubseteq \text{today}], \text{ iff } g(7) < t_c \wedge g(8) = t_c$$

The reason why English does not allow PEDT with coordinated adjuncts is due to the fact that different tense morphology has to be inflected on the predicate in these constructions, which does not trigger ATB movement. We assume that the ATB movement is licensed only when the moved elements are identical. In English, the copulas in the two coordinated clauses are inflected with different tense morphology (is/was). Therefore, the first step of ATB movement in this type of constructions does not occur and we are unable to obtain such constructions in English. In Mandarin, tense morphology is null and ATB movement is available, thus this kind of PEDT is not detected in English but detected in Mandarin.

2.6.3. Subject PEDT blocking effect of s-level statives

In the previous discussion about blocking PEDT in sentences with s-level statives, we show that the semantics of a standard imperfective aspect and *Dist* are adequate to capture this fact, as long as no *Split* operator exists. Tense has no impact on blocking effect. Let us briefly repeat the argumentation. The structure of the sentence in (159a) is repeated in (159b). Within a two-null-tense analysis, the denotation is presented in (159c).

- (159) a. John he Fred dou hen e.
 John and Fred DOU very hungry
 ‘John and Fred are very hungry./John and Fred were very hungry./#John was very hungry and Fred is very hungry.’
- b.



$$c. \exists s[\text{hungry}(s, j, w) \wedge g(7) \subseteq \tau(s)] \wedge \exists s[\text{hungry}(s, f, w) \wedge g(7) \subseteq \tau(s)]$$

According to (159c), no matter which time the tense operator supplies, it has to hold for both states, blocking PEDT. The two-null-tense analysis makes an even stronger claim: the reference time can only be either present or past even without the overlapping requirement derived from IMPFV and *Dist*, because only PRES or PAST exists in (159b).

2.6.4. Interim summary

This section demonstrates that an English-like two-null-tense approach captures PEDT in Mandarin equally well. Table 2.5 summarizes the performance of PEDT in English and Mandarin.

Table 2.5: PEDT in Mandarin and English

Pattern	Mandarin	English
a. subjects (deceased & alive) + i-level statives	✓	?? (✓ in ‘historical present’)
b. adjunct (past & present) + s-level statives	✓	× (except when tense is uninflected)
c. *coordinated subject + s-level statives (past only/present only)	✓	✓

From Table 2.5, we see that the two languages pattern exactly the same for constructions with a coordinated subject and s-level statives. They differ Subject PEDT with i-

level statives and Adjunct PEDT. English in general does not allow Subject PEDT even though some speakers find certain cases marginally acceptable depending on the i-level predicates. But English allows this type of construction in historical present usage and a deceased subject is not necessarily incompatible with present tense. We argue that this type of PEDT in Mandarin does not go against a two-null-tense analysis since we also observe similar phenomena in English. An account for English is potential to carry over to Mandarin.

English also disallows Adjunct PEDT, unless tense is not morphologically realized. We assume that the Mandarin counterpart has a different syntactic structure which allows ATB movement from two coordinated TPs with different tenses. In English, since different tense morpheme is overtly marked on the predicate, ATB movement of the verbal phrases is not allowed and thus PEDT is prohibited.

2.7. Constraints on time adverbs and lack of ‘present perfective’

So far, we lay out two types of analyses to account for PEDT in English, Mandarin and St’át’imcets: the non-future tense analysis and the two-null-tense analysis. In this section, we take a further look at other evidence in Mandarin to test the potential of the empirical coverage of both analyses.

Let us first consider the restrictions on temporal adverbs. Both Mandarin and St’át’imcets bare predicates unmarked by aspect markers are compatible with past and present time

adverbs but not future time adverbs. To express future interpretations, a future modal is often required (except futurates for scheduled eventualities in Mandarin, see Chapter 3 for details). Both the NONFUT tense and the two-null-tense analysis can account for this restriction. The non-future tense makes a distinction between future and non-future, which explains why non-future time adverbs are fine with bare predicates. The two-null-tense approach is similar because the two tenses are compatible with either present or past time adverbs.

2.7.1. Implications of 'present perfective'

Another phenomenon we are interested in is the parallelism between Mandarin and English observed in Section 2: the lack of 'present perfective'. A combination of perfective aspect and the present tense is functionally infelicitous in many languages (Comrie 1976, Bennett and Partee 1978, Bybee et al. 1994, Bache 1995). In flecional languages, where aspecto-temporal values are expressed cumulatively, this combination is not found. For example, in Romance languages, the perfective only has past reference (Comrie 1976). In languages where the categories of tense and aspect are expressed independently, such as Slavic languages, this grammeme combination is available, but involves reinterpretation

of one or the other of the two grammemes¹⁷ (Malchukov 2009). In this dissertation, we only focus on the more regular pattern in which ‘present perfective’ is infelicitous. Other patterns are only introduced when they are relevant. Readers who are interested in the Slavic pattern can refer to Malchukov (2009) for a proposal in terms of local markedness and markedness hierarchies in Optimality Theoretic terms.

One “irregular” pattern for the sake of our interest is the St’át’imcets pattern. St’át’imcets does not show infelicities of ‘present perfective’¹⁸ Unlike the default future or generic reading of present perfective in Slavic languages, in the context in (160), the morphologi-

¹⁷According to Malchukov (2009), Slavic languages differ in the way that perfective presents are interpreted (Comrie 1976; Breu 1994). In South Slavic languages, such as Bulgarian and Serbo-Croatian, the default meaning of a perfective present is generic present (narrative and habitual, see Comrie 1976; Breu 1994). For example, in the following sentence from Bulgarian, the present perfective form is used in a narrative discourse.

- (1) Speglednet se, pousmixnet, devojki...
 glance.PFV.PRES.3PL REFL smile.PFV.PRES.3PL girls
 ‘The girls look at one another, smile at one another...’ (Bulgarian, Comrie (1976: 69))

In East Slavic languages, such as Russian, a perfective present is normally interpreted as future. In (2), the present imperfective form denotes a generic reading, while the present perfective form denotes a future reading. Only in certain contexts (in the presence of the habitual particle *byvalo* or modal negation *nikak ne*, see Bondadrko (1971)), the present perfective forms have a generic interpretation, shown in the example in (3).

- (2) a. On idet.
 he go.IMPV.PRES.3SG
 ‘He goes.’
 b. On pri-det.
 he PFV-go.PRES.3SG
 ‘He will come.’ (Russian, Malchukov 2009: 19)
- (3) On byvalo pri-det, skazhet
 he PTCL PFV-go.PRES.3SG say.PFV.PRES.3SG
 ‘He used to come and say.’ (Russian, Malchukov 2009: 19)

¹⁸The St’át’imcets abbreviations in Reis Silva and Matthewson (2007) are summarized below: CIRC = circumstantial modal, DEIC = deictic, DET = determiner, INTR = intransitive, NEG = negation, POSS = possessive, SUBJ = subject, TR = transitive.

cally null form (perfective) of St'át'imcets eventives denote an ongoing interpretation.

(160) *Context: Your friend calls you on the phone and asks you to meet with her right now.*

You respond by saying:

ao kw-en ka-nás-a áku7 snúwa...
NEG DET-1SG.POSS CIRC-go-CIRC DEIC you...

'I can't come to your place...'

a. q'7-ál'men-lhkan
eat-want-1SG.SUBJ

'I'm hungry.'

(perfective stative)

b. máys-en-lhkan ti n-q'íl'q-a
fix-TR-1SG.SUBJ DET 1SG.POSS-chair-DET

'I'm fixing my chair.'

(perfective accomplishment)

c. k'wezús-em-lhkan
work-INTR-1SG.SUBJ

'I'm working.'

(perfective activity)

(Reis Silva & Matthewson 2007)

Nonetheless, Blackfoot (Algonquian), a language that shares a lot of similarities with St'át'imcets in their aspectual systems, pattern the same as Mandarin and English in disallowing present perfective readings (Reis Silva and Matthewson 2007). Blackfoot overtly marks imperfective aspect in all predicate types, giving rise to ongoing readings and habitual readings. Like St'át'imcets, predicates which have no imperfective marking are assumed to be perfective. In the telephone context in (161), the perfective form of a stative predicate in (161a) and imperfective form of eventives in (161b-c) are natural in such a context, but the perfective form of eventives in (161d-e) cannot be interpreted as present

tense.¹⁹

(161) *Context: Your friend calls you on the phone and asks you to meet with her right now.*

You respond by saying 'I can't meet with you right now because ...'

a. nitsiksttsokini

nit-ik-sttsokini

'1SG-INT-hungry'

'I am really hungry.'

b. nitaihkiita

nit-a-ihkiita

1SG-IMPF-cook

'I am cooking.'

c. nitaoksstoo'p-amo sinakiatsis

nit-a-oksstoo'p-wa amo sinaaki-a'tsis

1SG-IMPF-read-3SG 3DEM write-tool

'I am reading this book (specific).'

d. # nitsskiita

nit-ihkiita

1SG-cook

¹⁹The Blackfoot examples in Reis Silva and Matthewson (2007) are presented first in a broad phonemic transcription, then in a morphemic analysis. Abbreviations are as follows: DEM = demonstrative, DET = determiner, IMPF = imperfective, INT = intensifier, SG = singular.

'I cooked.'

e. # nitsikksstoo^a amo sinakiatsis

nit-ii-okstoo^ap-wa amo sinaaki-a'tsis
 1SG-?-read-3SG 3DEM write-tool

'I read this book (specific).'

(Reis Silva and Matthewson 2007)

Based on the lack of present perfective, Reis Silva and Matthewson (2007) propose that the English-type instantaneous present tense analysis can extend to Blackfoot. Thus Blackfoot has two null tenses: PRES and PAST. The telephone context effect among Blackfoot, English, Mandarin and St'át'imcets are summarized in Table 2.6.

Table 2.6: Telephone-context-effect in Blackfoot, English, Mandarin and St'át'imcets

Language	Blackfoot	English	Mandarin	St'át'imcets
Tense	PRES (\emptyset), PAST (\emptyset)	PRES (-s/ \emptyset), PAST (-ed)	TBD (\emptyset)	NONFUT (\emptyset)
Aspect	Impf (-a-), Perf (\emptyset)	Impf (-ing), Perf (\emptyset)	Impf (zai-), Perf (-le ₁)	Impf (wa ₇), Perf (\emptyset)
telephone context effect	✓	✓	✓	*

Despite the differences of the tense-aspect systems among the four languages, Blackfoot, English and Mandarin all disallow present perfective in the telephone context while St'át'imcets does not. We are interested in how the two analyses under discussion would say for this cross-linguistic variation.

2.7.1.1. The two-null-tense analysis: an instantaneous present

If we go for a two-null-tense analysis for Mandarin, the same pattern among the three genetically and areally unrelated languages can be attributed to a simple assumption: the present tense in these languages offers the utterance time as the topic time, which is

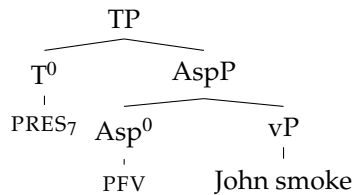
an instantaneous moment (Bennett and Partee 1978, Reis Silva and Matthewson 2007). This insight is formalized in (147a), repeated below in (162a). (162a) says that the present tense is only defined if $g(7)$ equals to t_c . In a root clause, t_c is the utterance time. It is generally the intuitive ‘now’ of the interlocutors, but very different from what the word ‘now’ means because it is a single moment. In an embedded attitude context, t_c may be the subjective ‘now’ of the attitude holder.

- (162) a. $[[\text{PRES}_7]]^{c,w,g} = g(7) : g(7) = t_c$
 b. $[[\text{PFV}]] = \lambda P_{\langle v, st \rangle} \lambda t \lambda w \exists e [P(e)(w) \wedge \tau(e) \subseteq t]$

An equally simple analysis for the perfective aspect in (162b) locates the runtime of the event in an interval supplied by another operator. An English present perfective sentence like (163a) with the structure in (163b) means that the runtime of John’s smoking is included in a single moment, s^* , demonstrated in (163c-d).

- (163) a. John smokes.

b.



- c. $[[163a]]^{g,c} = \lambda w \exists e [\text{smoke}(e)(w) \wedge \text{Agent}(e)(w) = j \wedge \tau(e) \subseteq g(7)]$, iff $g(7) = t_c$
 d. There is an event e of John smoking, whose runtime $\tau(e)$ is included in the contextually supplied time t_c . Namely, the utterance time s^* .

Apparently the runtime of eventives (accomplishments, achievements and activities) cannot be as instantaneous as the utterance time. Specifically, accomplishments and

achievements involve a process of change of state, which at least takes two moments for the original state and the result state after the change. Hence the runtime of accomplishments and achievements are not as instantaneous as s^* does, even achievements are conceptually punctual. Activities are homogeneous down to some minimal extent that allows the right type of activities to be recognizable (Rothstein 2004), which also requires a runtime longer than a single moment. Hence activities are not instantaneous as well. In other words, $\tau(e) \subseteq s^*$ does not hold for eventives. Therefore eventives are infelicitous in present perfective, explaining their oddness in the telephone context.

On the contrary, statives are homogeneous, possessing the sub-interval property defined in (164).

- (164) A predicate p of times has the subinterval property iff for all times t , for all subintervals t' of t , the truth of $p(t)$ entails the truth of $p(t')$. (Dowty 1979)

Different from activities, a state can hold in a single moment. Hence the runtime of statives can be a single moment small enough to satisfy the requirement of present perfective. This explains why in the telephone context, Blackfoot and English statives in present perfective are fine (Reis Silva and Matthewson 2007). In Mandarin, overt aspect markers are incompatible with statives in general (unless the statives obtain an inchoative reading or the statives take a durative complement) due to the selectional constraint of the overt aspect marker le_1 (similar with the English progressive form, which is incompatible with statives). Therefore, Mandarin statives in the telephone context are not overtly marked by le_1 but rather marked by a covert imperfective aspect.

Some readers may wonder where our intuition of a continuous reading of statives in present tense rather than a culminating reading in English comes from. This intuition can be further captured by the maximality constraint defined in (165). That is, if there is a state that can break down to smaller subparts that share the exact same properties with the whole state, it is the whole state that is perceptually picked out for evaluation. The *max* operator claims that for any state that it applies to, it returns the state that satisfy $P_{\langle v, st \rangle}$ and bears the unique, longest runtime t in a given context since all intervals t' in which the state holds are subsets of t . A state generally lasts longer than a single moment, thus the continuous reading is available and preferred when statives are in present tense.

$$(165) \quad \llbracket \text{max}(P) \rrbracket^c = \lambda s_{\langle v \rangle} \lambda w [P(s)(w) \wedge \iota t. \tau(s) = t \wedge \forall t' \forall s' [P(s')(w) \wedge \tau(s') = t' \rightarrow t' \subseteq t]]$$

With the instantaneous present tense assumption and the standard semantics of perfective aspect, we explain the lack of present perfective among Blackfoot, English and Mandarin in a unified way. A point to be noted is that it is a more general situation for the runtime of eventives to be incapable of being within an instantaneous reference time (Wurmbrand 2014, Rullmann and Matthewson 2018). For example, the English sentences below in the past and future contexts cannot mean that the full event is within the instantaneous moment specified by the *when*-clause. They can only yield an inchoative reading or a progressive form is required for an ongoing reading. Present perfective is just a special case for this generalization because the reference time in present tense for these languages is the utterance time, which is always instantaneous.

(166) a. * John sang in the shower when the mailman arrived.

OK if inchoative

cf. John was singing in the shower when the mailman arrived.

b. *John will sing in the shower when the mailman arrives.

OK if inchoative

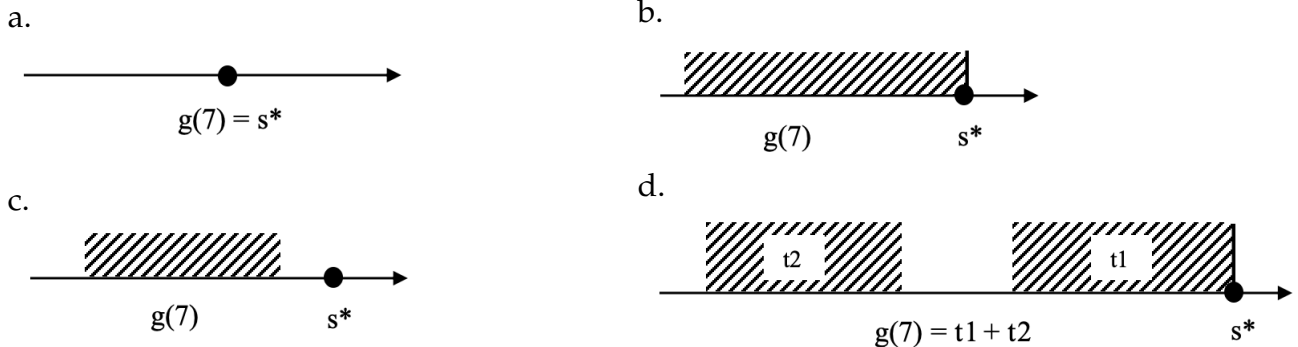
cf. John will be singing in the shower when the mailman arrives.

(Wurmbrand 2014: 429)

2.7.1.2. The NONFUT analysis: a PAST tense bundled with perfective

The NONFUT analysis correctly predicts the availability of present perfective in St'át'imcets. NONFUT is unspecified between present and past, thus it does not specify an instantaneous present option in the telephone context. Among the four possibilities (repeated below in (167)) that NONFUT could offer, (167b) provides a large enough interval that the runtime of an eventuality could fit in. Hence NONFUT successfully captures the fact that present perfective is licensed in St'át'imcets.

(167) Four possibilities of $g(7)$ given NONFUT



If Mandarin goes for a NONFUT analysis as St'át'imcets does, the lack of present perfective in Mandarin is less straightforward. In principle, Mandarin should show the St'át'imcets pattern since NONFUT does not restrict the topic time to the utterance time.

We could stipulate that though NONFUT does not specify present and past, present reading in Mandarin is only limited to an instantaneous present option, namely the situation in (167a). Then the argumentation for Blackfoot and English can extend to Mandarin. But this is an unattractive stipulation. Not only no independent evidence supports it, but also it is unclear to us what else this stipulation can bring us.

A better alternative (and possibly the only available option in a NONFUT framework for the telephone context effect if no extra element is assumed in the structure) is to build extra assumptions on the perfective aspect. This is of course not a new idea. J.-W. Lin (2006) exactly assumes a temporal precedence relation in the semantics of Mandarin perfective aspect, repeated below in (168a). Lin's proposal can be reproduced in a neo-Davidsonian framework in (168b).²⁰

- (168) a. $PFV := \lambda P_{\langle i,t \rangle} \lambda t_{Top} \lambda t_0 \exists t [t \subseteq t_{Top} \wedge P(t) \wedge t_{Top} < t_0]$ (J.-W. Lin 2006)
- b. $[[PFV]] = \lambda P_{\langle v,st \rangle} \lambda t_{Top} \lambda t_0 \lambda w \exists e [P(e)(w) \wedge \tau(e) \subseteq t_{Top} \wedge t_{Top} < t_0]$
- c. $[[PFV]]^{s,c} = \lambda P_{\langle v,st \rangle} \lambda t : t < t_c. \lambda w \exists e [P(e)(w) \wedge \tau(e) \subseteq t]$

Here we do not adopt J.-W. Lin's semantics for Mandarin perfective, but rather build the temporal precedence relation in the presupposition of the perfective, as shown in

²⁰Sun (2014) suggests that Mandarin le_1 requires the event time to precede the utterance time, as shown below. This analysis will also give us the desired result of the lack of present perfective in Mandarin, but we do not think it is an attractive alternative.

(1) $[[le]] = \lambda P_{\langle v,t \rangle} \lambda t' \lambda t. \exists e [P(e) = 1 \wedge t' \supseteq \tau(e) \wedge \tau(e) < t]$ (Sun 2014:75)

The motivation for Sun's revision of J.-W. Lin's proposal for le_1 is that with her syntactic and semantic assumptions about time adverbs, sentences with a temporal adverbial that overlaps with the utterance time do not yield the right prediction. But the problem Sun points out can be resolved if we make a different assumption about time adverbs (see an alternative by He (2019a)). The denotation offered by Sun also cuts off the correlation between the topic time and the utterance time, a basic insight for aspect from Klein (1994), hence is unattractive.

(168c), following the strategy by Bochnak et al. (2019) for Samoan, a superficially tenseless Austronesian language. The motivations for the two denotations are similar. We aim for the one in (168c) because it offers a unified semantic type for both imperfective and perfective, thus is simpler in derivation.²¹ According to the semantics in (168c), present perfective is unavailable in Mandarin because the perfective is only defined when the event time is within a time that precedes t_c (the utterance time in the telephone context). The lack of present perfective in Mandarin thus has nothing to do with NONFUT tense but is attributed to the presupposition of the perfective.

The implication of this alternative is that other than a NONFUT tense, Mandarin also has a past tense bundled with the perfective morpheme, a similar conclusion that we draw from J.-W. Lin's proposal. This is a less common tense system among languages. But if this analysis is on the right track, apparently Mandarin is not the only language that is argued to bear a tense system with a NONFUT tense and a past tense. For instance, S. Chen (2018) proposes that Atayal (Austronesian) has a covert non-future tense and an overt existential past tense *-in-*.

2.7.1.3. Interim summary

In this subsection, we investigate two other properties of Mandarin temporal interpretations: a non-future constraint over time adverbs on stative sentences and lack of present

²¹Another reason for J.-W. Lin (2006) to assume a complex semantic type for Mandarin perfective is that perfective aspect is incompatible with future modal *hui*. J.-W. Lin (2006) captures this fact with a type-mismatch story by assuming that future modal only takes in a complement with a semantic type of $\langle it \rangle$ (the type of an imperfective phrase) rather than $\langle i, it \rangle$ (the type of a perfective phrase). We will address this fact in Chapter 3, without relying on a type-mismatch account.

perfective. Both analyses work equally well with the constraint on time adverbs. The NONFUT tense accounts for the future vs. non-future distinction by offering a topic time unspecified for present or past. The two-null-tense approach accounts for the future vs. non-future distinction by the existence of covert PRES and PAST but not a covert future tense.

To account for the lack of present perfective in telephone context, the two analyses differ in their tools. The NONFUT tense analysis relies on a semantic past tense encoded in the perfective aspect. This treatment leads to the conclusion that Mandarin has a system with two tenses: a covert non-future tense and a semantic tense encoded in perfective aspect. To account for the lack of present perfective, the two-null-tense approach relies on the assumption of an instantaneous present tense, which derives the facts based on the infelicities of fitting a non-momentary event time into a single moment.

2.8. Comparison between the two analyses

So far we have investigated the explanatory power of the two analyses for the following Mandarin data: constraints on temporal adverbs, PEDT and lack of present perfective. The key ingredients and assumptions of each analysis for the corresponding data are summarized in Table [2.7](#).

From Table [2.7](#), we see that the two approaches do not differ in empirical coverage. For the non-future tense analysis, the covert imperfective aspect and a distributive operator exclude the possibility of Subject PEDT for s-level statives. I-level statives are compatible with Subject PEDT because they are not existentially closed by the imperfective but are

Table 2.7: Empirical coverage and relevant assumptions

Phenomena	NONFUT		two null tenses	
		assumptions		assumptions
PEDT				
(dead + alive) subject + i-stative	✓	GEN, <i>Dist</i>	✓	(GEN, <i>Dist</i>)
coordinated adjunct + s-stative	✓	IMPFV, <i>Dist</i> , <i>Split</i>	✓	PRES + PAST
*coordinated subject + s-stative	✓	IMPFV, <i>Dist</i>	✓	IMPFV, <i>Dist</i>
Time adverbs	✓	None	✓	None
Lack of present perfective	✓	PAST tense in perfective	✓	instantaneous present

bound by a generic operator. The generic operator only loosely requires the runtime of the state to overlap with the non-future topic time, hence i-level statives are compatible with Subject PEDT. In order to account for Adjunct PEDT, a *Split* operator is necessary to obtain the right reading. Moreover, to account for the lack of present perfective, the non-future analysis need to be coupled with a past tense encoded in the perfective. It is still unclear to us why the *Split* operator occurs in Adjunct PEDT but is excluded in cases with a coordinated subject. As far as we know, it is likely to be simply a stipulation. If we go for a non-future tense analysis, then we should focus on how to constrain the distribution of the *Split* operator based on language internal and cross-linguistic variation of PEDT phenomenon. Moreover, we should also try to understand the implication of a tense system with a NONFUT tense and a PAST tense. For instance, how do children acquire such a system, knowing when to make a future vs. non-future distinction and when to make a past vs non-past distinction? Is there any other evidence in support of this type of tense system?

For the two-null-tense approach, it goes with a slightly different set of assumptions. Though at this stage we do not provide a full account for PEDT with a coordinated subject

consisting of the dead and the alive,²² an account for similar data in English is potential to extend to Mandarin. The two-null-tense approach also goes for a syntax-heavy account for Adjunct PEDT, based on the assumption that two tense phrases are coordinated in narrow syntax. Lastly, the two-null-tense approach easily captures the lack of present perfective by a common assumption: present tense offers an instantaneous moment. If we go for a two-null-tense approach, then we should focus on the distribution of PRES and PAST. The two-null-tense system predicts that there will be facts showing ambiguous interpretations due to the morphological null forms of the operators. Meanwhile, it will also predict that there are situations in which only either interpretation is feasible, e.g. perfective goes well with PAST but not PRES. The task is to figure out those situations and account for the variations between overt tense systems and covert tense systems. For instance, why PEDT is more constrained in overt tense systems (e.g. PEDT is limited to infinitives or uninflected small clauses in English)?

Though we hope to decide between these two hypotheses on empirical grounds, it is obvious that no hard and fast evidence is going to do the job. Both the NONFUT account and the two-null-tense account find their own ways to account for the target data. Hence choosing between NONFUT and two null tenses at this stage is more of a question of internal elegance and compactness of the theory and empirical coverage with the least unattractive stipulations.

Even though we keep the possibilities open for the two analyses, we are confident

²²We assume that this type of structure also has a GEN operator and a *Dist* operator. More assumptions may be needed, hence we put the operators in brackets.

to draw the conclusion that Mandarin is not committed to a non-future tense analysis (cf. Sun 2014) even we observe similarities (especially PEDT) with languages that prefer a NONFUT tense. The two-null-tense approach also successfully captures the data in a constrained and predictable way. Hence the variations among superficially tenseless languages may lead to very different analyses and we call for further scrutiny of these variations. To account for the variation between St'át'incets and Mandarin, a non-future tense will need a PAST tense anyway. Extra complexity is required in the aspectual system for a non-future tense approach. In contrast, the two-null-tense approach maintains a simple and unified analysis for perfective and imperfective aspect for Mandarin. It works well empirically in a unified way and is based on more general assumptions detected in superficially tenseless languages and tensed languages. Therefore it is more likely to be on the right track. In this dissertation, we go for the two-null-tense approach as our working hypothesis.

2.9. Perfective *le1* is not the source of non-culminating readings

Cross-linguistic research shows that the properties of the verb and the object it takes influence the availability of the non-culminating reading of accomplishments: homogeneity of the eventuality (Rothstein 2004), event structures associated with the predicate (creation verbs, consumption verbs etc., Singh 1998, Tatevosov and Ivanov 2009, Zhang 2018), mass/count properties of the object (Singh 1991, 1998; Soh and Kuo 2005, Zhang 2018),

numeral modification (Bittner 2014), (in)definiteness of the objects (Zhang 2018).

There are two general directions in analyzing non-culminating accomplishment phenomena. One way is to attribute the non-culmination to the semantics of the aspect operator, treating the perfective aspect as the ‘neutral aspect’ (Smith 1994, 1997) or a partitive operator (Altshuler 2014, S. Chen 2017b, 2018; Y. He 2019b). Another way is to implement the non-culmination in the predicate: a. treat the so-called accomplishments as activities (via re-categorization, e.g. Tai 1984, A. Zhang 2018); b. assume a covert operator attached to the stem of the accomplishments (Koenig and Muansuwan 2000) that offer non-culmination or a covert operator that shift the accomplishments to be activities (Rothstein 2004); c. assume a partial thematic relation between the verb and the objects (Singh 1998) or assume that accomplishments can denote incomplete eventualities as Parsons (1990) does for English telic eventualities. We are unable to offer a theory for the phenomena of non-culminating accomplishments, not even for the Mandarin data in this dissertation. However, we suggest that capturing non-culmination via the semantics of the perfective *le*₁ is not a good solution for Mandarin. Instead, assuming a covert operator to account for non-culmination is a better option.

2.9.1. Accomplishments in Mandarin

Given the complexity and difficulty of categorizing aspectual classes, what should be classified as accomplishments in Mandarin is controversial. A. Zhang (2018) argues that the definition of accomplishments should base on two properties: durativity and boundedness. The natural end point of accomplishments is usually introduced either through

the inherent result states associated with the predicate (e.g. *kill*) or by specifying a certain amount of change in one of the arguments of the predicate (e.g. *drink three glasses of water*). The former is called inherent accomplishments and the latter derived accomplishments (Rothstein 2004, A. Zhang 2018). A. Zhang (2018) proposes that Mandarin counterparts of the following tests in (169) to diagnose the two properties and suggests that as long as activities and accomplishments pattern distinctively and form their own respective classes, we are able to obtain a well-defined class of activities and accomplishments.

- (169) a. *for*-phrase test:
- i. pre-direct-object duration phrase
 - ii. reduplication construction
- b. *in*-phrase test: duration phrase + *nei* ‘within’
- c. progressive test: *zai* ‘PROG’
- d. culmination entailment test
- e. *almost* test: *jihu* ‘almost’
- f. negation test: *meiyou* ‘NEG.PERF’

Table 2.8: Properties and diagnostics

semantic properties under investigation	diagnostics
durativity	pre-DO duration (counterpart of English <i>for</i> test) reduplication (counterpart of English <i>for</i> test) progressive
boundedness	duration + <i>nei</i> (counterpart of English <i>in</i> test) culmination test
fail attempt vs partial success	<i>almost</i> test negation test

As Table 2.8 summarizes, the *for*-phrase test and progressive test are to indicate the durativity property while *in*-phrase test aims to indicate the boundedness property of

a predicate. Culmination entailment test reveals the culmination pattern of a predicate with perfective aspect. The semantic properties that *almost* test and negation test target at are not clear. The examples for these tests drawing a line between accomplishments and activities are demonstrated in (170)-(174). The examples, categorizations of the predicates and glosses are from A. Zhang (2018), not us, though we change the gloss for *le*₁ from PERF to PFV and some of the apparent typos in her examples.

(170) Pre-direct-object duration phrase:

a. Baiyun chi-le san-xiaoshi de fan.
 Baiyun eat-PFV three-hour MOD rice
 ‘Baiyun ate rice for three hours.’ (activity)

b. # Baiyun chi-le san-xiaoshi de san-wan fan.
 Baiyun eat-PFV three-hour MOD three-bowl rice.
 ‘Baiyun ate three bowls of rice for three hours.’
 (derived accomplishment)

c. Baiyun xiu-le san-xiaoshi de qiche.
 Baiyun fix-PFV three-hour MOD car
 ‘Baiyun fixed a car/cars for three hours.’
 (inherent accomplishment)

d. # Baiyun xiu-hao-le san-xiaoshi (de) qiche.
 Baiyun fix-good-PFV three-hour (MOD) car
 ‘Baiyun fixed the car for three hours.’
 (resultative compound)

(A. Zhang 2018: 63-64)

(171) *In*-phrase test: duration phrase + *nei* ‘within’

- a. # Yunzi san-xiaoshi (nei) chi-le fan.
 Yunzi three-hour (in) eat-PFV rice
 'Within three hours, Yunzi ate rice.'

(activity)

- b. Yunzi san-xiaoshi (nei) chi-le san-wan fan.
 Yunzi three-hour (in) eat-PFV three-bowl rice
 'Within three hours, Yunzi ate three bowls of rice.'

(derived accomplishment)

- c. # Yunzi san-xiaoshi (nei) xiu-le che.
 Yunzi three-hour (in) fix-PFV car
 'Yunzi fixed the car/cars in three hours.'

(inherent accomplishment)

- d. Yunzi san-xiaoshi (nei) xiu-hao-le che.
 Yunzi three-hour (in) fix-good-PFV car
 'Yunzi fixed the car/cars in three hours.'

(resultative compound)

(A. Zhang 2018: 67-68)

(172) The progressive test with *zai*:

- a. Gaogao zai tiaowu.
 Gaogao PROG dance
 'Gagao is dancing.'

(activity)

- Gaogao zai xiu qiche.
 Gaogao PROG fix car
 'Gaoga is fixing the car/cars.'

(inherent accomplishment)

- b. Gaogao zai hua yi-fu hua.
Gaogao PROG draw one-CL picture
'Gaogao is painting a picture.'

(derived accomplishment)

- c. Gaogao zai xiu-hao qiche.
Gaogao PROG fix-goog car
'Gaogao is fixing the car.'

(resultative compound)

(A. Zhang 2018: 69-70, the example of inherent accomplishments is offered by us)

(173) *Almost* test:

- a. Wo jihu pao-le.
I almost run-PFV
'I almost ran.'

(activity: event cancellation reading)

- b. Wo jihu pao-le yi-qian-mi.
I almost run-PFV one-thousand-meter
'I almost ran one thousand meters.'

(derived accomplishment: event cancellation or non-culminating reading)

- c. Wo jihu xiu-le che.
I almost fix-PFV car
'I almost tried to fix the car.'

(inherent accomplishment: event cancellation reading but not the non-culminating reading)

- d. Wo jihu xiu-hao-le che.
I almost fix-good-PFV car

'I almost fixed the car.'

(resultative compound: non-culminating reading, but not the cancellation reading)

(A. Zhang 2018: 72-73)

- (174) a. Baiyun mei paobu.
Baiyun not.have run
'Baiyun did not run.'

(activity: event cancellation reading)

- b. Baiyun mei pao yi-bai mi.
Baiyun not.have run one-hundred meter
'Baiyun did not run one hundred meters.'

(derived accomplishment: event cancellation or non-culminating reading)

- c. Baiyun mei xiu zhe-liang che.
Baiyun not.have fix this-CL car
'Baiyun did not fix this car.'

(inherent accomplishment: only the event cancellation reading)

- d. Baiyun mei xiu-hao zhe-liang che.
Baiyun not.have fix-good this-CL car
'Baiyun did not fix this car.'

(resultative compound: non-culminating reading. Possibly also the event cancellation reading)

(A. Zhang 2018: 74-75)

The results of the tests for activities, inherent accomplishments, resultative compounds and derived accomplishments are presented in Table 2.9. A. Zhang proposes that true accomplishments in Mandarin only involve two types: a. resultative compounds; b. de-

rived accomplishments. There is no inherent accomplishment in Mandarin. The so-called ‘inherent accomplishments’ in Mandarin should be recategorized as activities, because the aforementioned tests show that inherent accomplishments pattern similar with activities rather than other categories.

Table 2.9: Diagnostics summaries adapted from A. Zhang (2018:77)

tests	activities	inherent accomplishments	resultatives	derived accomplishments
pre-DO duration	✓	✓	×	×
reduplication	✓	✓	×	✓
duration + <i>nei</i>	×	×	✓	✓
progressive	✓	✓	✓	✓
culmination entailment	–	×	✓	×
almost	cancellation	cancellation	non-culmination	cancellation non-culmination
negation	cancellation	cancellation	cancellation non-culmination	cancellation non-culmination

We disagree with A. Zhang’s conclusions of the *in*-phrase test and the progressive test. A. Zhang claims that (175a) is infelicitous because *chi-fan* ‘eat rice’ is an unbounded activity, in contrast to (175b) in which the predicate is bounded. However, our consultants accept (175a) and it yields a bounded interpretation such that Yunzi finished eating in three hours. The same judgement holds for the inherent accomplishments, illustrated in (176). In other words, the *in*-phrase on a predicate yields a bounded interpretation, disregarding the boundedness of the base predicate. It is not the right tool to indicate the boundedness property of the base predicate.

- (175) a. Yunzi san-xiaoshi (nei) chi-le fan.
 Yunzi three-hour (in) eat-PERF rice
 ‘Within three hours, Yunzi ate rice.’
- b. Yunzi san-xiaoshi (nei) chi-le san-wan fan.
 Yunzi three-hour (in) eat-PERF three-bowl rice
 ‘Within three hours, Yunzi ate three bowls of rice.’

- (176) a. Mali yi-fenzhong nei guan le men.
Mary one-minute in close PERF door
'Mary closed the door in one minute.'
- b. Yunzi san-xiaoshi (nei) xiu-le che.
Yunzi three-hour (in) fix-PERF car
'Yunzi fixed the car/cars in three hours.'

Moreover, in contrast to what A. Zhang claims, many resultatives are infelicitous with progressive marker *zai*. Other than (177c), we find the other examples in (177) odd. More resultative compounds shown in (178) are infelicitous with progressive aspect. This indicates that resultative compounds are not a unified group. There are other factors affecting the interaction between resultatives and grammatical aspect.

- (177) a. Gaogao zai da-po huaping.
Gaogao PROG hit-break vase
'Gaogao is breaking a vase.'
- b. Gaogao zai xiu-hao qiche.
Gaogao PROG fix-goo car
'Gaogao is fixing the car.'
- c. Gaogao zai ca-ganjing zhuozi.
Gaogao PROG wipe-clean desk
'Gaogao is wiping the desk clean.'

(A. Zhang 2018: 70)

- (178) a. * Yuehan zai pao-lei.
John PROG run-tired
Intended: 'John is running himself tired.'
- b. * Mali zai da-si Yuehan.
Mary PROG hit-die John
Intended: 'Mary is beating John to death.'
- c. * Yuehan zai chang-wan zhe-shou ge.
John PROG sing-finish this-CL song

Hence the results of the tests proposed by A. Zhang should be revised as follows in Table 2.10: ‘±’ in Table 2.10 means some resultatives are compatible with progressive while some do not. From the results in Table 2.10, it is hard to conclude that ‘inherent accomplishments’ and activities form a group while the rest form another group because each group differs in some test results from each other. Even for resultative compounds and derived accomplishments that A. Zhang claims to form the group of accomplishments, they differ a lot in the results of these tests. It is uneasy to argue that among the tests that A. Zhang (2018) proposes, one test is more important than the other in classifying aspectual classes. Furthermore, given the working hypothesis that durativity and boundedness define accomplishments, the only property that differentiates accomplishments from activities is the boundedness property since both activities and accomplishments are durative. However, we have shown that the counterpart of English *in*-test is not indicative of the boundedness of base predicates. The remaining tests only target at duration and culmination entailment. If the event culmination test serves as the deterministic test to distinguish activities from accomplishments, then it equals to making a stipulation such that if a predicate does not allow culmination entailment, it should be categorized as activities except for derived accomplishments, which is not convincing. Hence there is no robust evidence in Mandarin to support recategorizing inherent accomplishments as activities.

In the debate of how to classify non-culminating accomplishments, the position one chooses lies in the answer to the following question: Do the potential accomplishments have a natural end point when the actual end point can be arbitrary? This question is

Table 2.10: Revised results of diagnostics in A. Zhang (2018)

tests	activities	inherent accomplishments	resultatives	derived accomplishments
pre-DO duration	✓	✓	×	×
reduplication	✓	✓	×	✓
duration + <i>nei</i>	✓	✓	✓	✓
progressive	✓	✓	±	✓
culmination entailment	–	×	✓	×
almost	cancellation	cancellation	non-culmination	cancellation non-culmination
negation	cancellation	cancellation	cancellation non-culmination	cancellation non-culmination

difficult to answer because for languages that allow non-culminating readings, the definition of natural end point of a predicate is vague. On the one hand, it is unclear whether these predicates involve the change of states in their semantics, since interpretations with or without the change of state are both available given the right context. On the other hand, they are different from classic activities because there seems to be prototype events of these predicates that undergo a specific change of state. Namely, these events have a high probability for a specific type of result to happen, shown by the fact that without further context, these predicates with perfective aspect obtain a culminating reading. For classic activities, such an expected change of state is not obvious. Therefore, we agree with Zhang that it is better to treat predicates that may lead to more than two possible results as activities. For example, the sentences in (179) shows that Mandarin *xiu* ‘fix’ can have more than two possible results: other than being fixed, the object can be unfixed (179a) as it originally was or even worse (179b). If we incorporate the change of state as the natural end point into the lexical semantics of *xiu*, it is impossible to build in all the possibilities.

- (179) a. *gongren xiu le che, keshi che mei xiu-hao.*
 worker fix PERF car but car not fix-good
 Literally ‘The worker fixed the car, but the car is not fixed.’

- b. Shifu xiu-huai le wo de bao.
master fix-bad PERF I POSS bag
'The repairman damaged my bag from fixing it.'

(A. Zhang 2018: 135;137)

But for predicates that have only two possible results (the change of state is realized and not realized), there is no direct evidence motivating us to build or not to build the natural end point into the lexical semantics. If accomplishments that allow non-culminating readings are activities, why a culmination reading with the change of the state is salient without further context for these predicates but not for activities? The re-categorization approach will not have a true bite if this approach does not go with a story that accounts for the difference between these accomplishment-like activities and other activities, i.e. a pragmatic/cognitive account that incorporate the prior knowledge of the accomplishment-like activities to explain why the default reading is that the natural end point is obtained.

On the contrary, if we assume that the non-culminating accomplishments are like accomplishments in English, what we need is a story to pick out the activity component, which explains why we observe the similarities with activities. In this dissertation, we assume that Mandarin accomplishments contain at least three subcategories: resultative compounds, inherent accomplishments that the natural end point is inherently associated with the predicate and derived accomplishments such that the arguably atelic verb takes a quantized object. We adopt this assumption for two reasons. Firstly, as the previous discussion shows, there is no deterministic evidence to rule out the possibility of Mandarin having inherent accomplishments. We do admit that inherent accomplishments show-

ing non-culminating interpretations are not common since there are not many monomorphemic verbs that involve a change of state in Mandarin, this is probably due to the high analyticity of Modern Chinese (C.-T. James [Huang 2014](#)).

Secondly, the interpretations of accomplishments in (18), repeated in (180) are observed in genetically unrelated languages in which there is evidence to show that these predicates are accomplishments. For instance, the partial success reading and failed attempt reading are also detected in Russian, demonstrated by the examples in (181)-(182). In the Russian examples, the delimitative prefixation (marked in a square box) is marked on imperfective form of the predicate to yield a perfective reading. We believe that the current assumptions about Mandarin accomplishments benefit us most in connecting Mandarin to the fruitful cross-linguistic discussion of non-culminating accomplishments.

- (180) a. Mali guan-le men, keshi men mei guan-shang.
 Mary close-PERF door but door NEG.PERF close-tight
 'Mary closed the door, but the door was not closed.'

(failed attempt)

- b. Mali xie-le yi-feng xin, keshi meiyou xie-wan.
 Mary write-PERF one-CL letter, but NEG.PERF write-finish
 'Mary wrote a letter, but didn't finish.'

(partial success)

- c. # Yuehan da-sui le beizi, keshi beizi meiyou sui-diao.
 John hit-break PERF glass but glass NEG.PERF break-DIAO
 'John broke the glass, but the glass didn't break.'

(culmination entailment)

- (181) a. Vasja otkry-l dver' za minut-u.
 v. open.PFV-PST.M door.ACC in minute-ACC

'Vasja opened the door in a minute.'

- b. Vasja [po]-otkr-yva-l dver' pjat' minut i
v. DELIM-open-IPFV-PST.M door.ACC five minute.GEN.PL and
broši-l.
give.up-PST.M
{Context: The lock on the door is broken.} 'Vasja tried to open the door for
five minutes and gave up.'

(Tatevosov and Ivanov 2009: 84)

- (182) a. Vasja zapolni-l anket-u za pjat' minut.
v. fill.PFV-PST.M form-ACC in five minutes
'Vasja filled in the form in five minutes.'
- b. Vasja [po]-zapoln-ja-l anket-u pjat' minut.
v. DELIM-fill-IMPV-PST.M form-ACC five minutes
'Vasja spent five minutes filling in the form./ * Vasja tried to fill in the form
for five minutes (but has not filled in a single entry).'

(Tatevosov and Ivanov 2009: 86)

2.9.2. The pattern and the idiosyncrasy

The failed attempt reading is not common cross-linguistically while partial success reading is more often observed. Dowty (1979), Rothstein (2004) among others propose that accomplishments can be decomposed into an activity subevent associated with a change of state (become) subevent. The relation between the activity subevent and the become subevent can be incremental. Namely, each part of the activity has a one-to-one correspondence relation with each part of the become event. For examples, *read a book*, *build a house*, *plow a field* are predicates that involve an incremental relation between the ac-

tivity and the become event. These are incremental predicates (INCR predicates). The relation between the activity and the become event can also be a *mapping to a minimal final part* (MMFP) relation such that only the final part of the activity that corresponds to the change of state is relevant. Predicates like ‘tear a thread’, ‘open the door’ are different from ‘read a book’ and ‘plow a field’. For a door to be open, you might use a key, or turn the doorknob or hurl yourself at the door or perform a series of actions including all the aforementioned activities, these may all lead to the final result of the door being opened, but there is not necessarily a correspondence relation between these activities and the process of changing from being closed to being open. There is not a process of a door being 10% open or 50% open corresponding to the activity, either. What happened before the change of state does not directly map to the result as INCR predicates do. These are MMFP predicates. Tatevosov and Ivanov (2009) argue that MMFP predicates license the failed attempt reading while INCR predicates license the partial success reading.

Mandarin MMFP predicates, illustrated by examples in (183), allow the failed attempt reading. INCR predicates allow partial success readings, demonstrated by examples in (184).

- (183) a. Yuehan qiang-le Mali de qianbao, keshi meiyou deshou.
 John rob-PERF Mary DE purse but NEG obtain
 ‘John robbed Mary of her purse, but he didn’t get it.’
- b. Mali guan-le men, keshi men mei guan-shang.
 Mary close-PERF door but door NEG.PERF close-tight
 ‘Mary closed the door, but the door was not closed.’

- (184) a. Yuehan jian le yi-dong fangzi, ba wuding gai shang, jiu jian-wan
 John build PERF one-CL house, BA roof build on JIU build-finish

le.
PERF

'John built a house, when the roof is finished, then the construction is over.'

- b. Mali chang-le yi-shou *Rehab*, hou ban duan wang ci'er le, meiyou
Mary sing-PERF one-CL *Rehab*, after half CL forget lyrics PERF, NEG
chang-wan.
sing-finish

'Mary sang a song named *Rehab*, (but) she forgot the second half of the lyrics
and didn't finish the song.'

Not every Mandarin accomplishment allows non-culmination. Other than resultative compounds that systematically forbid non-culmination in perfective aspect as examples in (185) show, some MMFP predicates also entail culmination. In (186a), if the Plum Yew is not killed by the strangler fig, using perfective marker on *jiaosha* 'strangle-kill' is odd. Similarly, the sentences in (186b) and (186c) are odd if Mary's wallet was not lost and if the kids are not born.

- (185) a. # Yuehan da-sui le beizi, keshi beizi meiyou sui-diao.
John hit-break PERF glass but glass NEG.PERF break-off
'# John broke the glass, but the glass didn't break.'
- b. # Mali da-si le yi-zhi cangying, keshi cangying meiyou si.
Mary hit-dead PERF one-CL fly but fly NEG.PERF die
'# Mary killed a fly, but the fly was not dead.'
- (186) a. # Yuehan tou-le Mali de qianbao, keshi meiyou deshou.
John steal-PERF Mary DE wallet but NEG.PERF obtain
'# John stole Mary's wallet, but didn't get it.'
- b. # Mali sheng le yi-dui shuangbaotai, keshi na liang ge haizi
Mary give-birth-to PERF one-PAIR twin but that two CL child
meiyou sheng xia-lai.
NEG.PERF give-birth-to down-come

‘# Mary gave birth to a twin, but the two kids were not born. ’

A similar pattern holds for Russian as well. [Tatevosov and Ivanov \(2009\)](#) show that though delimitative verbs in Russian allow non-culmination, there are accomplishments that do not allow non-culminating readings at all, such as *po-vyda-va-t’ knigu* ‘give out a book’, *po-prinima-t’ tabletku* ‘take a pill’. In [\(187a\)](#), the delimitative form of the MMFP predicate ‘shot a captive’ disallow non-culminating readings at all. Since the imperfective morpheme *-(y)va-* is grammatical in [\(187b\)](#), yielding a predicate that denotes non-final stages and lead to a progressive reading, it must be the perfective operator (delimitative prefix *po-*) that contributes to the oddness of [\(187a\)](#). [Tatevosov and Ivanov \(2009\)](#) hypothesize that the perfective operator poses constraints on its complements, so that predicates like ‘shoot a captive’, ‘give out a book’ etc. cannot obtain a non-culminating reading.

- (187) a. ?? Vasja po-rasstrel-iva-l plenn-ogo.
v. DELIM-shoot-IPFV-PST.M captive-ACC
‘Vasja tried to shoot a/the captive (for some time, and gave up).’ (? , cited from Tatevosov and Ivanov 2009: 118)
- b. Vasja rasstrel-iva-l plenn-ogo.
v. shoot-IPFV-PST.M captive-ACC
‘(When I came,) Vasja was shooting a/the captive (e.g., he was taking aim when I saw him). ’

(Tatevosov and Ivanov 2009: 118)

The activity subevents of these predicates are inherently ordered (IO). For example, ‘break a vase’ that allows the failed attempt reading in [\(188a\)](#) and ‘shoot a captive’ that disallow the failed attempt reading in [\(188b\)](#) are different in their activity subevent. Sup-

bao ‘rob Mary of her wallet’. Neither stealing nor robbing involves an incremental process. Both events do not require a series of specific actions that are temporally ordered or causally ordered to lead to the final success of stealing or robbing of Mary’s wallet, either. But the two predicates perform different culmination patterns in Mandarin, shown by the repeated examples below. We can’t see what makes stealing different from robbing in the activity that is also shared by accomplishments such as *sheng yi-dui shuangbaotai* ‘give birth to a twin’, *jiaosha* ‘strangle’. This indicates that Mandarin MMFP accomplishments possess some degree of idiosyncrasy when it comes to which MMFP accomplishments license the failed attempt reading.

- (189) a. Yuehan qiang-le Mali de qianbao, keshi meiyou deshou.
 John rob-PERF Mary DE purse but NEG obtain
 ‘John robbed Mary of her purse, but he didn’t get it.’
- b. # Yuehan tou-le Mali de qianbao, keshi meiyou deshou.
 John steal-PERF Mary DE wallet but NEG obtain
 ‘# John stole Mary’s wallet, but didn’t get it.’

For INCR predicates that license the partial success reading, like Russian, Mandarin allows creation predicates to have the partial success reading in perfective. For example, the creation of a house is ordered in which part of the house come into existence first, the production of a song is ordered according to specific melodies. Therefore, the BECOME subevents of *jian yi-dong fangzi* ‘build a house’ and *chang yi-shou Rehab* ‘sing a song named Rehab’ are inherently ordered. Both predicates allow partial success readings. That means, unlike English, lack of inherent order of the become subevent is not a deterministic factor of licensing the partial success reading in Mandarin and Russian. However, as [Singh \(1998\)](#) points out, though Hindi creation predicates that involve an

incremental theme disallow the partial success reading in general, sometimes they can when the completeness of the theme reaches a certain degree. In Mandarin, we can also see how this factor influence our acceptance of non-culmination. When (190a) is uttered out of the blue with the culmination cancelled, (190a) is odd for some speakers. But in (190b), once the completeness of the house is specified (everything except the roof is completed), even if the house is not a complete house and thus ‘build a house’ partially succeeds, (190b) is much more acceptable than (190a). Here we are not able to specify a precise threshold upon crossing of which an unfinished object may be referred to as if it were the completed object, but intuitively this threshold varies from object to object and might vary among speakers as well. We leave this question to experimental studies.

- (190) a. ? Yuehan jian le yi-dong fangzi, keshi mei jian-wan.
 John build PERF one-CL house, but PERF.NEG build-finish
 ‘John built a house, but was not finished.’
- b. Yuehan jian le yi-dong fangzi, ba wuding gai shang, jiu jian-wan
 John build PERF one-CL house, BA roof build on JIU build-finish
 le.
 PERF
 ‘John built a house, when the roof is finished, then the construction is over.’

2.9.3. The source of non-culminating readings

This dissertation will not offer an analysis for the non-culminating readings in Mandarin, since pursuing a theory for non-culminating accomplishments goes far beyond the current goal. However, we claim that the non-culminating reading should not be attributed to the perfective *le*₁ given the empirical data. The semantics of perfective *le*₁ remains a standard treatment.

There seems to be a trend that INCR predicates allow the partial success reading given the right context, but there is no clear constraint detected on MMFP predicates that license the failed attempt reading in Mandarin. Suppose that there is an operator that yields non-culmination, a common assumption in the literature though there is controversy about where this operator locates and how to define it. [Tatevosov and Ivanov \(2009\)](#) argue that both non-culminating readings, i.e. the failed attempt reading and the partial success reading should be captured by a single operator instead of two because languages that show non-culmination phenomenon never morphologically distinguish the two readings. If [Tatevosov and Ivanov \(2009\)](#) are on the right track, we are unable to define a natural class of predicates that allow non-culminating readings in Mandarin given the idiosyncratic property of MMFP predicates. If we argue that the perfective aspect is the source for non-culminating readings, we run into one problem: how can native speakers determine when to include the operator and when to exclude it? A more likely speculation is that the operator attaches to the stems of the predicates that license non-culminating readings while others do not bear this operator. Various factors that influence the availability of the non-culminating readings are then detached from the perfective aspect and build into the licensing conditions of this operator. This is a similar idea with [Koenig and Muansuwan \(2000\)](#) for Thai. The difference is that in [Koenig and Muansuwan \(2000\)](#), all Thai accomplishments bears such an operator while in Mandarin only some of them bears this in their stem.

2.9.4. Interim summary

We looked into two types of non-culminating readings: partial success and failed attempt reading. We show that predicates that involve homogeneous sub-events, creation predicates in contexts where the creation exceeds a certain threshold allow partial success readings. Mandarin do not bear clear-cut constraints on their compatibility with licensing the failed attempt reading. Therefore, we suggest that a covert operator attached to the stem of a subset of accomplishments is a better option for the empirical data rather than taking the perfective aspect as the source of non-culmination.

2.10. Conclusions

In this Chapter, we compare how Mandarin and English root clauses express non-futurity readings, with the aspectual class of predicates and temporal contexts (present and past context) under control. We propose that Mandarin can also be analyzed in a regular and unified way with two null tenses: the present tense and the past tense, with simpler assumptions in the tense and aspect system compared to the non-future tense analysis. Evidence that is claimed to be favor a non-future tense analysis can be captured equally well within a two-null-tense approach. Last but not least, though Mandarin allows non-culminating readings for accomplishments marked with perfective aspect *le*, *le* is not the source of the non-culminating readings.

Chapter 3

Future interpretations in Mandarin root clauses

3.1. Introduction

3.1.1. Future markers: a tense or a modal?

Future expressions in languages have long been the interest of linguists and philosophers. Usually, future forms in languages either make use of a modal auxiliary like English in which present/past forms are inflected on the verb while the future adopts a different morphological form (illustrated in (191)), or is inflected on the verb like the present/past form, as Italian or Lithuanian (illustrated in (192)) does.

(191) a. Kim dances.

b. Kim danced.

c. Kim **will** dance.

(cited from Bochnak 2019: 2)

(192) a. dirb-au
work-1SG.PAST
'I worked/was working.'

b. dirb-u
work-1SG.PRES
'I work/am working.'

c. dirb-s-iu
work-FUT-1SG
'I will work/will be working.'

(Lithuanian; Chung and Timberlake 1985, cited from Bochnak 2019: 2)

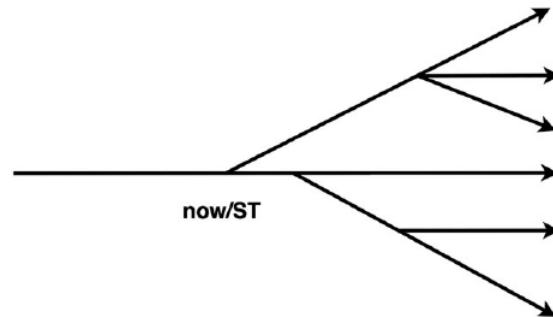
Two competing intuitions regarding the nature of future temporal reference are considered, as Palmer (2001) summarizes: "[Statements about the future] can be seen as either

realis, as assertions differing only from statements about the present or past in terms of time, or they can be seen as irrealis, because, unlike the present or past, the future is unknown.” In other words, on the one hand, future can be treated as a tense operator that is a symmetric counterpart of the past form. Languages that use an inflectional future marker like Lithuanian do not morphologically show any asymmetry. Under this view, there is a single timeline divided into the past and the future by the present (the speech time, ST in (193)), as the figure in (193a) shows. In a sample of 222 languages, Dahl and Velupillai (2013) show that 110 (49.5%) use an inflectional future marker.

(193) a.



b.



(Bochnak 2019: 2-3)

On the other hand, future can also be treated as an asymmetric creature with respect to present and past forms since we know nothing about the future at the time of utterance. Languages that adopt an auxiliary for future readings seem to morphologically demonstrate such an asymmetry. Under this view, there is a fundamental asymmetry between the past and the future because the past is settled on a single time line, but the

timeline branches off into different possible futures, as the figure in (193b) demonstrates. This view indicates that future time reference involves not only temporal displacement from the utterance but also modal displacements referring to possible worlds. Cross-linguistically, future expressions are often documented to convey modality (Copley 2002, 2009; Giannakidou 2012; Giannakidou and Mari 2013, 2018; Broekhuis and Verkuy1 2014).

For example, the English future marker *will* is sometimes considered as ‘future tense’, the counterpart of past tense (Prior 1967; Kissine 2008), or (more often) is treated as a modal (Palmer 2001; Enç 1996; Condoravdi 2002; Copley 2002, 2009; Klecha 2014 among others). Enç (1996) points out that the most well-known property of regular tenses like present and past is that they are deictic, referring to a time salient in the context. But future is not. For instance, the past tense in ‘John came’, denotes a contextually salient time in the past where John came at that time, while the future sentence ‘John will come’ does not refer to a time. There may, or may not, be a future time at which John comes in the actual world. A diagnostic for a modal component of *will* is its performance in modal subordination (Roberts 1989; Klecha 2014). In the following examples offered by Bochnak (2019), *will* in the second sentence of (194a) and (194b) receive an implicit conditional reading. Namely, the second sentence in (194a) can be paraphrased as ‘*If you drink that coffee, you will burn your mouth*’, it does not mean you will burn your mouth regardless. In this sense, *will* patterns the same as other modal operators, as the possible reading ‘*If you drink the coffee and burn your mouth, it could be painful*’ in (194c) shows. However, past tense in (194d) cannot be paraphrased in this way, meaning ‘*If Alex went to New York, she had fun*’.

- (194) a. Don't drink that coffee. You will burn your mouth.
 b. If Alex goes to New York, she will go shopping. She will have fun.
 c. If you drink the coffee, you could burn your mouth. It could be painful.
 d. If Alex went to New York, she went shopping. #She had fun.

(?: 4)

According to [Kratzer \(1986, 2012\)](#), conditionals are domain restrictors of modals. This pattern shows that the domain of quantification of the modals in the second sentences is restricted by an implicit conditional, indicating the presence of a modal domain. For a purely temporal operator like the past tense, there is no such modal domain to be restricted and the second sentence in (194d) cannot be interpreted as an implicit conditional. The pattern in (194) is replicated in Mandarin. The second sentence with *hui* obtains an implicit conditional interpretation in (195a) and (195b), similar with other modal elements such as *yiding* 'must' in (195c).

- (195) a. Bie he na-bei kafei. **Hui** tang dao zui.
 don't drink that-CL coffee HUI burn arrive mouth
 'Don't drink that cup of coffee. You will burn your mouth.'
- b. Ruguo Chensan Xiaojie qu Niuyue de hua, ta **hui** qu
 if Chensan Miss go New York DE utterance 3SG HUI go
 Diwudadao gouwu. Ta **hui** feichang kaixin.
 The Fifth Avenue shopping 3SG HUI very happy
 'If Miss Chensan goes to New York, she will go shopping in the Fifth Avenue.
 She will be very happy.'
- c. Ruguo ni he na-bei kafei de hua, **yiding** tang dao zui. Na
 if 2SG drink that-CL coffee DE utterance must burn arrive mouth that
yiding hen nanshou.
 must very painful

'If you drink that cup of coffee, you must burn your mouth. That must be very painful.'

- d. Ruguo zuotian Chensan Xiaojie qu-le Niuyue de hua, ta
if yesterday Chensan miss go-PFV New York DE utterance 3SG
yiding qu-le gouwu. #Ta hen kaixin.
must go-CL shopping 3SG very happy
'If Miss Chensan went to New York yesterday, she must have gone shopping.
#She was very happy.'

- e. Ruguo zuotian Chensan Xiaojie qu-le Niuyue de hua, #ta qu-le
if yesterday Chensan miss go-PFV New York DE utterance 3SG go-CL
gouwu. #Ta hen kaixin.
shopping 3SG very happy
'If Miss Chensan went to New York yesterday, #she went shopping. #She was
very happy.'

Since Mandarin only bears covert tenses and perfective aspect is compatible with past tense but not present tense, we specify a past time adverb and an episodic perfective event in the antecedent clause in (195d) to test the performance of past tensed sentences with preceding conditionals. Due to reasons that are still unknown to us at this stage, the consequent in the conditional construction requires a modal element, otherwise the sentence is odd as (195e) shows. With *yiding* 'definitely, must' in (195d), the second sentence is odd without any modals and it does not obtain a conditional reading. This indicates that the future marker *hui* in Mandarin also possesses a modal component.

Moreover, like many other languages, the putative future markers in Mandarin allow a variety of interpretations other than future. For instance, the future marker *hui* allows a metaphysical reading 'be able to, can', demonstrated by the example below. The fact that future markers across many languages and language families are compatible with a vari-

ety of modal meanings strongly suggests that modality is a crucial ingredient for future temporal reference in general (?). Therefore, we claim that future reference in Mandarin also has a modal component.

- (196) Zhangsan hui youyong.
 Zhangsan be-able-to swim
 'Zhangsan can swim.'

Some future markers in some languages are compatible with non-future readings. For instance, Greek and Italian future morphemes allows present and past epistemic readings (Giannakidou and Mari 2018), as shown in (197) and (198). Some languages such as Paraguayan Guaraní (Tupí-Guaraní), the future marker *-ta* entails future temporal reference in all its uses (Tonhauser 2011). For instance, *-ta* is unacceptable in present epistemic contexts, demonstrated by the example in (199b).

- (197) a. I Ariadne **tha troi** tora.
 the Ariadne FUT eat.IMPERF.NON-PAST.3SG now
 'Ariadne must be eating now.' (Greek)
- b. Giacomo ora **starà mangiando**.
 Giacomo now be.FUT.3SG eat.GERUND
 'Giacomo must be eating now.' (Italian)

(Giannakidou and Mari 2018: 90)

- (198) a. I Ariadne **tha itan** arrosti xthes (ji'afto dhen
 the Ariadne FUT be.PAST.3SG ill yesterday (for-this not
 irthe).
 came.PERF.PAST.3SG)
 'Ariadne must/#will have been ill yesterday (that's why she didn't come).'
- (Greek)

- b. Giovanni **sarà stato malato** ieri (per questo non é venuto)
 Giovanni be.FUT.3SG been ill yesterday (for this not has come)
 ‘Giovanni must/#will have been ill yesterday (that’s why he didn’t come).’

(Italian)

(Giannakidou and Mari 2018: 91)

- (199) a. Ko’ëro a-purahëi-ta.
 tomorrow A1SG-sing-FUT
 ‘I will sing tomorrow.’

(Paraguayan Guaraní; Tonhauser 2011: 6)

- b. [Context: I try to soothe a friend whose child hasn’t come home from school yet.]

Oi-mé-ta iñ-angirû-ndive
 A3-be-FUT B3-friend-with

‘Intended: He’ll be with his friend.’

(Paraguayan Guaraní; Tonhauser 2011: 22)

Mandarin future marker *hui* cannot freely allow non-future epistemic readings. In the following scenario from Matthewson (2006) in (200), like St’at’imcets, a sentence with Mandarin *hui* is odd as a response in (200a). Another epistemic modal such as *yinggai* ‘should, must’ must be present, as shown in (200b-c).

- (200) Situation: Your friend asks you how many fish were in the net this morning, and you aren’t quite sure of the number, but you know approximately. You say ‘It might have been five.’

- a. # **Hui** you/shi wu-tiao ba.
 HUI have/COP five-CL SFP

- b. **Yinggai** you wu-tao ba.
should have five-CL SFP
'There might be five.'
- c. ? **Yinggai hui** you wu-tao ba.
should HUI have five-CL SFP
'Intended: There might be five.'

The example in (200a) is incompatible with non-future epistemic readings, showing semantic restrictions on temporal ordering. From (195) and (200), we can see that Mandarin future marker *hui* has not only a modal component dealing with possible worlds but also a temporal component dealing with futurity, a common property of future expressions across languages.

3.1.2. Future and futurates

Other than future markers that are modals or inflectional morphemes, languages also adopt other formats to express future interpretations. Copley (2002, 2009) terms a sentence with overt morphology of future reference (*be going to*, *will* in English, *hui* and *yao* in Mandarin) a 'future' sentence. Examples from English and Mandarin are given in (201)-(202).

- (201) a. The Red Sox **is going to** play the Yankees tomorrow.
b. The Red Sox **will** play the Yankees tomorrow.
- (202) a. Gongsì mingtían **hui** kai niánhui.
company tomorrow HUI open year-end-party
'The company will hold the year end party tomorrow.'

- b. Gongsì míngtiān **yào** kāi niánhuì.
 company tomorrow YAO open year-end-party
 ‘The company will hold the year end party tomorrow.’

There are also sentences with no obvious means of future reference, that nonetheless convey that a future-oriented eventuality is planned, scheduled, or otherwise determined. Copley (2009) terms these cases as ‘futate’ sentences/futurates. For example, the English sentences in (203) adopt the form of present tense (called as ‘simple futurates’) or the progressive marking (called as ‘progressive futurates’) to express future readings. In Mandarin, a future interpretation is also obtained via a bare predicate without any overt future modals (Bittner 2014, Sun 2014), as shown in (204). What’s special with futurates is that they do not accept a presumably unplannable event (Copley 2002, 2009, Sun 2014), e.g. the winning of a match, as shown by the infelicity of the sentences in (205). However, overt future modals in these languages do not have such a constraint on the predicate, since the sentences in (206) are both felicitous with overt future modals.

- (203) a. The Red Sox **play** the Yankees tomorrow. (simple futurates)
 b. The Red Sox **are playing** the Yankees tomorrow. (progressive futurates)

- (204) Gongsì míngtiān **kāi** niánhuì.
 company tomorrow open year-end-party
 ‘The company holds the year-end party tomorrow.’

- (205) a. # The Red Sox defeat the Yankees tomorrow.
 b. # The Red Sox are defeating the Yankees tomorrow.
 c. # Huren duì míngtiān yíng Huójīan duì.
 Lakers team tomorrow win Rockets team
 ‘The Lakers defeat the Rockets tomorrow.’

- (206) a. The Red Sox **will** defeat the Yankees tomorrow.
- b. Huren dui mingtian **hui** ying Huojian dui.
Lakers team tomorrow HUI win Rockets team
'The Lakers will defeat the Rockets tomorrow.'

Futurates are not universal. On the one hand, in some languages like German, 'present' tensed verbs do not have the plannability restriction when used to talk about future. For instance, weather predicates denote events that are unplannable. In English, simple futurates and progressive futurates are bad with a weather predicate like *rain* in (207). However, the German sentence in (208a) with 'rain' as the predicate is fine to denote a future reading with the present tense. Copley (2009) thus suggests that present tense in German might be better understood as 'non-past'.

- (207) a. # It rains tomorrow.
- b. # It is raining tomorrow.
- c. It will rain tomorrow.

- (208) a. Morgen regnet's.
tomorrow rain-it
'Tomorrow it (will) rain.'
- b. Morgen wird es regnen.
tomorrow will it rain
'Tomorrow it will rain.'

On the other hand, even a language has futurate usages, the types of futurates can be different. For example, English futurates involve simple futurates and progressive futurates. In Mandarin, only bare predicates have the future reading when combined with

future adverbs. The progressive marker *zai* in (209a) can only have a non-future progressive interpretation. In (209b), *zai* cannot flexibly combine a future time adverb to denote a future reading. Even the sentence in (209c) with a punctual future time is felicitous, *zai* still has a progressive reading. Also, we cannot exclude the possibility that the future reading of the whole sentence stems from the fact that (209c) is a simple futurate sentence. In other words, Mandarin has simple futurate constructions and lacks progressive futurate constructions.

- (209) a. Zhangsan *zai* chifan.
 Zhangsan PROG eat
 'Zhangsan is eating.'
- b. #Mingtian Zhangsan *zai* shangxue.
 tomorrow Zhangsan PROG go-to-school
 'Intended: Zhangsan is going to school tomorrow.'
- c. Mingtian zhe-ge shihou, Zhangsan *zai* chifan.
 tomorrow this-CL time Zhangsan PROG eat
 'Zhangsan will be eating at this time tomorrow.'

3.1.3. A sketch of future markers in Mandarin

Mandarin possesses future constructions and futurate constructions to express future. It contains at least three overt markers that can denote future readings: *jiang*, *hui* and *yao*, as shown by the example in (210).

- (210) Zhangsan mingtian **jiang/yao/hui** canjia biye dianli.
 Zhangsan tomorrow JIANG/YAO/HUI participate graduate ceremony
 'Zhangsan will attend the graduation ceremony tomorrow.'

Among the three future modals, *hui* is the most basic one with least constraints while

the other two have their own restrictions in distributions. For instance, *yao* and *jiang* cannot be negated by *bu* to obtain a negated future interpretation when the subject is inanimate (Z. [Chen 2020](#)). *hui*, on the other hand, does not have this constraint, as shown in [\(211\)](#).

- (211) a. Mingtian bu **hui/*jiang/*yao** xiayu.
tomorrow NEG HUI/*jiang*/*yao* rain.
'Tomorrow it will not rain.'
- b. Huoche bu **hui/*jiang/*yao** zai yi-ge xiaoshi nei daoda Shanghai
train NEG HUI/*jiang*/*yao* in one-CL hour within arrive Shanghai
zhan.
station
'The train will not arrive the Shanghai station in one hour.'

When the subject is animate, *jiang* still cannot be negated by *bu*. Even *yao* is fine to be negated by *bu*, it is not sure if *yao* is still a future marker in negation since *yao* is interpreted like a volition modal expressing the desire of the subject, as shown by the translation in [\(212a\)](#).

- (212) a. Lisi mingtian bu-yao canjia biye dianli.
Lisi tomorrow NEG-YAO participate graduate ceremony
'Lisi does not want to participate the graduation ceremony tomorrow.'
- b. *Lisi mingtian bu-jiang canjia biye dianli.
Lisi tomorrow NEG-JIANG participate graduate ceremony
'Intended: Lisi will not attend the graduation ceremony.'

Similar to the pattern of negation, the three modals show differences in 'A not A' constructions.¹ *Jiang* cannot appear in 'A not A' constructions, as demonstrated by [\(213b\)](#)

¹*Yao* in [\(213a\)](#) is a bit odd when interpreted as a future marker but fine when it is interpreted as a deontic

and (214b). *Yao* can occur in 'A not A' constructions questions as a future marker if the subject is animate ((214c), but is odd when the subject is inanimate ((213c)).² *Hui* are the most flexible in 'A not A' constructions. *Hui bu hui* in (213d)-(214d) are ambiguous in questioning about future or questioning about the possibility (an epistemic reading meaning 'is it possible ... or not').

- (213) a. Huoche **jiang/hui/?yao** zai san xiaoshi hou daoda.
 train JIANG/HUI/YAO in three hour after arrive
 'The train will arrive in three hours.'
- b. *Huoche **jiang bu jiang** zai san xiaoshi hou daoda?
 train JIANG NEG JIANG in three hour after arrive
 'Will the train arrive in three hours or not?'
- c. #Huoche **yao bu yao** zai san xiaoshi hou daoda?
 train YAO NEG YAO in three hour after arrive
 '#Will the train arrive in three hours or not?/ ✓Do you want the train to arrive in three hours or not?'
- d. Huoche **hui bu hui** zai san xiaoshi hou daoda?
 train HUI NEG HUI in three hour after arrive
 'Will the train arrive in three hours or not?'
- (214) a. Xiazhou xuexiao **jiang/hui/yao** juxing yundonghui.
 next-week school JIANG/HUI/YAO hold sports-meeting
 'The school will hold the sports meeting next week.'
- b. *Xiazhou xuexiao **jiang bu jiang** juxing yundonghui?
 next-week school JIANG NEG JIANG hold sports-meeting

modal meaning 'The train has to arrive in three hours.'

²The sentence in (213c) is felicitous when *yao* is interpreted as a volition modal. The sentence then possesses a reading of 'Do you want the train to arrive in three hours or not'.

‘Will the school hold the sports meeting next week or not?’

- c. Xiazhou xuexiao **yao bu yao** juxing yundonghui?
next-week school YAO NEG YAO hold sports-meeting
‘Will the school hold the sports meeting next week or not?’
- d. Xiazhou xuexiao **hui bu hui** juxing yundonghui?
next-week school HUI NEG HUI hold sports-meeting
‘Will the school hold the sports meeting next week or not?’

Other than negation, the three future markers also show differences in genre of contexts. *Jiang* is used in formal genre while *yao* is more often used in colloquial contexts. *Hui* is fine with both contexts. For instance, a colloquial way to talk about ‘rain’ in (215a) is somewhat odd with *jiang* but fine with *hui* or *yao*. But when the sentence is rephrased in a weather-report way about a prediction in (215c), *jiang* and *hui* are fine while *yao* is a bit strange.

- (215) a. ??Mingtian **jiang** xiayu.
tomorrow JIANG rain
‘It will rain tomorrow.’ (Z. Chen 2020)
- b. Mingtian **hui/yao** xiayu.
tomorrow HUI/YAO rain
‘It will rain tomorrow.’
- c. Mintian jubu diqu **jiang/hui/?yao** you bao-yu.
tomorrow part area JIANG/HUIYAO have heavy-rain
‘Tomorrow, part of the area will have heavy rain.’

Since *hui* is the most common future marker with least distributional constraints, we only focus on *hui* in this dissertation and leave the other markers for future research.

3.1.4. Outline of the chapter

This chapter is organized as below. Section 2 is devoted to the overt future modal *hui*. Based on a systematic comparison with English *will*, we observe that when *hui* is unembedded in specific contexts, it can only be used in future contexts expressing a prediction about an eventuality after the utterance time. However, *hui* is able to obtain an epistemic reading in non-future contexts when it is embedded in NPI licensing contexts and in modal concords with another epistemic modal. Moreover, future modals in Mandarin are incompatible with perfective aspect in their complements unless another aspectual element such as *yijing* ‘already’ is present. We offer a semantic analysis to capture the aforementioned properties of *hui*. The key ingredients involve a non-perfective, present-future presupposition, universal quantifications over an epistemic modal base and a futurity requirement in the accessible worlds.

Section 3 focuses on simple futurates in Mandarin. We observe that Mandarin simple futurates share the following similarities with English simple futurates: a. both constructions require a future time adverb to license a future reading; b. both constructions are infelicitous with unplannable, uncontrollable eventualities; c. both constructions are focus sensitive and presuppose the existence of a plan. The two constructions also differ in several respects. Firstly, English simple futurates target at a present future interpretation (i.e. the eventuality is in the future of the utterance time), disallowing a past future reading (i.e. the event is located in the future of a past time). But Mandarin simple futurates are slightly more flexible since past future reading is detected in contexts with time adverbs with no indexes. Secondly, Mandarin disallows future perfective. Like *hui*, Mandarin

simple futurities are incompatible with embedded perfective aspect marker unless *yijing* ‘already’ occurs in the complement (Wu 2003; Bittner 2014). Following Copley (2009), we propose that there is a covert future modal $PLAN_M$ -simple in futurities, sharing the same semantic template as *hui*, with slightly different presuppositions and modal bases.

Section 4 concludes the chapter.

3.2. The future modal *hui*

Following Giannakidou and Mari (2018), we call the future reading of a future marker a ‘prediction’ reading and gloss *hui* as FUT. In Section 1, we have shown that Mandarin *hui* is a modal with temporal constraints. Though this chapter focuses on the ‘prediction’ usage of *hui*, this element has other modal usages other than being a future modal. For instance, like English *will* with generic usages in (216), Mandarin *hui* can also be used in a generic context in (217). Other than that, *hui* can be used as a modal expressing ability in (217a), an interpretation that is expressed by *can*, *be able to* but not *will* in English.

- (216) a. Water will freeze when the temperature is below zero.
 b. John will smoke after meal.

(Condoravdi 2003)

- (217) a. Xiaodi **hui** shuo fayu.
 Xiaodi be-able-to speak French
 ‘Xiaodi can speak French.’ (ability)
- b. Shui **hui** wang dichu liu.
 water *hui* go low-place flow
 ‘Water flows downward.’ (generic)

- c. Xiaodi shang xi-canting shi **hui** shuo fayu.
 Xiaodi go-to western-restaurant time *hui* say French
 'Xiaodi will speak French when he goes to western restaurants.'

(generic/habitual)

(W.-T. Dylan Tsai 2010: 2)

In the following discussion, we focus on the properties associated with *hui* as a future modal: forward-shifting, (in)compatibility with non-future contexts, the constraint on evaluation time and incompatibility with future perfective.

3.2.1. Properties of *hui*

3.2.1.1. Correlation with future

English *will* can be used as an epistemic modal in non-future contexts, as the examples in (218) and (219) show. The time adverb *right now* and the context in (218) demonstrates that *will* is in a present epistemic context. In (219), *yesterday* indicates that *will* is used in a past epistemic context.

- (218) a. He **will** be in his room right now.

- b. Context: The doorbell is ringing.

That **will** be the postman at the door.

(present epistemic)

(Condoravdi 2003: 2)

- (219) a. She will have left the island yesterday.

- b. If she asked him, he will have presented in her class yesterday.

(past epistemic)

(Condoravdi 2003: 2)

In contrast, Mandarin *hui* cannot freely allow non-future epistemic readings as *will* does. The scenario in (220) is from Matthewson (2006) targeting at a present epistemic reading and the scenario in (221) targets at a past epistemic reading. However, *hui* is infelicitous in both scenarios. Instead, other epistemic modals such as *yinggai* ‘should’, *keneng* ‘might’ and *yiding* ‘must’ are perfectly fine. The use of *hui* in (220a) and (221a) leads to a future interpretation and is infelicitous in a non-future context. The oddness in non-future contexts shows that *hui* cannot be simply analyzed as an epistemic modal because it temporally constrains the eventuality to occur after the utterance time.

(220) Situation: You are driving past your friend’s house and you notice her son’s car in the driveway and you say ‘Jimmy might be back’.

- a. *Jimmy **hui** zai jia.
Jimmy *hui* at home
- b. Jimmy (**yinggai/keneng**) zai jia.
Jimmy should/may at home
‘Jimmy should/might be at home’

(221) Context: Your friend Zhangsan didn’t attend school yesterday. You think he might have been sick.

- a. # Zhangsan **hui** shengbing le.
Zhangsan *hui* get-sick SFP
‘Intended: Zhangsan might have been sick yesterday.’
- b. Zhangsan **yiding/keneng/yinggai** shengbing le.
Zhangsan must/may/should get-sick SFP

'Zhangsan must/might/should have been sick.'

It has long been noticed in the Mandarin literature that *hui* can be used in some non-future contexts (Lv 1980, Xu 1993, Yuan 1999, Peng 2007, Z. Chen 2020 among others), but no one makes a precise generalization about the similarities of these contexts that license non-future usages of *hui*. We point out that these contexts involve two types: NPI licensing contexts and modal concord contexts.³ Negation, question and conditionals are NPI licensing contexts that allow the non-future epistemic usage of *hui*. In an unembedded, ordinary context, *hui* is odd with the present time adverb *xianzai* 'now' and perfective marker *le*₁/experiential marker *guo* that indicate a past context, as we can see in (222a) and (223a).⁴ However, when the sentence is negated ((222b), (223b)), embedded in a conditional ((222c), (223c)), embedded in a question (including classic questions in (222d), (223d) and rhetorical questions in (222e), (223e)) or embedded in another epistemic modal (*kending* in (222f) and *dangran* in (223f)), *hui* is fine to be used as an epistemic modal with present time adverb *xianzai* 'now' and perfective aspect marker *le*₁/experiential marker *guo*. The licenser in each context is highlighted in a box. These licensers can also be mixed to license a non-future interpretation of *hui*, as we can see in the sentence in (224).

- (222) a. ?? Xianzai ta **hui** zai jia.
now 3SG FUT at home
'He will be at home right now.'

³We thank Gennaro Chierchia for pointing out this pattern to us.

⁴The examples in (222)-(224) are adapted from Z. Chen (2020). The classification and generalization are our contributions.

b. Xianzai ta **bu** hui zai jia.
now 3SG NEG FUT at home
'Now he must not be at home.'

(negation)

c. Wanshang jiu dianzhong **de hua**, ta **hui** zai jia.
evening nine o'clock DE utterance 3SG FUT at home
'If it is nine o'clock in the evening, he will be at home.'

(conditional)

d. Xianzai ta **hui** zai jia **ma**?
now 3SG FUT at home Q
'Will he be at home now?'

(question)

e. Xianzai ta **zenme** **hui** zai jia **ne**?!
now 3SG how FUT at home Q
'How come he is now at home?!

(It is impossible that he is at home now)'

(rhetorical question)

f. Dou zhe-ge dian le, ta xianzai **kending** **hui** zai jia.
DOU this-CL point SFP, 3SG now absolutely *hui* at home
'It is at this time already, he must be at home.'

(modal concord)

(223) a. *Ta **hui qu-guo/le** ni bangongshi.
3SG FUT go-EXP/PFV 2SG office
'Intended: She will/might have been to your office.'

b. Ta **bu** hui qu-guo/??le ni bangongshi de.
3SG NEG FUT go-EXP/PFV 2SG office DE
'She will not have been to your office.'

(negation)

- c. Ta yaoshi you ni bangongshi yaoshi de hua, ta hui jin-guo
3SG if have 2SG office key DE utterance 3SG FUT enter-EXP
ni de bangongshi le.
2SG DE office SFP

'If she has the key to your office, she will have been to your office already.'

(conditional)

- d. Ta **hui qu-guo/le** ni de bangongshi ma?
3SG FUT go-EXP/PFV 2SG DE office Q

'Is it possible that she has/had ever been to your office?'

(question)

- e. Ta zenme **hui qu-guo/le** ni bangongshi ne?!
3SG how FUT go-EXP/PFV 2SG office Q

'How come she have/had been to your office!'

(It is impossible for her to have been to your office.)'

(rhetorical question)

- f. Ta you ni bangongshi de yaoshi, dangran **hui qu-guo/?le** ni de
3SG have 2SG office POSS key of-course FUT go-EXP/PFV 2SG DE
bangongshi.
office

'She has the key to your office, of course it is possible that she had/have been to your office before.'

(modal concord)

(Examples are adapted from Z. Chen 2020, the classification and highlights are ours.)

- (224) Ta juedui bu **hui qu-guo/?le** ni bangongshi.
3SG absolutely NEG FUT go-EXP/PFV 2SG office

‘She must have never been to your office.’

(negation, modal concord)

Unlike Mandarin, English *will* does not need extra licensors to possess a non-future epistemic reading, as we have already shown in the examples in (218) and (219). The non-future licensing contexts in Mandarin are usually compatible with the non-future epistemic reading of *will*, except that English *will* cannot be embedded in the scope of another epistemic modal such as *must* in (225d).

- (225) a. He will not be in his room right now.
b. If he is already at home, he will be cooking dinner right now.
c. Will he be in his room right now?
d. * He must will be in his room right now.

In summary, Mandarin *will* cannot flexibly license non-future epistemic reading unless it is embedded in NPI licensing contexts and modal concord contexts. Therefore, analyses that treat future markers as epistemic modals like English *must* (e.g. Italian and Greek by Giannakidou and Mari 2018) cannot extend to Mandarin directly. Mandarin *hui* should be analyzed as a future modal rather than an epistemic modal in its basic usages.

3.2.1.2. The (more or less) counterpart of *will* and *would*

Now let us take a look at the evaluation time of the future modal. The term ‘evaluation time’ here refers to the time which a future time is defined with respect to. If the evaluation time is the utterance time, then we obtain a present future reading, i.e. the eventuality

occurs after the utterance time. If it is a past time, then we obtain a past future reading. In English, the former reading is expressed by *will* while the latter is often expressed by *would* in embedded contexts. For example, *will* in the relative clause in (226a) indicates that ‘becoming the ruler of the world’ is after the utterance time. Similarly, *will* in the complement clause in (227) says that Susan’s leaving her husband is in one week after the utterance time. However, *would* in the relative clause (226b) says that ‘becoming the ruler of the world’ precedes the utterance time and was after the (past) time of the birth of the child. In the complement clause (227b), *would* also indicates that Susan’s leaving her husband was after the time of Susan’s saying (two weeks ago).

- (226) a. A child was born who will become ruler of the world.
b. A child was born who would become ruler of the world.

(Kamp 1971, cited from Matthewson 2006: 689)

- (227) a. Susan said 2 weeks ago that she will leave her husband in one week.
b. Susan said 2 weeks ago that she would leave her husband in one week.

(Matthewson 2006: 689)

The distribution of *would* in English is constrained. *Would* is often used in conditionals or subjunctives and cannot be used unembeddedly (Eng 2004, Wurmbrand 2014). The sentence below cannot mean that becoming the King was in the future of a past time.

- (228) * The child would become the King.

Similarly, Mandarin *hui* in unembedded contexts only have the present future reading. In a root clause, the sentence in (229b) cannot mean that ‘Zhangsan was going to meet

with Lisi yesterday'. Instead, like English *will*, only the present future reading is available in (229a).

- (229) a. Zhangsan mingtian hui jian Lisi.
 Zhangsan tomorrow FUT meet Lisi
 'Zhangsan will meet Lisi tomorrow.'
- b. *Zuotian Zhangsan hui jian Lisi.
 yesterday Zhangsan FUT meet Lisi
 'Intended: Yesterday, Zhangsan was going to meet with Lisi.'

In embedded contexts such as complement clauses, *hui* can be the counterpart of either *will* or *would*. For instance, the Mandarin counterpart of the English sentences in (227) can be a single form with *hui* in the embedded clause. The complement of *hui* in (230a) can either mean that the divorce is after the utterance time of the speaker or just after the time of Mary's utterance, as summarized in (230b). In (231), given the context cited from Matthewson (2006), *hui* in the complement clause takes the time of Julianne's knowing (a past time) as the evaluation time and is the Mandarin counterpart of *would* in this context.

- (230) a. Mali liang-zhou qian shuo ta hui zai yi-zhou hou gen ta laogong
 Mary two-week ago say 3SG FUT at one-week after with 3SG husband
 lihun.
 divorce
 'Mary said two weeks ago that she would divorce with her husband in one
 week/ Mary said two weeks ago that she will divorce with her husband in
 one week.'
- b. $t_{\text{say}} < s^* < t_{\text{divorce}}$ OR $t_{\text{say}} < t_{\text{divorce}} < s^*$

(231) Situation: Mike Leech is currently the chief of T'it'q'et. His (deceased) mother was called Julianne.

- a. Julianne zhidao zhe ge gang chusheng de haizi jianglai hui chengwei
 Julianne know this CL just be-born DE kid future FUT become
 qiuzhang.
 chief
 'Julianne knew this newly born kid would become the chief in the future.'
- b. $t_{\text{know}} < t_{\text{become-chief}} < s^*$

In a word, in unembedded contexts, Mandarin *hui* is like English *will*, taking the utterance time as the evaluation time and prohibiting a past future reading. However, in complement clauses, *hui* seems to be the counterpart of English *will* and *would* in the sense that the evaluation time of *hui* can be either the utterance time of the speaker or a past time that overlaps with the matrix event. To understand the embedded usages of *hui*, a general analysis for temporal interpretations in embedded contexts, Sequence of Tense (if there is any) and double-access phenomenon is in need, which goes beyond the range of this dissertation. We have to leave this topic for future research and devote ourselves to the unembedded usage of *hui*.

3.2.1.3. Interaction between *hui* and overt aspect markers

English *will* in general takes a bare predicate in its complement, as shown in (232a). Since perfective aspect is morphologically null in English, it is uncertain whether *smoke* in (232a) is a bare predicate or is marked by a covert perfective. Other than the bare verb form, the complement of *will* can also be marked by progressive (*-ing*) as in (232b) or by perfect (*have + past participle*) as in (232c).

- (232) a. John will smoke.
 b. John will be smoking.

- c. John will have smoked.

Mandarin *hui* is also compatible with imperfective complements. For instance, the complement of *hui* in (233a) can be generic or is marked by the progressive marker *zai* in (233b) progressive. However, *zai* is only possible in the complement of *hui* if the topic time is punctual. A durative topic time like *mingtian* ‘tomorrow’ is bad with *hui* followed by a progressive complement. The reason why punctuality/duality of the time adverb plays a role in the acceptability of future modal with progressive complement is unknown to us.

- (233) a. Shi nian hou, Zhangsan **hui** meitian chouyan.
 ten year after Zhangsan FUT every-day smoke
 ‘Ten years later, Zhangsan will smoke every day.’
- b. Mingtian ni jiandao Zhangsan de shihou, ta **hui zai** chouyan.
 tomorrow 2SG see Zhangsan DE time 3SG FUT PROG smoke
 ‘When you see Zhangsan tomorrow, he will be smoking.’
- c. ??Mingtian ta **hui zai** chouyan.
 tomorrow 3SG FUT PROG smoke
 ‘Intended: He will be smoking tomorrow.’

On the contrary, *hui* is incompatible with perfective aspect markers (Wu 2003, J.-W. Lin 2006, Bittner 2014) except with the aspectual marker *yijing* ‘already’. In (234a-b), *hui* is ungrammatical with *le*₁ and *guo*. With *yijing* ‘already’ in (234c-d), the sentences become acceptable. The punctuality/duality of time adverb plays a role in the acceptability of the sentence in (234c). Our consultants find the sentence in (235a) ungrammatical even with *yijing* ‘already’. But with a punctual time adverb in (234c) (repeated in (235b), the sentence becomes more acceptable. But we admit that some speakers still find it marginal.

- (234) a. *Mingtian zhe-ge shihou, Zhangsan **hui** likai-**le** Nanjing.
tomorrow this-CL time Zhangsan FUT leave-PFV Nanjing
- b. ??Mingtian zhe-ge shihou, Zhangsan **hui** jian-**guo** Lisi le.
tomorrow this-CL time Zhangsan FUT meet-EXP Lisi SFP
- c. Mingtian zhe-ge shihou, Zhangsan **hui yijing** likai-**le** Nanjing.
tomorrow this-CL time Zhangsan FUT already leave-PFV Nanjing
'Zhangsan will have already left Nanjing by this time tomorrow.'
- d. Mingtian zhe-ge shihou, Zhangsan (**hui**) **yijing** jian-**guo** Lisi le.
tomorrow this-CL time Zhangsan FUT already meet-EXP Lisi SFP
'Zhangsan will have already met Lisi by this time tomorrow.'
- (235) a. *Mingtian Zhangsan **hui yijing** likai-**le** Nanjing.
tomorrow Zhangsan FUT already leave-PFV Nanjing
'Intended: Zhangsan will have already left Nanjing by tomorrow.'
- b. Mingtian zhe-ge shihou, Zhangsan **hui yijing** likai-**le** Nanjing.
tomorrow this-CL time Zhangsan FUT already leave-PFV Nanjing
'Zhangsan will have already left Nanjing by this time tomorrow.'

The Mandarin pattern of interaction between future marker and overt aspect markers is not alone. Hausa (Chadic language of the Semito-Hamitic languages, Africa) also performs a similar and even stricter pattern. The morpheme *zā* is often treated as 'future tense' in Hausa. Mucha (2015) argues that *zā* is a modal. It has long been observed that *zā* is incompatible with any aspect markers. In (236), perfective and imperfective aspect morphology are bad with *zā* (Mucha 2015).

- (236) a. *Zā ta-nà wàsà gòbe.
ZĀ 3SG.F-IPFV play tomorrow
Intended: "She will be playing tomorrow."
- b. *Zā tā yi wàsà gòbe.
ZĀ 3SG.F-PFV do play tomorrow

Intended: “She will have played tomorrow.”

(Mucha 2015: 83)

3.2.1.4. Interim summary

Table 3.1 summarizes the properties of *hui* and *will* in the previous discussion.

Table 3.1: Mandarin *hui* and English *will* (in unembedded contexts)

Temporal context	Reading	Environment	English <i>will</i>	Mandarin <i>hui</i>	
future	prediction	unembedded modal	✓	✓	
future, interaction with overt aspect	prediction	unembedded modal	embedded progressive	✓	✓
			embedded perfective	NA	×
future, evaluation time of future	prediction	unembedded modal	present	present	
non-future	generic	unembedded modal	✓	✓	
non-future	ability	unembedded modal	×	✓	
non-future	epistemic	unembedded modal without licensors	✓	×	
		embedded with licensors	epistemic modal	×	✓
			conditional	✓	✓
			negation	✓	✓
		question	✓	✓	

As we can see in Table 3.1, *hui* and *will* are very similar in unembedded contexts denoting a future reading. Both take the utterance time as the evaluation time for a present future reading and are compatible with progressive complement. English perfective aspect is not overtly marked, hence we can't decide the compatibility between *will* and the null perfective (marked as NA in Table 3.1). More variations are observed in non-future contexts. Firstly, *hui* has the 'ability' usage while *will* do not, even though both *hui* and *will* can have generic usages. Secondly, English *will* can flexibly license an epistemic interpretation in non-future contexts while Mandarin *hui* need to be embedded in NPI licensing contexts or modal concord contexts with specific licensors. English *will* in principle can be used as an epistemic modal with those contexts (conditional, negation, question), but

it cannot be in the scope of another epistemic modal like Mandarin *hui* does.

3.2.2. The analysis of *hui* in future usages

We save the non-future usages of *hui* and *will* for future studies and focus on the basics: the future modal usage of *hui* and *will* in unembedded contexts. The properties of *hui* that are of our interest are summarized in (237).

- (237) a. The evaluation time is the utterance time for *will* and *hui* in root clauses.
b. Mandarin *hui* is incompatible with perfective complements.

We treat *hui* and *will* as modals essentially. What's special with these future modals is that they impose temporal constraints. Firstly, the perspective of evaluating the information of the modal base has to be from the time of the utterance. Secondly, they make an assertion about the complement to be in the future of the utterance time. Before we present our analysis for *hui* and *will*, we first demonstrate our assumptions on aspectual elements in future constructions.

3.2.2.1. Aspect in the complement of future modals

3.2.2.1.1 The cross-linguistic picture A well-known cross-linguistic generalization about aspect is that aspectual distinctions are more often observed in the domain of past tenses (Comrie 1976, Dahl 1985). For examples, Romance (Comrie 1976) and Mangarayi (Merlan 1982) are languages in which perfective forms always occur in past tense. Comrie (1976) claims that aspectual qualification is less relevant for actions that have not yet occurred,

hence lack/neutralization of tense and aspect distinctions is frequent in negative clauses and irrealis moods (Aikhenvald and Dixon 1998).

Unlike present perfective that leads semantic conflicts (see details in Chapter 2), the temporal property of perfective does not conflict with future contexts in principle, since the runtime of an event is possible to be included in a (potentially infinite) future time. Comrie (1976), Dahl (1985), Malchukov (2009) among others suggest that perfective (or more generally aspectual distinctions involving perfective as a marked member) is more often found in the past, less often in future, usually lacking in the present or else is reinterpreted. For instance, in East Slavic languages such as Russian, a present perfective is normally interpreted as future (future meaning arises in contexts where the present meaning is blocked), as illustrated by the examples in (238).

(238) a. On idet.
he go.IMFV.PRES.3SG
'He goes.'

b. On pri-det
he PFV-go.PRES.3SG
'He will come.'

(Malchukov 2009: 19)

Malchukov (2009) suggests the markedness hierarchy in (239) constraining tense-aspect interaction. The hierarchy captures the generalization that a combination of the present tense and perfective aspect is most marked (least natural) and the combination of past perfective is the most natural and frequent. Future perfective is in between. A small sample of languages from Malchukov (2009) to illustrate this hierarchy is summarized in (240).

(239) *PFV & PRES » *PFV & FUT » *PFV&PAST

(240) Aspectual opposition

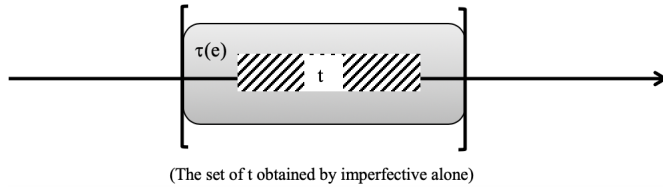
- a. Romance: only in past;
- b. Greek: past and future, *present;
- c. Slavic: past, future and present, but present perfective is reinterpreted
- d. ChiBemba: perfective, imperfective, perfect
past: perfective, imperfective, perfect
future: perfective, imperfective
present: imperfective

The aspectual distinctions obtain only in the past tense for Romance languages. while in Greek it is found in both past and future, but not in the present. In the Slavic languages, the distinction is extended to present as well, but the present perfective combination is reinterpreted (either future or generic). Evidence for all parts of the hierarchy can even be found in a single language. The Bantu language ChiBemba makes a three-way distinction in its aspectual system: perfective, imperfective and perfect. The three-way distinction is observed in the past and is reduced in the future (future perfect is lacking). In present tense, only imperfective exists (Chung & Timberlake 1985: 227-228).

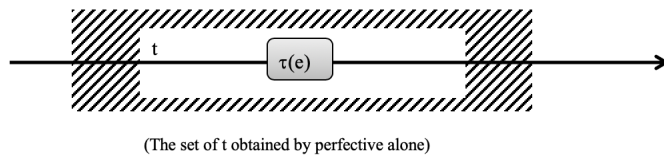
The cross-linguistic pattern of interaction between tense and aspect shows that future modal being incompatible with perfective aspect like Mandarin and Hausa is language-specific. Due to the fact that the perfective is covert in English, there is no direct evidence to tell us if perfective aspect combines with future context or not. In principle, English can go either way.

3.2.2.1.2 ASP in the complement of Mandarin *hui* The strategy we adopt to account for the lack of future perfective in Mandarin to assume a presupposition in Mandarin *hui* that rules out perfective complements. The temporal difference between the outcome of a perfective phrase and an imperfective phrase can be simplified and depicted in (241). The white space stands for the set of intervals that is returned by the overt aspect marker. The space with slashes stands for the superset of this set. The grey box represents the runtime of the eventuality. From (241a), we see that the set of *t* returned by an imperfective aspect has an upper bound (a maximal value $\tau(e)$). Hence the set of *t* is not closed under superset,⁵ because any superset larger than $\tau(e)$ will be out of the set of *t*. On the contrary, in (241b), the set of intervals returned by perfective aspect is closed under superset. No boundaries is set for *t*, hence the superset of *t* will be within *t* since time is infinite.

(241) a. imperfective AspP: $\lambda t. \exists e [t \subset \tau(e)]$



b. perfective AspP: $\lambda t. \exists e [\tau(e) \subseteq t]$



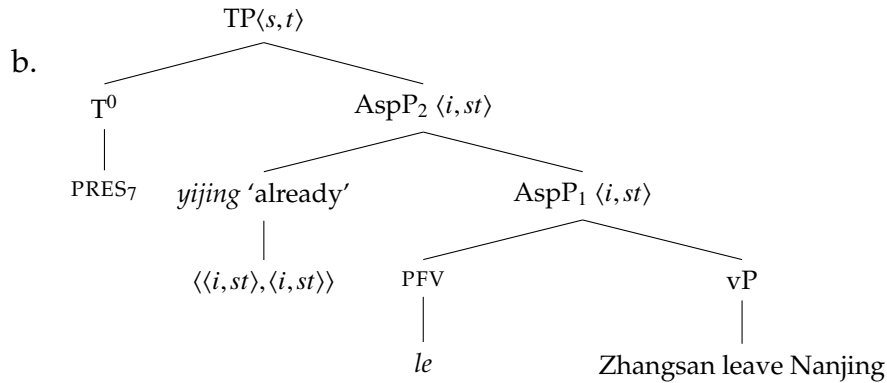
We assume that *hui* is sensitive to this difference: the set of intervals denoted by the

⁵If $p(x) = 1$ and an operation α on x is also true for p , i.e. $p(\alpha(x)) = 1$, then $p(x)$ is closed under the operation α .

complement cannot be closed under superset. The reason why elements like *yijing* ‘already’ rescue perfective phrases as the complement of the future modal is because *yijing* ‘already’ creates the right environment for *hui*. We assume the semantics in (242) for *yijing* ‘already’. *Yijing* takes in a temporal proposition and shifts the time argument associated to the proposition to a past time. A simple example shown in (243) with *yijing* means that there is a leaving event that occurred before the utterance time ($t_c = s^*$). Given the structure in (243b), we obtain the right reading of the sentence in (243a). The details of the derivation are shown in (244).

(242) $\llbracket yijing \rrbracket = \lambda p \lambda t \lambda w. \exists t_0 [t_0 < t \wedge p(t_0)(w)]$

- (243) a. Zhangsan *yijing* *likai* *le* Nanjing.
 Zhangsan already leave PFV Nanjing
 ‘Zhangsan has already left Nanjing.’



(244) a. $\llbracket AspP_1 \rrbracket = \lambda t \lambda w \exists e [\tau(e)(w) \subseteq t \wedge \text{leave}(e)(w) \wedge \text{Th}(e)(w) = n \wedge \text{Ag}(e)(w) = z]$

b. $\llbracket yijing \rrbracket = \lambda p \lambda t \lambda w \exists t_0 [t_0 < t \wedge p(t_0)(w)]$

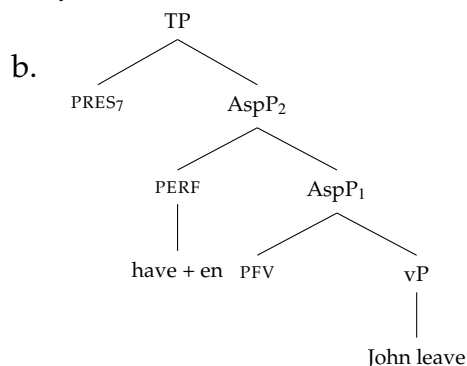
c. $\llbracket AspP_2 \rrbracket = \lambda t \lambda w \exists t_0 \exists e [t_0 < t \wedge \tau(e)(w) \subseteq t_0 \wedge \text{leave}(e)(w) \wedge \text{Th}(e)(w) = n \wedge \text{Ag}(e)(w) = z]$

d. $\llbracket TP \rrbracket = \lambda w. \exists t_0 \exists e [t_0 < t_c \wedge \tau(e)(w) \subseteq t_0 \wedge \text{leave}(e)(w) \wedge \text{Th}(e)(w) = n \wedge \text{Ag}(e)(w) = z]$

The function of *yijing* ‘already’ is very similar to that of English perfect (*have + past participle*). Similarly, English perfect selects a perfective aspect and shifts the event time to the past. We assume the denotations for English perfect in (245a) and perfective in (245b). The sentence in (246a) obtains a reading shown in (246d): there is a contextually salient past time that precedes the utterance time, within that time there is an event of John leaving.

- (245) a. $\llbracket \text{PERF} \rrbracket = \lambda p \lambda t \lambda w \exists t_1 < t [p(t_1)(w)]$
 b. $\llbracket \text{PFV} \rrbracket = \lambda P \lambda t \lambda w \exists e [P(e)(w) \wedge \tau(e) \subseteq t]$

- (246) a. John has left.

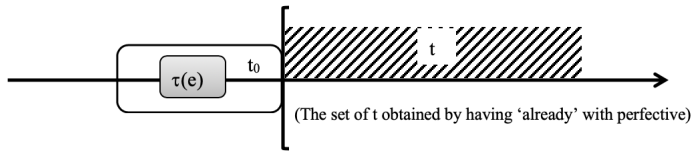


- c. $\llbracket \text{AspP}_2 \rrbracket = \lambda t \lambda w \exists t_1 \exists e [t_1 < t \wedge \tau(e)(w) \subseteq t_1 \wedge \text{leave}(e)(w) \wedge \text{Ag}(e)(w) = j]$
 d. $\llbracket \text{TP} \rrbracket = \lambda w \exists t_1 \exists e [t_1 < t_c \wedge \tau(e)(w) \subseteq t_1 \wedge \text{leave}(e)(w) \wedge \text{Ag}(e)(w) = j]$

We admit that the semantics in (242) (same for English perfect in (245)) is a simplification, focusing only on the temporal contribution and ignores a lot of other properties associated with *yijing* ‘already’. Though it is inadequate for a full picture of *yijing* ‘already’, it is enough for our purpose here to show how it makes a perfective complement acceptable with a future modal. *Yijing* returns a set of intervals ($\lambda t.$) and shifts the eventuality to a time that precedes all the members in that set. In contrast to a single perfective

complement that leaves the boundaries of t open in (241b), *yijing* closes one boundary in (247). In this case, only the supersets of t that are after t_0 satisfy $\lambda t \exists t_0 \exists e [t_0 < t \wedge \tau(e) \subseteq t_0]$, the supersets that include intervals that precede t_0 will not. Therefore, with *yijing* scoping over a perfective complement, the set of intervals that serves as the input for a future modal is no longer closed under superset.

(247) perfective with *yijing* ‘already’: $\lambda t \exists t_0 \exists e [t_0 < t \wedge \tau(e) \subseteq t_0]$

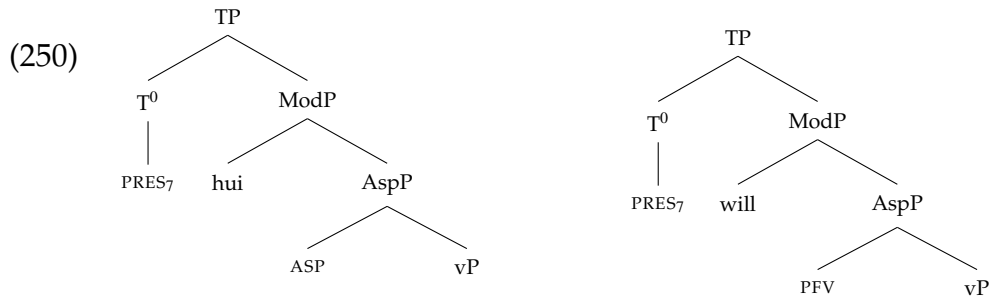


This observation is formalized in (248). The complement of *hui* p has to satisfy the presupposition that not all the superset of t will hold for p . This presupposition then excludes perfective complements and allows imperfective complements or complements that contain other elements (*yijing* ‘already’) to yield the right input. Furthermore, we assume that there is a covert bleached aspect in the complement of *hui*. The covert aspect in the complement of *hui* is just a type-shifter that turns a property of eventualities into a temporal proposition for the next derivation (Matthewson 2012). We assume that this covert aspect is the same bleached aspect we propose for stative predicates with the following denotation in (249). ASP here is very similar to a perfective aspect except that it is not defined by an inclusion relation between the event time and the topic time, so that it does not trigger a presupposition failure of the future modal.

(248) $\lambda p : \neg \forall w' \forall t' \forall t'' (p(t')(w') \wedge t' \subseteq t'' \rightarrow p(t'')(w'))$.

(249) $\llbracket \text{ASP} \rrbracket = \lambda P \lambda t \lambda w . \exists e [P(e)(w) \wedge \tau(e) = t]$

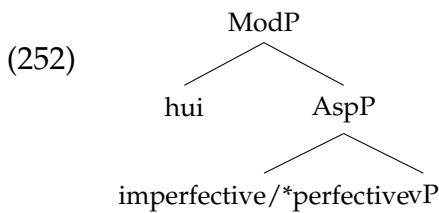
Given the fact that future perfective is possible cross-linguistically and English does not show evidence to exclude such a possibility, we assume that there is a covert perfective aspect in the complement of *will* to existentially close the eventuality argument. The general structures for Mandarin and English future sentences are summarized as in (250).



3.2.2.1.3 Other alternatives To address the incompatibility of future perfective in Mandarin, there are several other options in the literature. One type of analyses to this phenomenon is to attribute the infelicity to type-mismatch between future modal and aspectual phrases. For example, J.-W. Lin (2006) propose the denotations in (251) for *hui*, perfective and imperfective aspect in Mandarin. J.-W. Lin (2006) only focuses on the temporal semantics of *hui*, thus does not discuss the modal nature in details. In Lin’s framework, the perfective aspect is a temporal-aspectual particle that takes in a temporal proposition and returns a function of type $\langle i, it \rangle$ (the transformation of Lin’s notation to our system can be found in Chapter 2, though this point is irrelevant for our purpose here). In contrast, the imperfective aspect in (251c) returns a proposition of type $\langle i, t \rangle$.

- (251)
- a. $\llbracket \text{hui} \rrbracket = \lambda P_{\langle i, t \rangle} \lambda t \lambda t_0 [P(t) \wedge t_0 < t]$
 - b. $\llbracket \text{perfective aspect} \rrbracket = \lambda P_{\langle i, t \rangle} \lambda t_{\text{Top}} \lambda t_0 \exists t [t \subseteq t_{\text{Top}} \wedge P(t) \wedge t_{\text{Top}} < t_0]$
 - c. $\llbracket \text{imperfective} \rrbracket = \lambda P_{\langle i, t \rangle} \lambda t_{\text{Top}} \exists t [t_{\text{Top}} \subseteq t \wedge P(t)]$

J.-W. Lin (2006) proposes that the future modal *hui* heads a modal phrase ModP and scopes over the aspectual phrase AspP, as shown in (252). Due to the fact that *hui* takes an argument of a proposition of the type $\langle i, t \rangle$ and a perfective phrase is of type $\langle i, it \rangle$, a future sentence with a perfective phrase is ungrammatical due to type mismatch while no problem occurs for imperfective phrases.



A similar idea is proposed by Mucha (2015) for Hausa. Mucha (2015) suggests that the future form in Hausa is $z\bar{a}$ + PROSP, i.e. the combination of an overt modal $z\bar{a}$ and a covert prospective aspect PROSP. The temporal futurity is obtained by the covert prospective aspect PROSP and $z\bar{a}$ is just a plain modal that scopes over the prospective aspect. The denotations of the two elements are shown in (253). l stands for the type of the eventuality argument (v in our notation system). PROSP takes in a property of eventuality and returns a function P of type $\langle l, \langle i, st \rangle \rangle$, which serves as the first argument for $z\bar{a}$. $Z\bar{a}$ then states that P holds in all the best ranked worlds based on some modal bases MB according to some ordering sources ($O_{(w),(t)}$).

(253) a. $\llbracket \text{PROSP} \rrbracket = \lambda P_{\langle l, \langle s, t \rangle \rangle} . \lambda e . \lambda t . \lambda w . [P(e)(w) \& \tau(e) > t]$

b. $Z\bar{a}$ presupposes a realistic modal base and an inertial or bouletic ordering source. If defined:

$$\llbracket z\bar{a} \rrbracket = \lambda P_{\langle l, \langle i, \langle s, t \rangle \rangle \rangle}. \lambda t. \lambda w. \forall w' [w' \in \text{BEST}_{O(w), (t)}(MB(w)(t)) \rightarrow \exists e [P(e)(t)(w')]]$$

Chopping off the details, the main idea of Mucha's proposal is that $z\bar{a}$ selects an argument of type $\langle l, \langle i, st \rangle \rangle$. A perfective or imperfective aspect can only offer an argument of type $\langle i, st \rangle$ while prospective aspect offers an argument of $\langle l, \langle i, st \rangle \rangle$, the right fit for $z\bar{a}$. Therefore, $z\bar{a}$ occurs in future contexts (because of the covert PROSP) and is incompatible with perfective/imperfective morphology due to type-mismatch.

Neither J.-W. Lin's proposal nor Mucha's proposal is ideal for the Mandarin facts. Firstly, in Chapter 2 we have shown that the property of Mandarin perfective aspect reporting past eventualities can be captured by a more general assumption of incompatibility of present perfective. We do not need to stipulate that Mandarin perfective aspect is a temporal-aspectual-particle. Moreover, assuming different semantic types of perfective and imperfective in Mandarin increases the complexity in computation and may lead to redundancy in the lexicon. Elements that can take both perfective complements and imperfective complements (for example, attitude predicates that take a Proposition complement, see details in Chapter 4) will need two lexical entries to accommodate the different types of complements. If we do not want two lexical entries, we need to stipulate some sort of rules to existentially close one time argument of perfective phrases so that both perfective and imperfective complements are of the same semantic type. Therefore, J.-W. Lin's proposal is unattractive to us. Secondly, unlike Hausa $z\bar{a}$ that disallows perfective or imperfective morphology in its complement, Mandarin *hui* only prohibits perfective aspect. Given our analysis in Chapter 2, both perfective aspect and imperfective aspect are of the same semantic types. Therefore, a Mucha-style type-mismatch theory will rule

out the grammatical imperfective complements as well and thus is not ideal.

We are also aware of a third possibility to capture the interaction between overt aspect markers and future modals in Mandarin. Bittner (2014) suggests that Mandarin *le*₁ requires relative verifiability. Namely, at a certain perspective point, we are able to tell if the the eventuality modified by *le*₁ has occurred or not. The perspective point is the speech act by default, but it can be anaphoric. The crucial role of the context-setting aspectual adverb *yijing* ‘already’ is to introduce a future perspective point for *le*₁. If Bittner (2014) is on the right track, we could assume a covert bleached aspect in the complement of the future modal or a covert perfective aspect without the relative verifiability property. The conflict between future contexts and perfective aspect *le*₁ is because in a sentence without *yijing*, the perspective point is the utterance time. The use of *le*₁ requires the eventuality to be verifiable at the utterance time but future modal says that the eventuality is irrealis and is not verifiable at the utterance (though veridical in a future time), leading to a conflict. We are unclear about the formal implementations of Bittner’s idea. For instance, it is unclear to us how relative verifiability is defined in a future context and how the perspective point is selected for *yijing* ‘already’. Therefore, we leave this possibility open.

3.2.2.2. The semantics of Mandarin *hui*

Following the common analysis for future morphemes (Rullmann et al. 2008 for St’át’imcets *kelh*, Tonhauser 2011 for Paraguayan Guaraní *-ta* etc.), we treat *hui* and *will* as a combination of modality and futurity. They universally quantifies over a set of possible worlds and introduces a time subsequent to the reference time at which the proposition in ques-

tion is true.

The denotation of Mandarin *hui* and English *will* is shown in (254). $\text{BEST}(\text{MB}, \text{O}, w, t)$ stands for the set of possible worlds that are ranked best among the modal base according to the ordering source O in w at t . Furthermore, both *will* and *hui* impose a presupposition on the time argument: $t \subseteq t_c$. This presupposition secures that *will* and *hui* can only combine with the present tense which supplies t_c as the reference time.⁶ Other than that, Mandarin *hui* also possesses a presupposition that makes sure that the complement cannot be the output of the perfective aspect alone.

- (254) a. $\llbracket \text{hui} \rrbracket^{g,c} = \lambda p \lambda t \lambda w : \neg \forall w' \forall t' \forall t'' (p(t')(w') \wedge t' \subseteq t'' \rightarrow p(t'')(w')) \wedge t \subseteq t_c. [\forall w' \in \text{BEST}(\text{MB}, \text{O}, w, t) \rightarrow \exists t' [t' > t \wedge p(t')(w')]]$
- b. $\llbracket \text{will} \rrbracket^{g,c} = \lambda p \lambda t \lambda w : t \subseteq t_c. [\forall w' \in \text{BEST}(\text{MB}, \text{O}, w, t) \rightarrow \exists t' [t' > t \wedge p(t')(w')]]$

We are not going to dig into the details of the modal base and ordering sources of English *will* due to its controversy (Copley 2002, 2009, Condoravdi 2003, Giannakidou and Mari 2018 among many others). For Mandarin *hui*, we propose that it quantifies over worlds from an epistemic modal base, ranked by a bouletic ordering source or an inertial ordering source in the sense of Copley (2009). If the speaker is confident that some contextually defined actor is able to bring about the truth of a proposition in the

⁶English *will* is often treated as the morphological spell-out of a present tense and a future modal *woll* in the literature on Sequence of Tense and infinitives (Abusch 1985, Ogihara 1996, Condoravdi 2003, Wurmbrand 2014 among many others), based on the fact that *will* shows the same absolute properties as English present tense does. Though we do not go for this decompositional view, in our analysis the constraint on the temporal argument will force a present tense to combine with *will*, leading to the fact that *will* always goes with the present tense in unembedded contexts (this observation can also extend to embedded contexts in English). Therefore, even we do not assume a decompositional analysis for *will* in English, the absolute nature of English *will* is successfully captured in a slightly different way.

future and is committed to doing so, we are dealing with a bouletic ordering source. If the speaker is confident that certain contingent facts about the world brings about the truth of a proposition when things proceed normally, the ordering source is inertial. Two arguments show that *hui* quantifies over an epistemic modal base: a. depending on what they know, two different people may disagree on the predictions, which is not veridical at the utterance time but only veridical at a future time; b. future marker can be used in a scenario where the event is metaphysically impossible to happen.

The contexts in (255) and (257) are from Giannakidou and Mari (2018) to show that the possible worlds that *hui* quantifies over are epistemic in nature. In a context depicted in (255), based on her knowledge, Mary utters the sentence in (256) about Gianni's arrival. Yet it is totally natural for Susan to disagree with Mary and utters (256) if Susan believes that there is construction going on.

- (255) a. Context: Mary and Susan are waiting for Gianni.
- b. What Mary knows about the current situation: {'around 4 it is not yet rush hour', 'the traffic is easy outside rush hour', 'if you travel outside rush hour the trip from Hyde Park to Lakeview will take 20 minutes.'}
- c. What Susan knows about the current situation: {'around 4 it is not yet rush hour', 'the traffic is easy outside rush hour,' 'if you travel outside rush hour the trip from Hyde park to Lakeview will be take 20 minutes', 'there is construction going on the Lake Shore Drive', 'when there is construction on the road, traffic slows down'}

(Slightly adapted from Giannakidou and Mari 2018: 103-104)

- (256) a. Mary: Yuehan hui si dianzhong dao.
 John FUT four o'clock arrive.
 'John will arrive at 4.'
- b. Susan: Bu dui, Yuehan hui wu dianzhong dao.
 NEG right John FUT five o'clock arrive
 'No, John will arrive at 5.'

Given the context in (257), it is metaphysically impossible for Mary and Susan to meet tomorrow because of the accident. However, based on what Mary knows and believes, it is natural for Mary to utter the sentence in (257) with a future modal. Therefore, we conclude that the modal base associated with *hui* is epistemic.

- (257) Context: Mary and Susan are planning to meet tomorrow. Unfortunately, Susan passed away in a car accident today and Mary does not know about this sad news. Mary is looking forward to the meeting tomorrow and utters:

Wo mingtian hui/yao gen Susan jianmian.
 1SG tomorrow FUT with Susan meet

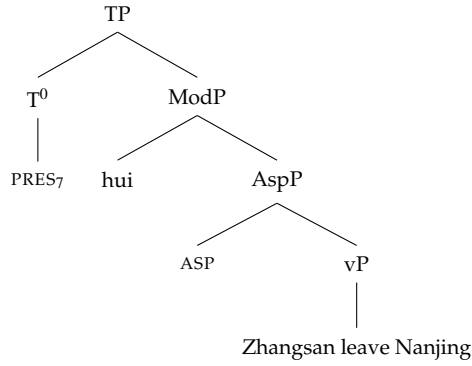
'I will meet with Susan tomorrow.'

Finally, with all the pieces settled, the future sentence in (258) with the structures demonstrated in (258ba) obtains the desired readings. In (258b), the aspectual phrase AspP contains a bleached ASP and thus is non-perfective. The tense operator offers the utterance time as the topic time for ModP, hence the presupposition of *hui* is satisfied and *hui* is defined. According to the derivations in (259), the sentence in (258a) obtain a reading that in all the best worlds based on an epistemic modal base and a bouletic/inertial ordering source, there is a t' that is after t_c and it is the runtime of an event of Zhangsan

leaving Nanjing. A similar derivation holds for the English sentence in (260a), we will not repeat the derivation here.

- (258) a. Zhangsan hui likai Nanjing.
 Zhangsan FUT leave Nanjing
 'Zhangsan will leave Nanjing.'

b.



- (259) a. $[[\text{AspP}]] = \lambda t \lambda w \exists e [\tau(e)(w) = t \wedge \text{leave}(e)(w) \wedge \text{Ag}(e)(w) = z \wedge \text{Th}(e)(w) = n]$

- b. $[[\text{hui}]]^{g,c} = \lambda p : \neg \forall w' \forall t' \forall t'' (p(t')(w') \wedge t' \subseteq t'' \rightarrow p(t'')(w')) \wedge t \subseteq t_c. \lambda t \lambda w. [\forall w' \in \text{BEST}(\text{MB}, \text{O}, w, t) \rightarrow \exists t' [t' > t \wedge p(t')(w')]]]$

- c. *hui* is defined iff

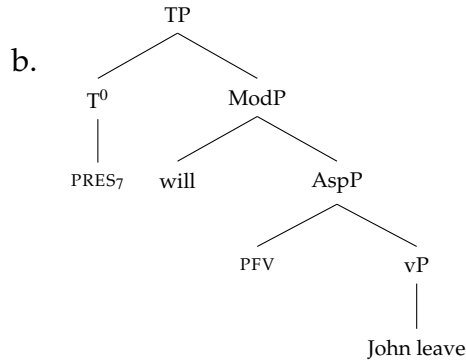
AspP satisfies $\neg \forall w' \forall t' \forall t'' (p(t')(w') \wedge t' \subseteq t'' \rightarrow p(t'')(w'))$, and

$T^0 = \text{PRES}_7 (g(7) = t_c)$

- d. $[[\text{ModP}]] = \lambda t \lambda w. [\forall w' \in \text{BEST}(\text{MB}, \text{O}, w, t) \rightarrow \exists t' \exists e [t' > t \wedge \tau(e)(w') = t' \wedge \text{leave}(e)(w') \wedge \text{Ag}(e)(w') = z \wedge \text{Th}(e)(w') = n]]]$

- e. $[[\text{TP}]] = \lambda w [\forall w' \in \text{BEST}(\text{MB}, \text{O}, w, t_c) \rightarrow \exists t' \exists e [t' > t_c \wedge \tau(e)(w') = t' \wedge \text{leave}(e)(w') \wedge \text{Ag}(e)(w') = z \wedge \text{Th}(e)(w') = n]]$.

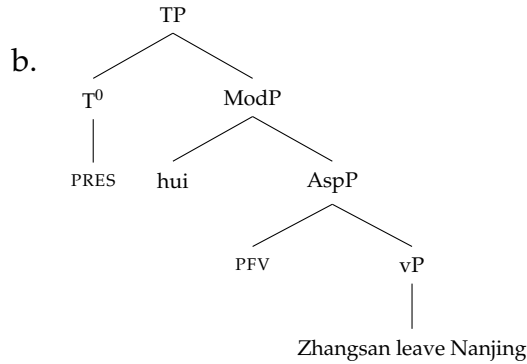
- (260) a. John will leave.



- c. $[[TP]] = \lambda w[\forall w' \in \text{BEST}(\text{MB}, \text{O}, w, t_c) \rightarrow \exists t' \exists e[t' > t_c \wedge \tau(e)(w') \subseteq t' \wedge \text{leave}(e)(w') \wedge \text{Ag}(e)(w') = j]]$.

When it comes to the incompatibility between *hui* and perfective aspect, as shown by the example below, *hui* is undefined because AspP satisfies $\forall w' \forall t' \forall t'' (p(t')(w') \wedge t' \subseteq t'' \rightarrow p(t'')(w'))$, leading to the ungrammaticality of (261a).

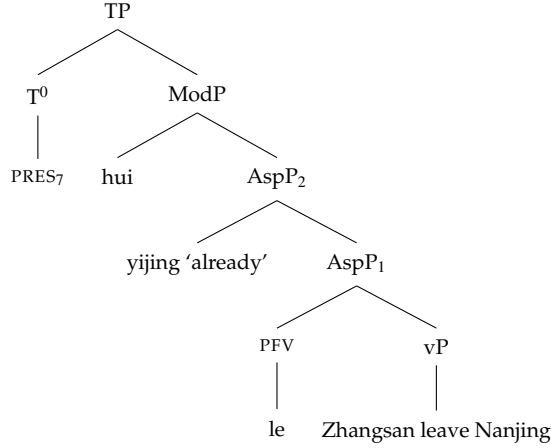
- (261) a. *Zhangsan **hui** likai **le** Nanjing.
 Zhangsan FUT leave PFV Nanjing.
 'Intended: I will have left Nanjing.'



In contrast, for a perfective complement with *yijing* 'already', the complement of *hui* is no longer against the non-perfective presupposition since not all the elements in the supersets of *t* satisfy AspP₂ in (262e). With the present tense, *hui* is defined and the derivations in (262c-h) yield the reading in (262h).

- (262) a. Zhangsan **hui** yijing likai **le** Nanjing.
 Zhangsan FUT already leave PFV Nanjing.
 'Zhangsan will have left Nanjing.'

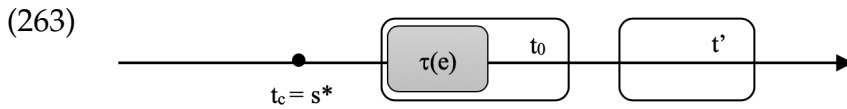
b.



- c. $[[\text{AspP}_1]] = \lambda t \lambda w \exists e [\tau(e)(w) \subseteq t \wedge \text{leave}(e)(w) \wedge \text{Ag}(e)(w) = z \wedge \text{Th}(e)(w) = n]$
- d. $[[\text{yijing}]] = \lambda p \lambda t \lambda w \exists t_0 [t_0 < t \wedge p(t_0)(w)]$
- e. $[[\text{AspP}_2]] = \lambda t \lambda w \exists t_0 \exists e [t_0 < t \wedge \tau(e)(w) \subseteq t_0 \wedge \text{leave}(e)(w) \wedge \text{Ag}(e)(w) = z \wedge \text{Th}(e)(w) = n]$
- f. AspP_2 satisfies $\neg \forall w' \forall t' \forall t'' (p(t')(w') \wedge t' \subseteq t'' \rightarrow p(t'')(w'))$.
- $T^0 = \text{PRES}_7$, $g(7) = t_c$. $t \subseteq t_c$ is also satisfied.
- hui* is defined.
- g. $[[\text{ModP}]]^c = \lambda t \lambda w. [\forall w' \in \text{BEST}(\text{MB}, \text{O}, w, t) \rightarrow \exists t' \exists t_0 [t' > t \wedge t_0 < t' \wedge \exists e [\tau(e)(w') \subseteq t_0 \wedge \text{leave}(e)(w') \wedge \text{Ag}(e)(w') = z \wedge \text{Th}(e)(w') = n]]]$
- h. $[[\text{TP}]]^{c,g} = \lambda w [\forall w' \in \text{BEST}(\text{MB}, \text{O}, w, t_c) \rightarrow \exists t' \exists t_0 \exists e [t' > t_c \wedge t_0 < t' \wedge \tau(e)(w') \subseteq t_0 \wedge \text{leave}(e)(w') \wedge \text{Ag}(e)(w') = z \wedge \text{Th}(e)(w') = n]]]$

The denotation in (262h) says that in all the best accessible worlds, there is a time t' after the utterance time and there is an event of Zhangsan leaving Nanjing before the

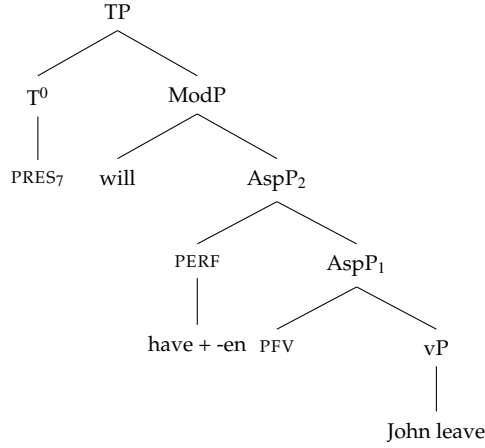
future time t' , as depicted by the graph below.



This reading more or less captures the meaning of (262a): Zhangsan will have left by a future time. But the denotation in (262h) is a bit loose, because the denotation of $\exists t' \exists t_0 \exists e [t' > t_c \wedge t_0 < t' \wedge \tau(e)(w') \subseteq t_0]$ does not require $t_0 > t_c$. Namely, this denotation does not rule out the possibility that the leaving might happen before now. Though the denotation in (262h) is compatible with a past reading, yet we only obtain a future reading of the event. We suggest that this is due to pragmatic constraints. The denotation in (262h) is compatible with a past reading and a future reading that will occur before a certain future time. However, for the past reading ($t_0 < t_c$), a past tensed sentence is the most informative and economic option since everything is veridical at the utterance time. It is pragmatically odd to use a future modal plus an aspectual phrase to target at a past reading in this scenario. Hence $t_0 > t_c$ is preferred and strengthened to be the only available reading.

It is easy to see the connection between a future sentence with *yijing* 'already' in Mandarin and a future perfect sentence in English. Following a similar process of derivation in (264c-h), the English future perfect sentence in (264a) obtains the same reading: in all the best accessible worlds, John will leave before a certain future time.

- (264) a. John will have left.
 b.



- c. $[[\text{AspP}_1]] = \lambda t \lambda w \exists e [\tau(e)(w) \subseteq t \wedge \text{leave}(e)(w) \wedge \text{Ag}(e)(w) = j]$
- d. $[[\text{PERF}]] = \lambda p \lambda t \lambda w \exists t_1 [t_1 < t \wedge p(t_1)(w)]$
- e. $[[\text{AspP}_2]] = \lambda t \lambda w \exists t_1 < t \wedge \exists e [\tau(e)(w) \subseteq t_1 \wedge \text{leave}(e)(w) \wedge \text{Ag}(e)(w) = j]$
- f. $[[\text{ModP}]]^c = \lambda t \lambda w : t \subseteq t_c. [\forall w' \in \text{BEST}(\text{MB}, \text{O}, w, t) \rightarrow \exists t' \exists t_1 [t' > t \wedge t_1 < t' \wedge \exists e [\tau(e)(w') \subseteq t_1 \wedge \text{leave}(e)(w') \wedge \text{Ag}(e)(w') = j]]]$
- g. T^0 is PRES_7 , $g(7) = t_c$. ModP is defined given $t_c \subseteq t_c$.
- h. $[[\text{TP}]]^{c,g} = \lambda w [\forall w' \in \text{BEST}(\text{MB}, \text{O}, w, t_c) \rightarrow \exists t' \exists t_1 \exists e [t' > t_c \wedge t_1 < t' \wedge \tau(e)(w') \subseteq t_1 \wedge \text{leave}(e)(w') \wedge \text{Ag}(e)(w') = j]]]$

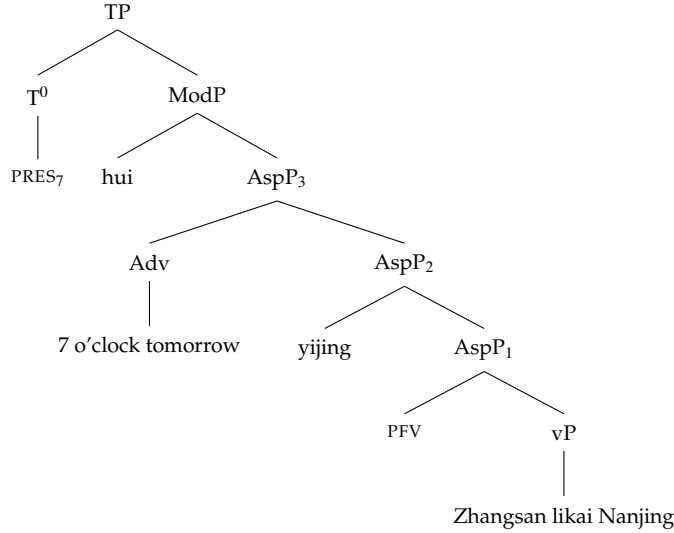
Taking time adverbs into account, our analysis also yield the right prediction for future perfective sentences with *yijing* ‘already’. The sentence in (265) with *yijing* ‘already’ and a future time adverb *mingtian qidian de shihou* ‘7 o’clock tomorrow’ means that Zhangsan will leave by 7 o’clock tomorrow. Given the structure and the derivations shown in (266), (265d) says that in all the best accessible worlds, there is a time t' within 7 o’clock tomorrow such that Zhangsan will leave before this time, as the figure depicted in (265e).

- (265) a. Zhangsan mingtian qi-dian de shihou hui yijing likai le
 Zhangsan tomorrow seven-o’clock DE time FUT already leave PFV

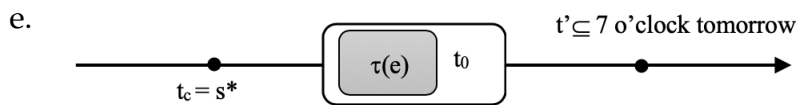
Nanjing.
Nanjing

'Zhangsan will have left Nanjing (by) 7 o'clock tomorrow.'

b.



- (266) a. $[[\text{AspP}_2]] = \lambda t \lambda w \exists t_0 \exists e [t_0 < t \wedge \tau(e)(w) \subseteq t_0 \wedge \text{leave}(e)(w) \wedge \text{Ag}(e)(w) = z \wedge \text{Th}(e)(w) = n]$
- b. $[[\text{AspP}_3]] = \lambda t \lambda w \exists t_0 \exists e [t_0 < t \wedge t \sqsubseteq 7 \text{ o'clock tomorrow} \wedge \tau(e)(w) \subseteq t_0 \wedge \text{leave}(e)(w) \wedge \text{Ag}(e)(w) = z \wedge \text{Th}(e)(w) = n]$
- c. $[[\text{ModP}]] = \lambda t \lambda w. [\forall w' \in \text{BEST}(\text{MB}, \text{O}, w, t) \rightarrow \exists t' \exists t_0 \exists e [t' > t \wedge t_0 < t' \wedge t' \sqsubseteq 7 \text{ o'clock tomorrow} \wedge \tau(e)(w') \subseteq t_0 \wedge \text{leave}(e)(w') \wedge \text{Ag}(e)(w) = z \wedge \text{Th}(e)(w') = n]]$
- d. $[[\text{TP}]] = \lambda w [\forall w' \in \text{BEST}(\text{MB}, \text{O}, w, t_c) \rightarrow \exists t' \exists t_0 \exists e [t' > t_c \wedge t_0 < t' \wedge t' \sqsubseteq 7 \text{ o'clock tomorrow} \wedge \tau(e)(w') \subseteq t_0 \wedge \text{leave}(e)(w') \wedge \text{Ag}(e)(w') = z \wedge \text{Th}(e)(w') = n]]$

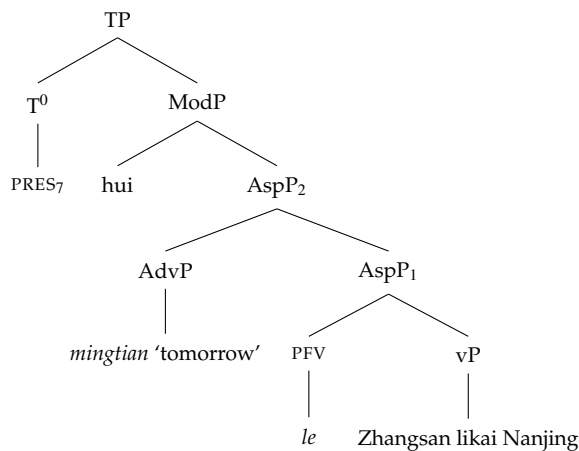


There is one problem with the current analysis for the incompatibility between *hui* and

le. The non-perfective presupposition of *hui* is based on the fact that perfective complements return a set of intervals without boundaries. However, if we define a time adverb as a set of intervals and take time adverbs as a modification of the aspectual phrase, the application of predicate modification between time adverbs and aspectual phrases will set a boundary for a perfective phrase, which makes the complement with a time adverb the right fit for *hui* regardless of the aspect. For example, the sentence in (267a) has the structure in (267b). Given the semantics of ‘tomorrow’, AspP_2 will obtain a denotation in (267d). AspP_2 returns a set of intervals that is within tomorrow, which in principle will satisfy the non-perfective presupposition of *hui*: $\neg\forall w'\forall t'\forall t''(p(t')(w') \wedge t' \subseteq t'' \rightarrow p(t'')(w'))$. Intervals that are beyond the scope of *tomorrow* will not satisfy AspP_2 and thus *hui* should be defined, predicting that the sentence in (267a) is grammatical, contradictory to facts.

- (267) a. *Zhangsan mingtian hui likai-le Nanjing.
 Zhangsan tomorrow FUT leave-PFV Nanjing

b.



c. $\llbracket \text{tomorrow} \rrbracket = \lambda t. [t \sqsubseteq \text{tomorrow}]$

d. $\llbracket \text{AspP}_2 \rrbracket = \lambda t \lambda w \exists e [\tau(e)(w) \subseteq t \wedge t \sqsubseteq \text{tomorrow in } w \wedge \text{leave}(e)(w) \wedge \text{Ag}(e)(w) = z \wedge \text{Th}(e)(w) = n]$

We are unaware of any possible solutions to this problem. Even we assume a different semantics for *mingtian* ‘tomorrow’ as the one in (268) by replacing the subset relation by an ‘overlap’ relation (represented by ‘ \circ ’ in (268a)), AspP_2 still satisfies the non-perfective presupposition of *hui*. Not all the intervals that are supersets of t will satisfy AspP_2 because there are intervals that do not overlap with ‘tomorrow’ given the denotation of AspP_2 in (268b). The ungrammaticality of (267a) indicates that time adverbs that modify the aspectual phrases do not block the selection of *hui* while aspectual elements like *yijing* ‘already’ can. We have to leave this issue unsolved here.

(268) a. $\llbracket \text{tomorrow} \rrbracket = \lambda t. [t \circ \text{tomorrow}]$

b. $\llbracket \text{AspP}_2 \rrbracket = \lambda t \lambda w \exists e [\tau(e)(w) \subseteq t \wedge t \circ \text{tomorrow in } w \wedge \text{leave}(e)(w) \wedge \text{Ag}(e)(w) = z \wedge \text{Th}(e)(w) = n]$

3.2.2.3. Interim summary

In the previous discussion, we have offered a detailed investigation on *hui* based on a comparison with English *will*. In unembedded contexts, *hui* denote a prediction about the future, disallowing non-future usages (except when *hui* denotes a generic or ability reading). Like *will*, *hui* only combines with the present tense. Other than that, *hui* is incompatible with perfective aspect le_1 . In NPI licensing or modal concord contexts, *hui* is able to be used as an epistemic modal in non-future contexts.

We treat English *will* and Mandarin *hui* as a combination of modality and futurity. Both future makers take a presupposition that calls for the utterance time to be the evaluation point for future. Moreover, Mandarin *hui* possesses an extra non-perfective requirement

on its complement. *Hui* universally quantifies over the best worlds according to an epistemic modal base and bouletic/inertial ordering sources, and states that a proposition is true in those worlds at a time in the future of now.

3.3. Futurates in Mandarin

Mandarin only possesses simple futurates and lacks progressive futurates. Generally speaking, Mandarin simple futurates share a lot with English simple futurates, though minor variations also exist. Following the insights from Copley (2009), we assume that both constructions contain a covert futurate modal PLAN with certain presuppositions. The covert futurate modal PLAN share the same template with overt future modals in (269).

$$(269) \quad \llbracket \text{PLAN}/\text{hui}/\text{will} \rrbracket^{s,c} = \lambda p \lambda t \lambda w : \text{Presupposition } X. [\forall w' \in \text{BEST}(\text{MB}, \text{O}, w, t) \rightarrow \exists t' [t' > t \wedge p(t')(w')]]$$

3.3.1. Properties of Mandarin simple futurates

The most obvious similarities between English simple futurates and Mandarin simple futurates are: a. disallow unplannable events ; b. require a future time adverb to license a future reading; c. presuppose the existence of a plan the content of which is a member from the focus alternative set of the assertion.

The two constructions also reveal differences. English simple futurates share the same morphological form with present tense and only allow present future interpreta-

tion. Mandarin simple futurates do not specify the evaluation time, but only show past future readings when combined with time adverbs without indexicals.

3.3.1.1. Constraints on eventualities

English simple futurates (as well as progressive futurates) are infelicitous with events that are not planned or scheduled (Lakoff 1971, Copley 2002, 2009, Thomas 2014). For instance, the weather and the result of a match are unplannable. Therefore, the sentences in (270) are infelicitous in futurate forms.

- (270) a. # The Red Sox defeats the Yankees tomorrow.
b. # It rains tomorrow.
c. # The Red Sox are defeating the Yankees tomorrow.
d. # It is raining tomorrow.

This property also holds for Mandarin simple futurates (Sun 2014), as demonstrated by the examples in (271). Such a constraint on predicates is not detected among sentences with the overt future marker *hui*, as we can see in (272). Different from English, Mandarin is more flexible with weather predicates in simple futurates. The sentences in (273) contain weather predicates but do not need overt future modals. In these cases, the speaker has a strong belief about the weather condition being predictable with the help of science.

- (271) a. # Mingtian dizhen.
tomorrow earthquake
'# There is an earthquake tomorrow.'
b. # Yuehan mingnian dangxuan zongtong.
John next-year be-elected-to-be president

‘# John is elected to be the president next year.’

- c. #Mingtian Huren dui jibai Huojian dui.
tomorrow Lakers team defeat Rockets team
‘# The Lakers defeat the Rockets tomorrow.’

- (272) a. Mingtian **hui** dizhen.
tomorrow FUT earthquake
‘There will be an earthquake tomorrow.’
- b. Yuehan mingnian **hui** dangxuan zongtong.
John next-year FUT be-elected-to-be president
‘John will be elected to be the president next year.’
- c. Mingtian Huren dui **hui** jibai Huojian dui.
tomorrow Lakers team FUT defeat Rockets team
‘The Lakers will defeat the Rockets tomorrow.’

- (273) a. Mingtian xiayu.
tomorrow rain
‘Lit: It rains tomorrow.’
- b. Mingtian xiaxue.
tomorrow snow
‘Lit: It snows tomorrow.’

Other than that, simple futurates are also felicitous with predictable eventualities based on our scientific understandings of physical laws/principles of the world, as shown by the examples in (274) and (275) from English and Mandarin.

- (274) a. The sun rises tomorrow at 5:13 a.m.
b. The meteorite impacts tomorrow at 5:13 a.m. (Copley 2009: 39-40)
- (275) a. Mingtian wudian ban richu.
tomorrow five-o’clock half sun-rise

'The sun rises tomorrow at 5:30 am.'

- b. Shizizuo liuxingyu lingchen yi dianzhong kaishi.
Leo meteor-shower early-morning one o'clock begin
'The Leonids starts at one o'clock in the morning.'

Unlike eventualities such as *dizhen* 'have an earthquake', astronomy activities such as sunrise, eclipse, meteorites can be predicted scientifically with modern techniques. They are 'planned' by the laws of the universe and can be predicted by human beings if everything occurs inertially. As Copley (2009) points out, these sentences still involve 'plannable' events. The planner is just the law-based world rather than a certain entity. Copley (2009) calls the entity that is able to secure the occurrence of the plan and is committed to the plan the 'director'. The director is not necessarily the subject of the sentence but is contextually determined.

Taking into account the pattern of weather predicates in English and Mandarin, we see a graded pattern about simple futurities with predicates denoting natural phenomena. Namely, English somehow still takes the weather to be 'unplannable' or 'unpredictable' according to our understanding of the world. But Mandarin treats weather predicates the same as predicates denoting astronomy activities in the sense that they are strongly believed to follow the laws of science and thus are predictable as if they are plannable.

3.3.1.2. Obligatoriness of future time adverbs

Another property associated with simple futurities in both languages is that the licensing of a future reading requires a future time adverb. In the context where a salient future time is already set-up, the future time adverb can be elided as in (276). Otherwise, an

overt future time adverb is necessary in simple futurate constructions. The English example in (277a) without a future time adverb can only obtain a generic/habitual reading while the same example marked with *will* does not need a future time adverb to obtain the future reading.

(276) A: What's John's plan tomorrow?

B: John leaves.

(277) a. # Joe watches TV.

Intended: Joe watches TV sometime in the future.

b. Joe watches TV tomorrow.

c. Joe will watch TV.

The Mandarin sentence in (278a) cannot get a futurate reading without a future time adverb, too. Besides, a bare eventive predicate in (278b) cannot freely obtain a generic reading without quantificational adverbs. In contrast, a future marker *hui* in (278c) does not need a future time adverb to acquire a future reading. Moreover, the felicity of the sentence in (279) shows that the future time in a futurate construction does not need to be specific.

(278) a. Zhangsan *(mingtian) deng tai yanchu.
Zhangsan tomorrow get-on stage perform
'Zhangsan performs on the stage tomorrow.'

b. Zhangsan *(changchang) deng tai yanchu.
Zhangsan often get-on stage perform
'Zhangsan often performs on the stage.'

- c. Zhangsan hui deng tai yanchu.
 Zhangsan FUT get-on stage perform
 'Zhangsan will perform on the stage.'

- (279) Zhangsan zai jianglai shiji chengshu de shihou zou. Juti shi shenme
 Zhangsan at future timing mature DE time leave detailed COP what
 shihou, xianzai hai bu hao shuo.
 time now still NEG good say
 'Zhangsan leaves when the timing is correct in the future. Exactly when it will
 be, it is hard to say now.'

3.3.1.3. Presupposition of the existence of a plan

Simple futurates in both English and Mandarin presuppose the existence of a plan that is relevant to the assertion. Copley (2009) shows that the progressive futurate question in (280a) asks whether there is a plan for Joe going skydiving tomorrow and the negation of the progressive futurate sentence in (281a) is negating the existence of a plan with the same content. However, the question form and the negation form of simple futurates in (280b)-(281b) do not question or negate the existence of a plan. Instead, what (280b)-(281b) question or negate is the content of the plan rather than the existence of a plan. (280b)-(281b) take it for granted that there is a plan of Joe going skydiving at some point, and question/negate that it will happen tomorrow.

- (280) a. Is Joe going skydiving tomorrow?
 b. Does Joe go skydiving tomorrow? (Copley 2009: 35)
- (281) a. Joe isn't going skydiving tomorrow.
 b. Joe doesn't go skydiving tomorrow. (Copley 2009: 35)

A similar pattern holds in Mandarin simple futurates. The sentences in (282a) and (282b) presuppose that something is planned in the future. Depending on which element is stressed, the content of the presupposed plan changes. For instance, if *mingtian* ‘tomorrow’ in (282a) is stressed, then the presupposition is that ‘The company has a plan of holding the year-end-party in a future time’ and the assertion is questioning if the time is ‘tomorrow’. However, if the vP *kai nianhui* ‘hold year-end-party’ is stressed, then the presupposition becomes ‘The company plans something for tomorrow’ and the assertion questions about whether the activity of the plan is the year-end-party.

- (282) a. Gongsì míngtiān kāi niánhuì ma?
 company tomorrow open year-end-party Q
 ‘Does the company hold the year-end-party tomorrow?’
- b. Gongsì míngtiān bù kāi niánhuì.
 company tomorrow NEG open year-end-party
 ‘The company does not hold the year-end-party tomorrow.’

3.3.1.4. Constraints on evaluation time

Mandarin simple futurates differ from English simple futurates in compatibility of evaluation time. English progressive futurates are possible in the present tense and the past tense (283a-b) while simple futurates are restricted to the form of present tense (283d) rather than the past tense. For example, (283c) with the past tense can only describe a past event, being unable to denote a future reading that takes a past time as the evaluation time for future.

- (283) a. The Red Sox were playing the Yankees tomorrow, but now they won’t.
 b. The Red Sox are playing the Yankees tomorrow.

c. # The Red Sox played the Yankees yesterday.

‘Intended: The Red Sox were playing the Yankees yesterday.’

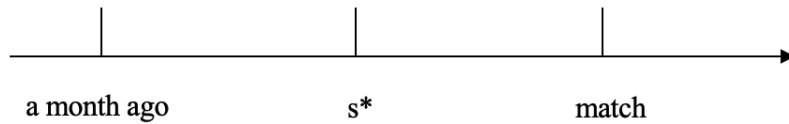
d. The Red Sox play the Yankees tomorrow.

Given the fact that Mandarin present tense and past tense are both covert, we have to rely on specified contexts that target at specific evaluation time to investigate the Mandarin picture. Our strategy is to set a plan in the past, and then test the felicitousness of a sentence with a present tense in English and a sentence with a bare eventive in Mandarin (i.e. simple futurates) to see if the sentence is able to take the past time or has to take the utterance time as an evaluation point. Note that futurate constructions require a time adverb, the type of adverb is a second factor that we need to control. We notice that the possibility of evaluation time in Mandarin simple futurates is influenced by the type of time adverb. Time adverbs like ‘tomorrow’ and ‘last week’ are sensitive to the context. They carry an indexical that anchors to the utterance time. Time adverbs like *shí tiān hòu* ‘after ten days’, ‘Jan 10, 2020’ are not indexical and insensitive to the utterance time. Simple futurates with indexical adverbs only allow the present future reading, i.e. the utterance time has to be the reference point for future. Simple futurates with neutral adverbs without indexicals are compatible with either present future or past future interpretations.

In the context depicted in (284) where the scheduled event is after the utterance time according to a past plan, simple futurate constructions are both available for English and Mandarin, as shown by (284a) and (284b).

(284) Context: On March 10, you are checking the meeting notes of the basketball club

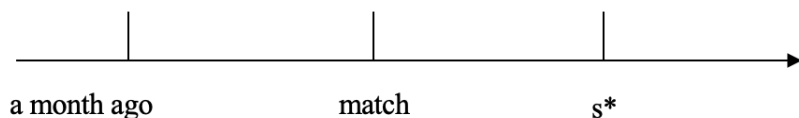
which was taken a month ago on Feb 10. The notes said that the match between the Lakers and the Rockets would be on March 11, namely tomorrow. You say:



- a. According to the plan made a month ago, the Lakers and the Rockets **compete** tomorrow.
- b. Anzhao yi-ge yue qian zhiding de jihua, Huren dui gen Huojian according-to one-CL month ago make DE plan Lakers team and Rockets dui mingtian **bisai**.
team tomorrow compete
'According to the plan made a month ago, the Lakers compete with the Rockets tomorrow.'

If the scheduled event would occur before the utterance time according to a past plan as depicted in (285), English simple futurates are infelicitous, as we can see in (286a). In this scenario, the conditional form *would have* or the past progressive futurate *was v-ing* should be used. Similarly, the Mandarin bare eventive form in this scenario with an indexical time adverb *shangzhou* 'last week', is infelicitous, either, demonstrated by the sentence in (287a). In this scenario, a sentence with *hui* in (287b) or a sentence with an epistemic modal and a perfective complement in (287c) is a proper statement.

- (285) Context: On March 10, you are checking the meeting notes of the basketball club which was taken a month ago on Feb 10. The notes said that the match between the Lakers and the Rockets would be on March 3, namely a week ago. You don't know whether the match happened or not. You comment:

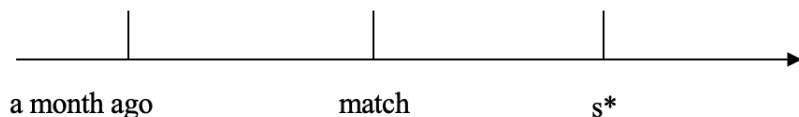


- (286) a. # According to the plan made a month ago, the Lakers and the Rockets **compete** a week ago/last week.
- b. According to the plan made a month ago, the Lakers **would have competed/was competing** with the Rockets a week ago/last week.
- (287) a. # Anzhao yi-ge yue qian zhiding de jihua, Huren dui gen according-to one-CL month ago make DE plan Lakers team and Huojian dui shang-zhou bisai. Rockets team last-week compete.
 ‘Intended: According to the plan made a month ago, the Lakers were competing with the Rockets last week.’
- b. Anzhao yi-ge yue qian zhiding de jihua, Huren dui gen Huojian according-to one-CL month ago make DE plan Lakers team and Rockets dui **hui zai** shang-zhou bisai. team FUT at last-week compete.
 ‘According to the plan made a month ago, the Lakers were competing with the Rockets last week.’
- c. Anzhao yi-ge yue qian zhiding de jihua, Huren dui gen Huojian according-to one-CL month ago make DE plan Lakers team and Rockets dui **yinggai zai** shang-zhou bisai-**guo le**. team should at last-week compete-EXP SFP.
 ‘According to the plan made a month ago, the Lakers should have competed with the Rockets last week.’

In a similar context in (288) where the scheduled event would occur before the utter-

ance time according to a past plan, when we change the indexical time adverb to a neutral time adverb *shi tian hou* ‘in/after ten days’, an English simple futurate is still bad with ‘after ten days’, as shown in (289a). Similarly, a conditional or a past progressive futurate in (289b) is preferred in this context. Interestingly, the Mandarin simple futurate form is felicitous if the time adverb is without an index in (290).

(288) Context: On March 10, you are checking the meeting notes of the basketball club which was taken a month ago on Feb 10. The notes said that the match between the Lakers and the Rockets would be in ten days from the time of the meeting. Namely, the match was scheduled to take place on Feb 20. You don’t know whether the match happened or not. You comment:



- (289) a. # According to the plan made a month ago, the Lakers and the Rockets **compete** after ten days.
- b. According to the plan made a month ago, the Lakers **would have competed/were competing** with the Rockets after ten days.

(290) Anzhao yi-ge yue qian zhiding de jihua, Huren dui gen Huojian according-to one-CL month ago make DE plan Lakers team and Rockets dui shi-tian hou **bisai**.
 team ten-day after compete
 ‘According to the plan made a month ago, the Lakers was competing with the Rockets after ten days.’

Though the sentence in (290) with a neutral time adverb is fine with a past future

reading for the context in (285), our consultants also point out that the most prominent reading for this sentence is still a present future reading, e.g. a scenario depicted in (291). Targeting at a present future reading, simple futurates are perfectly fine in both English and Mandarin, as shown in (291).

(291) Context: On March 10, you are checking the meeting notes of the basketball club which was taken a month ago on Feb 10. The notes said that the match between the Lakers and the Rockets would be on March 20, in ten days from now on. You comment:



- a. According to the plan made a month ago, the Lakers and the Rockets **compete** in ten days.
- b. Anzhao yi-ge yue qian zhiding de jihua, Huren dui gen Huojian according-to one-CL month ago make DE plan Lakers team and Rockets dui shi-tian hou **bisai**.
team ten-day after compete
'According to the plan made a month ago, the Lakers compete with the Rockets in ten days.'

Table 3.2 summarizes our observations about the possibility of having a past future reading with simple futurates in English and Mandarin.

For indexical time adverbs, both simple fututates in the two languages are only compatible with a present future reading. Namely, though the eventuality will occur after the context-specified past time (the time when the plan was made), it also has to occur after

Table 3.2: Time adverbs and futurates

Time adverbs	English present tense	Mandarin bare eventives
Indexical future time: 'tomorrow', 'next week'	✓ (will)	✓ (hui)
Indexical past time: 'yesterday', 'last week'	× (would have/ was/were v-ing)	× (hui/epistemic modals)
Neutral time preceding s* without an index: 'in ten days', 'Jan 10, 2020'	× (would have/ was/were v-ing)	✓ (hui)

the utterance and cannot precede the utterance time if we have to use a simple futurate form. Otherwise, we need to adopt other forms such as conditionals or past progressive futurates in English and *hui* or epistemic modals in Mandarin. English simple futurates are strictly absolute in the sense that even we switch the indexical time adverbs to neutral time adverbs, the reading of future is still defined based on the utterance time rather than a past time. Mandarin shows more flexibilities when it comes to neutral time adverbs. Future can be defined based on a context-salient past time with bare eventives when the time adverb in the simple futurate does not carry an index that anchors to the utterance time.

3.3.1.5. Interaction with overt aspect

Finally, let us take a look at the interaction between simple futurates and overt aspect marking. Unlike English progressive futurates that make use of the progressive form to express future reading, English simple futurates adopt the present tense morphology without any aspect marking. The predicate in simple futurates is mostly the bare form in Mandarin. Mandarin simple futurates show a similar pattern with overt future modal *hui* in the interaction with overt aspect marking. In (292a), the simple futurate usage is fine

with progressive marker *zai*. We again observe the impact of the punctuality of a topic time on the acceptability of a sentence. Without a punctual topic time *mingtian zhe-ge shihou* ‘tomorrow at this time’, (292a) is odd with a progressive predicate. The sentences in (292b) and (292c) show that simple futurates are also incompatible with the perfective aspect unless other aspectual element such as *yijing* ‘already’ is present, a pattern observed for *hui*. Specifically, simple futurates are totally fine with a future time adverb that is not punctual (*mingtian* ‘tomorrow’) in a future perfective construction with *yijing*, slightly different from *hui* that calls for a punctual future time adverb in these constructions.

- (292) a. Zhangsan mingtian ??(zhe-ge shihou) **zai** gongzuo.
 Zhangsan tomorrow this-CL time PROG work
 ‘Zhangsan will be working at this time tomorrow.’
- b. * Zhangsan mingtian (zhe-ge shihou) likai-**le** Nanjing.
 Zhangsan tomorrow this-CL moment leave-PFV Nanjing
- c. Zhangsan mingtian (zhe-ge shihou) **yijing** likai-**le** Nanjing.
 Zhangsan tomorrow this-CL moment already leave-PFV Nanjing
 ‘Zhangsan has already left Nanjing by (this moment) tomorrow.’

(Adapted from Dai 1994, cited from J.- W. Lin 2000: 120)

3.3.1.6. Interim summary

So far, we have investigated the following properties related to simple futurates in English and Mandarin: constraints on plannable eventualities, compatibility with tense (present future or past future), need of future time adverbs, interaction with aspect on the predicate and presupposition associated with such a construction, summarized below in Table

3.3.

Table 3.3: Futurates in English and Mandarin

morphological forms	English futurates		Mandarin futurates
	progressive futurates	simple futurates	simple futurates
unplannable events	*	*	* (weather predicates OK)
compatibility with tense	PRES, PAST	PRES	PRES, PAST (limited)
compatibility with overt aspect	PROG	NA	×PFV, (✓) PROG
require future time adverbs	✓	✓	✓
presupposition	director has the ability	director has the ability there is a plan, content: focus alternatives of the assertion	director has the ability there is a plan, content: focus alternatives of the assertion

As shown in Table 3.3, English has progressive futurates and simple futurates, but Mandarin only has simple futurates. Both simple futurates in the two languages require future time adverbs to license future readings and are infelicitous with events that cannot be planned/scheduled, though Mandarin has more flexibility in allowing weather predicates. English simple futurates take the utterance time as the evaluation time for future and are only compatible with present tense. Mandarin simple futurates do not limit the evaluation time. Though the most prominent reading still takes the utterance time as the evaluation point for future, we can obtain a past future reading in specific contexts with neutral time adverb that does not carry an index. Moreover, Mandarin simple futurates are incompatible with perfective aspect marking on the predicate unless *yijing* ‘already’ shows up. Last but not least, both simple futurate constructions in English and Mandarin presuppose that some plan that is physically plannable and relevant to the assertion is made in the context.

3.3.2. The semantics of Mandarin simple futurates

Following Copley (2002,2009) and Sun (2014), we suggest that Mandarin simple futurates contain a covert future modal PLAN-simple, with slightly different presuppositions and

modal bases from the overt future modal *hui*. Due to the obvious parallel between English simple futurates and Mandarin simple futurates, we extend Copley’s proposal of English simple futurates to Mandarin with necessary modifications. The next section is devoted to the details of Copley (2009) and our amendment to it.

3.3.2.1. Copley (2009)

According to Copley (2009), futurates convey that there is a plan with the content of the assertion. The key components of Copley’s (2009) analysis consist of two parts: a covert metaphysical modal ALL_b and the concept of ‘direction’ modeling plan-making. ALL_b was labeled as PLAN in Copley (2002). We find the label of PLAN more intuitive, hence we term ALL_b as PLAN in our discussion and analysis. In English, PLAN has two correlated but slightly different varieties: PLAN-prog in progressive futurates and PLAN-simple in simple futurates. We will focus on PLAN-simple.

To differentiate the two covert futurate modals in English and Mandarin, we label the English version as $PLAN_E$ -simple and the Mandarin version as $PLAN_M$ -simple. Also, we will stick to an earlier version of direction and PLAN (with essentially the same ingredients in the final version) in Copley (2009)⁷ since it is easier for us to see the composition. To

⁷In the final version of ‘direction’ and PLAN, Copley (2009) formalizes plans as propositions, which she dubs it as ‘predicates of worlds’, i.e. a set of worlds. The reason why plans are formalized as propositions is to capture the fact that futurates require a future time adverb via a stipulation. It is stipulated that the proposition (i.e. the predicate of worlds) must contain a future time adverb and must be existentially closed by a time in the future. Then PLAN implements on this special proposition with the time argument saturated already. The definition of ‘direction’ under this assumption is demonstrated in (1).

- (1) An entity d directs a predicate of worlds P in w at t iff:
 - $\forall w'$, d has the same abilities in w' as in w :
 - $[\forall w''$ metaphysically accessible from w' at t and consistent with d ’s commitments in w' at t :
 - $[\forall w'''$ metaphysically accessible from w at t :

make Copley’s proposal accessible to the readers, from now on, we reinterpret Copley’s ideas in our notations.

Following Copley, we call the agent who makes the plan its director. The director is not necessarily the subject of a futurate sentence and is supplied by the context. For example, the director of the plan in the simple futurate sentence in (293) is whoever has the authority on scheduling baseball games, i.e. Major League Baseball. Moreover, futurates also convey that the director has the intention for the plan to happen. In Copley’s words, the director is *committed* to the plan happening.

(293) The Red Sox play the Yankees tomorrow.

The notion of ‘direction’ is shown in (294a). Following Thomas (2014), we translate it into (294b).

(294) a. An entity d directs p in w at t iff:

$\forall w', d$ has the same abilities in w' as in w :

$[\forall w''$ metaphysically accessible from w' at t and consistent with d ’s commitments in w' at t :

$[\forall w'''$ metaphysically accessible from w at t :

$\exists t'[t' > t \wedge p(t')(w'')] \leftrightarrow \exists t''[t'' > t \wedge p(t'')(w''')]]]$

(Copley 2009: 34)

b. An entity d directs $p_{(i,st)}$ in w at t iff:

$[P(w'')] \leftrightarrow [P(w''')]]]$

(Copley 2009: 37)

$$\forall w_1 \forall w_2 \forall w_3 [A_{d,t}(w)(w_1) \wedge M_t(w_1)(w_2) \wedge Com_{d,t}(w_1)(w_2) \wedge M_t(w)(w_3) \rightarrow \\ [\exists t_1 [t_1 > t \wedge p(t_1)(w_2)] \leftrightarrow \exists t_2 [t_2 > t \wedge p(t_2)(w_3)]]]$$

Let us assume that plans are formalized as a temporal proposition of type $\langle i, st \rangle$. In (294b), M_t is a modal operator with a metaphysical modal base. According to Thomason (1970), a metaphysical modal base contains all the propositions that are true in the actual world. A world w' that is metaphysically accessible from w at t can be understood as: w' and w have the same history up to t . ' W ' is metaphysically accessible from w at t' is represented as $M_t(w)(w')$. $A_{d,t}(w)(w_1)$ stands for ' d has the same ability in w_1 as in w at t ' and $Com_{d,t}(w_1)(w_2)$ stands for ' w_2 is consistent with d 's commitments in w_1 at t '.

According to (294b), for all the worlds w_2 in which he/she has the ability and the intention to secure a certain plan to happen, once a plan p holds in a future time in w_2 , then the same plan p also holds in a future time in all the metaphysically accessible worlds w_3 from the actual world w at t . If so, we say that a context-determined director ' d directs' a plan p in w at t . The intuition about plan-making/direction can be summarized as follows: If in w at t , there exists a plan made by a director with the necessary ability and intention, the plan will happen at a future time in the worlds that share the same history with w at t . The requirement of the director being able to ensure the realization of the plan then captures the fact that the eventuality in futurates has to be plannable. For simplification, if an entity d directs p in w at t , we abbreviate it as $DIRECT_d(p)(w)(t)$.

Now let us move to the semantics of PLAN-simple. In the previous section, we have shown that simple futurates presuppose the existence of a certain plan. Depending on which element is focused in the assertion, the content of the plan may change. Consider

the sentence in (295a). Normally, the temporal adverbial receives a focus accent, denoted by the subscript F. The presupposition of simple futurates refers to the union of the focus alternatives to ‘*Joe skydives tomorrow_F*’ that are obtained by replacing the focused element with alternatives to it. Following Rooth (1992), we assume that the set of focus alternatives is a discourse variable C restricted by an operator ‘ \sim ’ in a context. The set of focus alternatives $g(C)$ for (295a) is shown in (295b). The futurate modal PLAN-simple takes this context-sensitive discourse variable C and an numerical index that picks out a director via the assignment function g , notated as $\text{PLAN-simple}_{1,C}$.

(295) a. *Joe skydives tomorrow_F*.

b. $g(C) = \llbracket \text{Joe skydives tomorrow} \rrbracket^f$

$$\left\{ \begin{array}{l} \lambda t \lambda w. \text{Joe skydives at } t \text{ in } w \wedge t \sqsubseteq \text{the day after tomorrow in } w \\ \lambda t \lambda w. \text{Joe skydives at } t \text{ in } w \wedge t \sqsubseteq \text{next week in } w \\ \vdots \end{array} \right.$$

The denotation of $\text{PLAN}_E\text{-simple}_{1,C}$ is shown in (296).

$$(296) \quad \llbracket \text{PLAN}_E\text{-simple}_{1,C} \rrbracket^g = \lambda p \lambda t \lambda w : \exists p' \in g(C) \wedge g(C) = \llbracket p \rrbracket^f \wedge \text{DIRECT}_{g(1)}(p')(w)(t) \wedge \forall w' [M_t(w)(w') \wedge \text{Com}_{g(1),t}(w)(w') \rightarrow \exists t' [t' > t \wedge p'(t')(w')]] \\ \forall w' [M_t(w)(w') \wedge \text{Com}_{g(1),t}(w)(w') \rightarrow \exists t' [t' > t \wedge p(t')(w')]].$$

$\text{PLAN}_E\text{-simple}_{1,C}$ takes an argument p of type $\langle i, st \rangle$, a time argument and a world argument. It is defined if a set of presuppositions is satisfied and returns true if the assertion holds. The semantics of $\text{PLAN-simple}_{1,C}$ can be divided into two blocks. The first block is its presupposition that involves the following components. Firstly, there is a plan p'

that is a focus alternative of p in the assertion $(\exists p' \in g(C) \wedge g(C) = \llbracket p \rrbracket^f)$. Secondly, p' has to be compatible with the ability and intention of the director $g(1)$ ($\text{DIRECT}_{g(1)}(p')(w)(t)$). Thirdly, in all the worlds that share the same history with w and is consistent with the director's commitments, p' will happen in a future time $(\forall w' [M_t(w)(w') \wedge \text{Com}_{g(1),t}(w)(w') \rightarrow \exists t' [t' > t \wedge p'(t')(w')]])$. In the assertion, $\text{PLAN-simple}_{1,C}$ acts like a normal future modal. It returns true if in all the metaphysically accessible worlds that are consistent with the director's intention, p holds in a time t' after t .

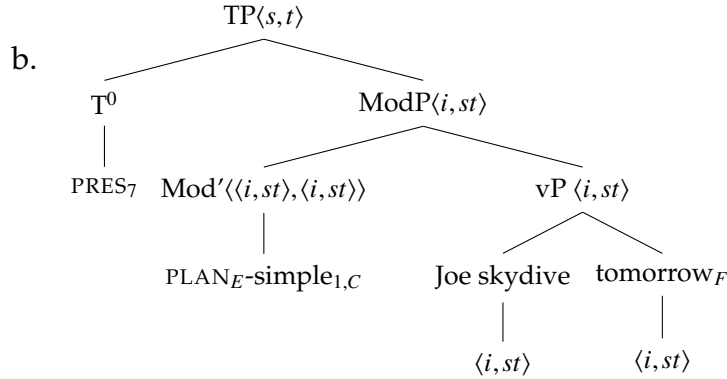
Before we go through an example to illustrate the proposal, we revise the analysis in Copley (2009) to capture the obligatoriness with present tense in English simple futurates. We add one more element in the presupposition: $t \subseteq t_c$. This piece of presupposition constrains the reference time to be supplied by a present tense. Moreover, we rewrite the modal base $(M_t(w)(w') \wedge \text{Com}_{g(1),t}(w)(w'))$ of $\text{PLAN}_E\text{-simple}_{1,C}$ as a metaphysical modal base MB_{met} with a bouletic ordering source O_{boul} of the director $g(1)$. The final version of $\text{PLAN}_E\text{-simple}_{1,C}$ is then demonstrated in (297).

$$(297) \quad \llbracket \text{PLAN}_E\text{-simple}_{1,C} \rrbracket^{g,c} = \lambda p \lambda t \lambda w : t \subseteq t_c \wedge \exists p' \in g(C) \wedge g(C) = \llbracket p \rrbracket^f \wedge \text{DIRECT}_{g(1)}(p')(w)(t) \wedge \\ \forall w' [w' \in \text{BEST}(\text{MB}_{\text{met}}, \text{O}_{\text{boul}}, w, t) \rightarrow \exists t' [t' > t \wedge p'(t')(w')]]. \forall w' [w' \in \text{BEST}(\text{MB}_{\text{met}}, \text{O}_{\text{boul}}, w, t) \rightarrow \\ \exists t' [t' > t \wedge p(t')(w')]].$$

The structure of the sentence in (295a) (repeated in (298)a) is shown in (298b). $\text{PLAN}_E\text{-simple}_{1,C}$ is defined iff: a. T^0 is PRES; b. there is a plan p' that is directed by the director and is a focus alternative of 'Joe skydives tomorrow' (e.g. Joe skydives next week); c. p' will occur in the worlds that are metaphysically accessible to w and are ranked best according to the bouletic ordering sources. Once $\text{PLAN}_E\text{-simple}_{1,C}$ is defined, the sentence

in (298a) obtains the reading in (298e): in all the best accessible worlds in w at t_c (the utterance time s^*), there is a time t' after t_c that is within tomorrow and Joe skydives at t' .

(298) a. Joe skydives tomorrow_F.



c. $\llbracket vP \rrbracket = \lambda t \lambda w [\text{Joe skydives}(t)(w) \wedge \text{tomorrow}(t)(w)]$

d. $g(C) = \llbracket \text{Joe skydives tomorrow} \rrbracket^f$

e. If $PLAN_E\text{-simple}_{1,C}$ is defined,

$$\llbracket \text{ModP} \rrbracket = \lambda t \lambda w \forall w' [w' \in \text{BEST}(\text{MB}_{\text{met}}, \text{O}_{\text{boul}}, w, t) \rightarrow \exists t' [t' > t \wedge \text{Joe skydive}(t')(w') \wedge \text{tomorrow}(t')(w')]]$$

f. $\llbracket \text{TP} \rrbracket = \lambda w \forall w' [w' \in \text{BEST}(\text{MB}_{\text{met}}, \text{O}_{\text{boul}}, w, t_c) \rightarrow \exists t' [t' > t_c \wedge \text{Joe skydive}(t')(w') \wedge \text{tomorrow}(t')(w')]]$

Note that the ordering sources in $PLAN_E\text{-simple}_{1,C}$ (also $PLAN_M\text{-simple}_{1,C}$) can be bouletic or inertial (O_{boul} or O_{inert}). When the director is the world with law-like principles in the examples in (299), the ordering source is inertial rather than bouletic even we could still say ‘the world is committed to the plan according to its law-like properties’.

(299) a. The meteorite impacts tomorrow at 5:13 a.m.

b. Shizizuo liuxingyu lingchen yi dianzhong kaishi.
Leo meteor-shower early-morning one o'clock begin

'The Leonids starts at one o'clock in the morning.'

3.3.2.2. Mandarin simple futurates: $\text{PLAN}_M\text{-simple}$

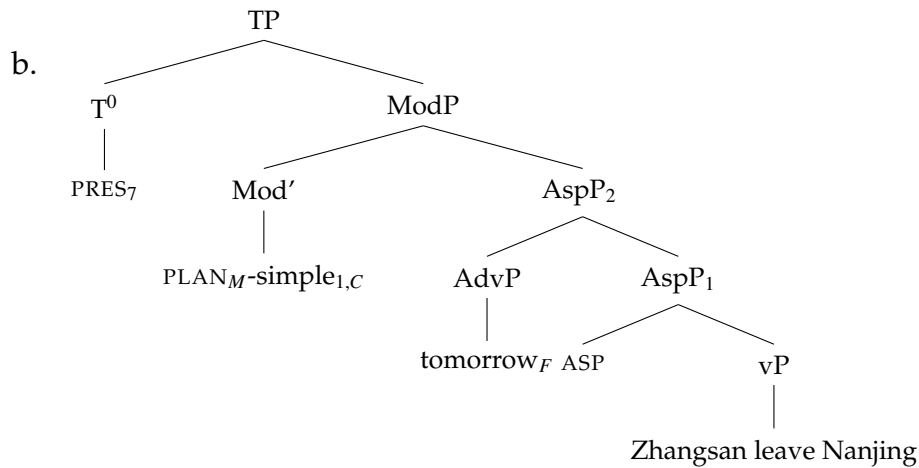
To recap, Mandarin simple futurates have several differences, compared to English simple futurates. Firstly, the time argument associated with the PLAN modal is not constrained to the utterance time. When the time adverb is without indexicals such as *shi tian hou* 'after ten days', Mandarin simple futurates allow a past futurate reading. Therefore, the temporal constraint on t for $\text{PLAN}_E\text{-simple}$ should be removed from the Mandarin version. $\text{PLAN}_M\text{-simple}$ can combine with PRES or PAST . Since both are morphologically null, no overt differences are observed. Secondly, Mandarin simple futurates are compatible with weather predicates while English does not. Mandarin treats simple futurates with weather predicates as cases in which the law-based world directs the weather. Thirdly, like the overt modal *hui*, $\text{PLAN}_M\text{-simple}$ is incompatible with perfective aspect marker le_1 as well. Hence it also carries the non-perfective presupposition as *hui* does.

The denotation of $\text{PLAN}_M\text{-simple}$ is defined in (300). The presupposition of direction and the existence of a plan which is a focus alternative of the assertion is exactly the same as English $\text{PLAN}_E\text{-simple}$. What's new for $\text{PLAN}_M\text{-simple}$ is that the presupposition does not constrain the time argument but constrains the argument p to be non-perfective ($\neg\forall w'\forall t'\forall t''(p(t')(w') \wedge t' \subseteq t'' \rightarrow p(t'')(w'))$).

$$(300) \quad \llbracket \text{PLAN}_M\text{-simple}_{1,C} \rrbracket^{g,c} = \lambda p \lambda t \lambda w : \neg\forall w'\forall t'\forall t''(p(t')(w') \wedge t' \subseteq t'' \rightarrow p(t'')(w')) \wedge \exists p' \in g(C) \wedge g(C) = \llbracket p \rrbracket^f \wedge \text{DIRECT}_{g(1)}(p')(w)(t) \wedge \forall w'[w' \in \text{BEST}(\text{MB}_{\text{met}}, \text{O}_{\text{boul}}, w, t) \rightarrow \exists t'[t' > t \wedge p'(t')(w')]]. \forall w'[w' \in \text{BEST}(\text{MB}_{\text{met}}, \text{O}, w, t) \rightarrow \exists t'[t' > t \wedge p(t')(w')]].$$

The derivation of the example in (301a) illustrates how the analysis works given the assumptions of future constructions in this chapter. Suppose that the time adverb is stressed and focus marked. As shown in the structure in (301b), like *hui*, the complement of $PLAN_M$ -simple contains a bleached aspect ASP, which secures that the non-perfective presupposition is satisfied. If other pieces of the presupposition are satisfied, $PLAN_M$ -simple acts like a normal future modal that shifts the event time to the future. The sentence then obtains a reading in (301e) which says that for all the worlds accessible from w given a metaphysical modal base and a bouletic ordering source, Zhangsan leaves Nanjing tomorrow in those worlds.

- (301) a. Zhangsan mingtian likai Nanjing.
 Zhangsan tomorrow leave Nanjing
 ‘Zhangsan leaves Nanjing tomorrow.’



c. $\llbracket AspP_2 \rrbracket = \lambda t \lambda w \exists e [\tau(e)(w) = t \wedge t \sqsubseteq \text{tomorrow in } w \wedge \text{leave}(e)(w) \wedge \text{Ag}(e)(w) = z \wedge \text{Th}(e)(w) = n]$

- d. If $PLAN_M$ -simple_{1,C} is defined,

$$\llbracket ModP \rrbracket = \lambda t \lambda w \forall w' [w' \in \text{BEST}(MB_{\text{met}}, O_{\text{boul}}, w, t) \rightarrow \exists t' \exists e [t' > t \wedge \tau(e)(w') = t' \wedge t' \sqsubseteq \text{tomorrow in } w' \wedge \text{leave}(e)(w') \wedge \text{Ag}(e)(w') = z \wedge \text{Th}(e)(w') = n]$$

- e. $\llbracket \text{TP} \rrbracket = \lambda w \forall w' [w' \in \text{BEST}(\text{MB}_{\text{met}}, \text{O}_{\text{boul}}, w, t_c) \rightarrow \exists t' \exists e [t' > t_c \wedge \tau(e)(w') = t' \wedge t' \sqsubseteq \text{tomorrow in } w' \wedge \text{leave}(e)(w') \wedge \text{Ag}(e)(w') = z \wedge \text{Th}(e)(w') = n]$

Lastly, we would like to lay out our speculations about why simple futurates in English and Mandarin require a future time adverb, a property treated as a stipulation in Copley (2009). The presupposition of simple futurates contains a set of focus alternatives of the assertion p . Beaver and Clark (2008) claims that the set of alternatives is always a Question Under Discussion that exists in the discourse. In fact, simple futurates are often used as answers to a preceding question about the plan. The set of alternatives in the presupposition of futurates can be taken as the answers to a question in the preceding discourse with the form of ‘When does p happen?’ Therefore, a simple futurate always requires a future time adverb in answer to the question due to the focus-sensitive property with its presupposition.

3.4. Conclusions

In this chapter, we have investigated future interpretations in Mandarin based on a comparison with English. Two forms are of specific interests: future sentences with the future modal *hui* and futurate sentences with the covert futurate modal PLAN_M -simple. We suggest that *hui* and PLAN_M -simple contain a modal component and a futurity component, sharing the same template in (302).

$$(302) \quad \llbracket \text{FUT} \rrbracket^{s,c} = \lambda p \lambda t \lambda w : \text{Presupposition } X. [\forall w' \in \text{BEST}(\text{MB}, \text{O}, w, t) \rightarrow \exists t' [t' > t \wedge p(t')(w')]]$$

Hui and PLAN_M -simple project different presupposition on their arguments, univer-

sally quantify over accessible worlds and assert that a proposition holds in a future time in the accessible worlds. The modal base of *hui* is epistemic while the modal base of PLAN_M -simple is metaphysical. Both modals can involve bouletic ordering sources or inertial ordering sources.

Chapter 4

Complementation and finiteness in Mandarin

4.1. Introduction

In the previous discussion, we have revealed the following properties of Mandarin root clauses with only one predicate:

- (303)
- a. Root clauses with no overt aspect describe states or report regularities (generic interpretation). Overt aspect is obligatory when an eventive reports an episodic reading.
 - b. Perfective aspect marker *le*₁ reports past events and is incompatible with present tense.
 - c. Bare predicates denoting stative readings (lexical statives and derived statives such as habituals) can be modified by past or present time adverbs, but cannot combine with future time adverbs freely.
 - d. Bare sentences that denote scheduled, controllable events allow future-oriented readings with future time adverbs (futures), others require an overt modal.

In Chapter 2, we propose a two-null-tense analysis for Mandarin: a covert instantaneous PRES and a covert PAST to capture (303b)-(303c). In Chapter 3, we show that among the three overt future modal *hui*, *yao* and *jiang*, *hui*, the most basic future modal with the least constraints in usage, carries an epistemic modal base. Moreover, we suggest that other than overt future modals, Mandarin also possesses a covert PLAN modal in futures to capture (303d). With our understanding of temporal interpretations in root clauses, we now move to the temporal properties of complement clauses and their correlations to finiteness. We shall observe three types of complement clauses corresponding to the

widely attested classes of complementation: Proposition complements, Situation complements and Event complements, following an Implicational Complementation Hierarchy (Wurmbrand and Lohninger 2020). The properties expressing finiteness in a language, also align with this hierarchy.

It has long been noticed that Mandarin complement clauses are roughly divided into two types: a type that patterns closely to a main clause (a root clause) with more complexities and another type that are control constructions constrained in many dimensions. The former is often tagged as a finite complement while the latter is often tagged as a non-finite complement for linguists that assume an implicit distinction of finiteness in Mandarin. Before we display our observations and arguments, we briefly review the consensus and disagreements on complement clauses centering around the finiteness debate in Mandarin. The glossing of aspect markers and sentence-final-particles varies a lot in the literature. When citing the data, we keep the original glosses without transforming them into our notation system. The arguments under review should be self-explanatory from the context even the glosses of the same element can be very different. The highlight of the element under discussion is added by us.

4.1.1. Finite vs. non-finite: the proposition side

The seminal work by C.-T. James [Huang \(1982, 1989\)](#) starts the debate on the finiteness distinction in Mandarin. C.-T. James Huang (1989) claims that languages have different ways to encode finiteness with different elements of AUX (corresponding to Infl). In Mandarin, such a distinction is made based on the potential occurrence of the modal or

aspectual elements of the AUX category. For instance, the complements in (304) allow aspect marker *le* and future modal *hui*. However, the complement in (305) do not allow modals like *hui* ‘will’, *neng* ‘can’, *keyi* ‘may’ or aspect markers such as progressive marker *zai*, durative marker *zhe*, experiential marker *guo* and perfective marker *le*. The former complements are considered to be finite since they allow elements of AUX and the latter is non-finite.

- (304) a. Zhangsan shuo [(ta) lai le].
 Zhangsan say 3.SG come ASP
 ‘Zhangsan said that (he) come.’
- b. Zhangsan xiangxin [(ta) hui lai].
 Zhangsan believe 3.SG will come
 ‘Zhangsan believes that (he) will come.’

(C.-T. James Huang 1989: 188)

- (305) a. Lisi shefa [PRO lai].
 Lisi try come
 ‘Lisi tried to come.’
- b. *Lisi shefa [PRO hui/neng/keyi/zai lai].
 Lisi try will/can/may/DUR come
- c. *Lisi shefa [PRO lai zhe/guo/le].
 Lisi try come DUR/EXP/PFV

(C.-T. James Huang 1989: 189)

C.-T. James Huang further connects finiteness to the overtness of embedded subject following the standard GB account for the distribution of overt DP. Namely, the finite AUX governs and licenses the overt subject while the non-finite AUX does not. This insight of finite vs. non-finite distinction is followed by many other researchers (Y.-H. Audrey Li

1985a, 2017, T.-C. Tang 2000, T.-H. Jonah Lin 2015, Sybesma 2007, Sun 2014, N. Zhang 2016, 2019, N. Huang 2018, Paul 2018, Liao and Wang 2019 among many others), but the reliable evidence for finiteness comes with disagreements.

For example, Y. Li (1985b) observes that not all modals or aspect markers in the AUX category according to C.-T. James Huang (1989) are excluded in the complements of control predicates (i.e. the non-finite complements). For instance, the matrix predicates in (306) are control predicates, but the modal *yao* and the aspect marker *le* are felicitous in the complements. Y.-H. Audrey Li (1985a, 1990) claims that the finite vs. non-finite distinction does not lie in the potential occurrence of modals in general, but in the possible occurrence of only those modals that have become tense markers, for example, *hui* and *yao* that Y.-H. Audrey Li claims to be future tense markers. Even so, Y.-H. Audrey Li's proposal cannot explain why *hui* is prohibited in (307a) while *yao* is possible (307b-c).

- (306) a. Wo zhunbei mingtian **yao** canjia yige hui.
 I plan tomorrow will attend a meeting
 'I plan to attend a meeting tomorrow.'
- b. Wo quan ta chi **le** zhe wan fan.
 I persuade he eat ASP this bowl rice
 'I persuade him to finish eating this bowl of rice.'

(Y. Li 1985, cited from Hu et al. 2001: 1122)

- (307) a. *Wo quan/bi ta [**hui** lai]
 I persuade/force he will come
 'I tried to persuade him to come.'

(Y.-H. Audrey Li 1990: 22)

- b. Wo quan ta [**yao** lai]
 I persuade he will come

'I tried to persuade him to come.'

- c. Ta bi wo [yiding **yao** zai liang tian zhinei wancheng].
he force I must will at two days within finish
'He forced me to finish it within two days.'

(Hu et al. 2001: 1123)

Treating aspect marker on a verb as evidence for finiteness also calls for questions. For the superficially counterexample in (306b), C.-T. James Huang (1989) claims that the aspect marker in the complement is better construed with the matrix verb, or with the entire sequence including the upper and the lower verb. This argument is supported by the evidence of negation. The negation form of perfective aspect (including perfective marker *le*₁ and *guo*) is *mei-you*. C.-T. James Huang (1989), Huang et al. (2009) claim that *you* is also a perfective marker that occurs in negation forms and is a suppletive form of *le*₁. When the sentence in (308a) is negated, the negation shows up on the matrix predicate rather than in the complement.

- (308) a. Wo bi ta lai le.
I force he come PERF
'I forced him to come.'

- b. Wo jiao ta kan guo nide shu.
I tell he read EXP your book
'I have asked him to read your book.' (C.-T. James Huang 1989: 190)

- (309) a. *Wo bi ta [**mei you** lai].
I force he not have come

- b. Wo **mei you** bi ta [PRO lai].
I not have force he come
'I didn't force him to come.' (C.-T. James Huang 1989: 190)

Y.-H. Audrey Li (1990) holds a similar idea. The sentence in (310a) is another example that allows an overt aspect marker in an arguably non-finite complement, which reveals another dimension of the complexity of interaction between aspect and finiteness: restructuring and actuality entailment. Y.-H. Audrey Li (1990) hypothesizes that the experiential marker *guo* should be interpreted as an aspect marker of the matrix V and an aspect-lowering rule moves the aspect marker from the matrix verb to the embedded clause. However, the ‘aspect lowering’ claim is objected by Hu et al. (2001) by the evidence in (310b-c). Hu et al. (2001) argues that if the complement aspect marker is lowered from the matrix verb, we would expect that the sentence in (310b) and (310c) should make no difference. However, the complement aspect marker triggers actuality entailment while the matrix aspect marker does not. Namely, the aspect that shows up in the complement entails that the embedded event also happened in the actual world. Hence the ‘aspect lowering’ account needs to be fixed. At least, the existence of aspect marker in the complement clause does not necessarily lead to a finite complement.

- (310) a. Wo congqian qing ta [chi guo fan].
 I before invite he eat ASP meal
 ‘I invited him to eat before.’ (Y.-H. Audrey Li 1990: 19)
- b. Wo qing guo ta [chi fan], keshi ta mei lai.
 I invite ASP he eat meal but he not come
 ‘I invited him to have dinner, but he did not come.’
- c. # Wo qing ta [chi guo fan], keshi ta mei lai.
 I invite he eat ASP meal but he not come
 (Hu et al. 2001: 1126)

N. Zhang (2016) also questions the correlation between finiteness and overt embedded

subjects. Based on an investigation of possible forms of embedded subject of control constructions, N. Zhang falsifies a direct correlation between the overtness of the subject of an embedded clause and the dependency status of the clause. Though N. Zhang (2016) does not directly talk about finiteness, the control constructions discussed by Zhang are often considered to be non-finite, which she terms as dependent clauses. N. Zhang argues that the null PF form of a controllee is not universal. The exact possible forms of controllee are a language-specific issue. In the Mandarin complement clause of a control verb, the forms of a subject are restricted to a *cpro* (e.g. *ta yi ge ren* 'he one person'), *ziji* 'self', a bound lexical pronoun and the default null form (PRO). These are variables that must occur in the subject position bearing obligatory *de se* readings. Moreover, N. Zhang suggests that different overt controllees may have different occurrence restrictions.

Though aspect markers, overtness of embedded subjects as well as modals that are proposed to diagnose finiteness in Mandarin, they do not consistently single out a class of finite/non-finite complements. Researchers then turn to other properties. For instance, T.-H. Jonah Lin (2011, 2015) adds the scope relation between sentence-final particle *le₂* and modals as evidence for finiteness. T.-H. Jonah Lin (2011) assumes that *le₂* is a perfect/inchoative marker that appears at the end of a sentence. It requires a reference time (namely the topic time) semantically. He claims that in the examples below, the root modals such as *neng* 'be-able-to' cannot scope over *le₂* while epistemic modals *keneng* 'be likely to' can take *le₂* in its scope, as shown in (311)-(312).

- (311) a. Zhangsan **keneng** [qu Taipei **le**].
 Zhangsan be-likely-to go Taipei PERF
 'Zhangsan may have gone to Taipei.' (keneng > le)

- b. * Zhangsan [[**keneng** qu Taipei] **le**].
 Zhangsan be-likely-to go Taipei PERF
 ‘Intended: ‘It has become possible that Zhangsan goes to Taipei.’”
 (*le > keneng)

- (312) a. Zhangsan [[**neng** qu Taipei] **le**].
 Zhangsan be-able-to go Taipei PERF
 ‘It has become the case that Zhangsan is able to go to Taipei.’
 (le > neng)

- b. * Zhangsan **neng** [qu Taipei **le**].
 Zhangsan be-able-to go Taipei PERF
 ‘Intended: Zhangsan is able to have gone to Taipei.’
 (*neng > le)

(T.-H. Jonah Lin 2011: 52-53)

T.-H. Jonah Lin (2011) suggests that a Mandarin sentence syntactically contains a T. A finite TP has a value providing the reference time for le_2 while a non-finite TP does not supply such a value. Hence a non-finite clause is incompatible with le_2 . Leaving aside the details about the nature of T, how T offers a reference time to le_2 as well as the semantics of le_2 ,¹ T.-H. Jonah Lin concludes that the complements of *hui* and root modals are non-finite while the complements of epistemic modals are finite. Assuming that Mandarin possesses a finite vs. non-finite distinction and finiteness is determined by tense, T.-H. Jonah Lin (2015) further proposes that Mandarin has a syntactic tense.

¹The example of the denotation for le_2 in footnote 4 in T.-H. Jonah Lin (2011) from J.-W. Lin (2003) is actually for le_1 rather than for le_2 . Even though the proposal by J.-W. Lin (2003) does have the shape of the semantics of a pluperfect morpheme, J.-W. Lin (2003) does not discuss whether the semantics for le_1 can extend to le_2 . The exact semantics for le_2 remains a mystery.

Moreover, N. Zhang (2019) proposes that finite clauses exhibit speaker-oriented properties while non-finite ones do not. Non-finite clauses exhibit properties dependent on the matrix clause. N. Zhang presents eight types of embedded clauses (complement of a control verb, the complement of a raising verb, the complement of *lai* 'come' and *qu* 'go', complement of a non-epistemic modal, the V-even-not-V adverbials, small clauses, gap-less relative clauses, the complement clause of *dui* 'to') in which sentence-final-particles *le₂*, *laizhe* and *ne* cannot occur. N. Zhang terms these three sentence-final-particles as 'sentence-final aspect particles' which are complementizers that is closest to TP (Low C in Paul (2018)).

Paul (2018) criticizes N. Zhang's proposal for not controlling the relevant factors properly before drawing a conclusion. Firstly, N. Zhang (2019) does not control for properties related to non-root status of clausal complements vs. properties related to non-finite status. For instance, speaker-oriented properties are typically absent from embedded, non-root clauses, despite their eventual finiteness. Moreover, the sentence-final-particle *ne* does not occur in embedded contexts, as Pan (2015), Paul and Pan (2017) argue. Secondly, some assumptions (e.g. the existence of ECM verbs in Mandarin) made by Zhang is problematic or need further scrutiny. Thirdly, some data claimed to be felicitous by Zhang are indeed odd for other speakers. Last but not least, the sentence final particles *le₂*, *laizhe* and *ne* are examined in all cases without taking the semantics of these particles into account. Hence, the ungrammaticality of bearing these sentence final particles may due to semantic conflicts instead of being non-finite. Paul (2018) suggests that sentence-final-particles realizing Low C in Mandarin can encode finiteness, but do not do so systematically.

Other than sentence-final particles, Liao and Wang (2019) also propose that finiteness distinction is based on anchoring of speech events based on the evidence of pseudo-imperative elements (PIE) *'bie'*. Complements that can embed PIEs are claimed to be non-finite while those that cannot are finite. However, Liao and Wang's observation is only applicable for bouletic attitude predicates but cannot extend to other predicates such modals, aspectual verbs which are also argued to take a non-finite complement.

4.1.2. Finite vs. non-finite: the opposition side

Hu et al. (2001) provides counter examples in which non-finite complements in C.-T. James Huang (1989) allow overt subjects, aspect markers and modals. Some examples are already presented in the previous subsection when we point out the disagreements on the right diagnostics for finiteness in Mandarin, therefore we will not repeat them here. Based on these counter examples, Hu et al. (2001) concludes that there is no independent evidence to support a finite/non-finite distinction in Mandarin and thus such a distinction does not exist in Mandarin.

The problem of the argumentation and proposal by Hu et al. (2001) is two-folded. Firstly, some of the counter examples do not control the relevant factors such as the meaning of the matrix predicate and the meaning of the complement. Hence in some so-called "counter examples", the matrix predicates are no longer holding the same meaning as the those that are argued to take a non-finite complement. Similarly, some complements no longer denote an unrealized event or future situation but denote a proposition instead. For example, the sentences in (313) are supposed to argue against the claim that non-finite

complements are incompatible with overt embedded subjects.

- (313) a. Wo quan Zhangsan [ruguo mei you ren mai zhe ben shu, ta ye
I persuade Zhangsan if no have people buy this CL book he also
bu yao mai.]
not will buy
'I persuaded Zhangsan not to buy this book if no one bought it.'
- b. Zhangsan dasuan [jin nian xiatian laopo, ziji he erzi dou qu Qingdao
Zhangsan plan this year summer wife self and son all go Qingdao
du jia].
spend vacation
'Zhangsan planned to go to spend his holidays in Qingdao together with his
wife and son this summer.'

(Hu et al. 2001: 1131-1132)

The non-finite complement of *quan* 'persuade, urge' denotes an irrealis situation, but the complement in (313a) 'If nobody buys this book, he should not buy it as well' apparently denotes a proposition that has a truth value. The matrix predicate *dasuan* in (313b) means slightly different from the one that means 'plan' and takes a future irrealis complement. *Dasuan* in (313b) means 'considering the plan/idea, make the plan that'.² A more precise translation for the sentence in (313b) is 'Zhangsan is considering the plan such that this summer his wife, his son and he himself go to Qingdao for vacation.' Under this

²We thank C.-T. James Huang for pointing out that this reading of *dasuan* can be expressed by another verb *pansuan* 'calculate, make a plan', which takes a finite complement, as the examples below demonstrate.

- (1) a. Zhangsan zai pansuan [jinnian Lisi hui zhuan duoshao qian].
Zhangsan PROG calculate this-year Lisi FUT earn how-much money
'Zhangsan is calculating/considering that how much money Lisi will make this year.'
- b. Zhangsan zai pansuan [qunian Lisi zhuan-le duoshao qian].
Zhangsan PROG calculate last-year Lisi earn-PFV how-much money
'Zhangsan is calculating/considering how much money did Lisi made last year.'

interpretation of *dasuan*, the embedded subject is not obligatorily controlled by the matrix argument, as C.-T. James Huang (2017) points out in the following sentence.

- (314) Wo dasuan tian hei yihou **nimen** xian guolai.
1SG plan sky dark after 2PL first come
'I was/am considering the plan that you guys come first after it gets dark.'

Secondly, Hu et al. (2001) draws the conclusion that Mandarin does not encode finiteness based on an implicit assumption: a predicate can only take one type of complement. If a predicate takes a non-finite complement, then it cannot take a finite one. This assumption is untenable. As C.-T. James Huang (2017) points out, in languages such as English which morphologically encode finiteness, the same predicate *persuade*, *promise*, *advise*, *prefer* can take finite or non-finite complements, as shown by the sentences in (315).

- (315) a. I prefer to leave in the fall.
b. I prefer that I leave in the fall.

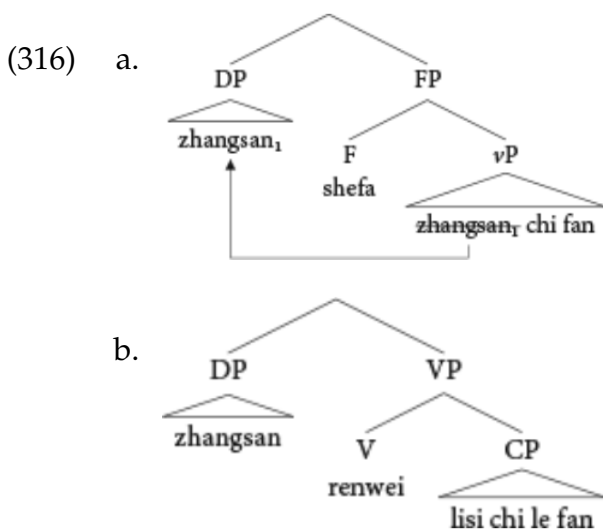
There is no reason to assume that Mandarin is different in this sense. Therefore, the sentences in (313) serve as a good example to show that complementation is not just a matter of the predicate or just a matter of the complement. Wurmbrand and Lohninger (2020) propose a synthesis modal of complementation, arguing that the interpretation of the matrix predicate and the complement clause dynamically interact with each other. The semantic properties of the matrix predicate will select a certain semantic type of the complement while the complement also affects our interpretations of the matrix predicate. At least the existence of some counter examples do not argue against a finite/non-finite distinction, but rather it tells us the flexibility of syntax-semantic mapping in com-

plementation.

J.- W. Lin (2006, 2010) also argues against the existence of finite/non-finite distinction in Mandarin from a different perspective. His argumentation is as follows. Finiteness is defined by tense: a finite clause is tensed while a non-finite clause is tenseless or bears a deficient Tense category in syntax. J.- W. Lin (2006) suggests that Mandarin does not bear an independent tense operator. Temporal interpretations relies on aspect (default or overt aspect marker), temporal adverbs and context etc. Therefore, there is no semantic tense or syntactic tense and there is no finiteness distinction in Mandarin. It is noteworthy to point out that even J.-W. Lin (2006) claims that Mandarin does not have semantic tenses, his definition of perfective aspect does encode a tense component in it. The problem with J.-W. Lin's (2006, 2010) claim is that there is no universal definition of finiteness (? , McFadden and Sunderesan 2014, C.- T. James Huang 2017, Wurmbrand et al. 2020 among others). Languages implement different properties to express finiteness, tense is one way to encode it but is not the only way. Whether tense is the property that Mandarin adopts to encode finiteness is a question need to be answered in the first place. Even tense is not responsible for finiteness, it does not exclude the possibility of Mandarin encoding finiteness since other morphosyntactic properties can be possible candidates. Hence proposals that reduce the property of finiteness to the property of tense need to demonstrate evidence/motivations for this move, otherwise proposals trying to draw a conclusion about the existence of finiteness based on tense or the other way around, i.e. to draw a conclusion about tense based on finiteness (e.g. T.-H.Jonah Lin 2015) is problematic. As Grano (2017) argues in details, finiteness contrasts offer no clear positive

evidence in favor of Tense in Mandarin. However, taking tense as the defining property of finiteness in Mandarin is still possible, since there are other semantic evidence suggesting the existence of semantic tense in Mandarin, such as the proposal by Sun (2014) and our proposal in this dissertation.

Grano (2012, 2015) proposes that the syntactic contrasts which in previous literature have been taken as evidence for finite/non-finite split are more parsimoniously explained by instead appealing to a monoclausal/biclausal split. The so-called non-finite clause such as the complement of *shefa* ‘try’ is a vP complement of the functional head *shefa* ‘try’, in a mono-clausal construction. There is no PRO in the complement but just a trace left by the movement of the embedded subject, as demonstrated by (316a). The so-called finite clause such as the complement of *renwei* ‘believe’ is a CP within a bi-clausal structure, as demonstrated by (316b).



(Grano 2015: 142)

The aforementioned ‘non-finite’ evidence such as ‘aspect lowering’, lack of modals, obligatory covert subjects etc. can be reduced to clausal transparency of a monoclausal

structure as a result of restructuring. For instance, the lack of modals such as *yinggai* ‘should’, *keneng* ‘might’ in ‘non-finite complements’ are because epistemic modals tend to sit high in the structure above TP, thus cannot fit in a vP complement. In contrast, the so-called ‘finite complement’ of *renwei* ‘believe’ is a full CP, thus allows modals that are located high in the structure.

Nevertheless, N. Huang (2018) points out that the monoclausal claim for restructuring is inadequate for Mandarin. N. Huang (2018) investigates the complements of three predicates with a meaning roughly corresponds to “try” (*changshi*, *shefa* and *qitu*), *dasuan* ‘to plan’ and *zhunbei* ‘to get ready/prepare to’ and suggests that elements such as the clause introducer ‘*shuo*’ and a focus sensitive item *ye* ‘also’ that are located high in the structure above vP, are able to occur in the complements of the restructuring constructions, as illustrated by the examples below.

- (317) a. Lisi hui zai zhe zhou nei wancheng ziliao souji gongzuo. Ta hui shefa
 Lisi will at this week in finish data collection work he will try
 [ye zai zhe zhou nei tijiao jinzhan baogao].
 also at this week in submit progress report
 ‘Lisi will finish data collection this week. He will try to also submit a progress report this week.’
- b. Lisi xiang changshi [**shuo** huan yixia bie de xifalu].
 Lisi want try SHUO change a bit another shampoo
 ‘Lisi wants to try switching to another shampoo.’

Therefore, N. Huang (2018) argues that a monoclausal solution for Mandarin restructuring configurations is problematic. A more flexible account that allows more options of restructuring sizes such as [Wurmbrand \(2015\)](#) is preferred. Given the fact that the op-

tion of a clausal complement is available for both control constructions and non-control constructions, yet restrictions against overt subjects, tense and modal morphemes in the *shuo*-clause complements of control predicates have clear parallels with non-finite clauses in other languages, N. Huang (2018) concludes that Mandarin does encode finiteness.

4.1.3. Interim summary and outline of the chapter

Even the monoclausal story for Mandarin control constructions with non-finite complements is problematic, Grano's claim is intriguing in casting an important question for the debate of finiteness in Mandarin: what is the defining property of finiteness in Mandarin? The distinctions between the two types of complement clauses reflect several dimensions of a clause: complexity, transparency and independency. Does finiteness determines these properties or these properties are more fundamental? In Grano (2017), he admits that Mandarin can be said to exhibit a finite/non-finite distinction, but only if 'finiteness' is construed broadly as a cluster of properties that enable a clause to stand alone as a syntactically unembedded assertion.

Defining 'finiteness' is difficult, especially for languages like Mandarin that does not even overtly realize agreement and tense. Even some (but not all) researchers from the affirmative camp of finite/non-finite distinction propose possible definitions for this term, the debate keeps going on about which one is more privileged than the others. Instead of trying to define 'finiteness', we focus more on the morphosyntactic properties that reflect the independency, complexity and transparency of a clause, which are more fundamental properties of clausehood and follow a cross-linguistically robust implicational

hierarchy of complementation. Follow the idea of [Wurmbrand et al. \(2020\)](#), we propose that finiteness is a property or a set of properties that implement on this hierarchy. On the one hand, we agree with Grano (2012, 2015, 2017) that categories that are prohibited in the so-called non-finite clauses are located high in the structure: the Operator domain. On the other hand, we make a distinction between elements that are located high in the structure but are semantically vacuous (such as the clause introducer *shuo*) and those that have more concrete semantic contributions (sentence-final-particles and epistemic modals). Most of the evidence argued to be evidence of finiteness can be explained by the existence/absence of such a domain. Some evidence such as the compatibility of *hui* and overt, referentially independent subjects can be best captured by revitalizing an old idea that finiteness in Mandarin is related to tense.

This chapter is organized as below. Section 2 introduces the work by [Wurmbrand and Lohninger \(2020\)](#) as our working framework for this chapter. We introduce the Implicational Complementation Hierarchy to serve as a cross-linguistic guideline for us to investigate and group the morphosyntactic properties under discussion. We also introduce the synthesis model of complementation as a working hypothesis to capture the dynamic interaction between the matrix predicate and the complement.

Section 3 focuses on temporal (in)dependency and subject reference (in)dependency. Specifically, for temporal (in)dependency, we investigate categories related to temporal interpretations in complement clauses: constraints on temporal adverbs, presence and absence of aspect markers in non-future contexts and compatibility with overt future modal *hui* in future contexts. For subject reference, we focus on the possible forms and referential

properties of the embedded subject.

Section 4 is attributed to structural complexities. We investigate the distribution of modals and sentence-final-particles, showing that the distribution of modals and sentence-final-particles are limited in the *Situation* complements and *Event* complements. Modals that are syntactically higher than future modals and sentence-final-particles that conflict with temporal/aspectual requirements of the complement are disallowed.

Section 5 focuses on clausal transparency, taking restructuring into account. Again, restructuring only occurs in the *Situation* complements and *Event* complements, rather than the *Proposition* complements. In this section, we take a closer look at the properties of aspect lowering.

Section 6 demonstrates how the aforementioned properties follow the Implicational Complementation Hierarchy and why it is so. We argue that the minimal functional projections in the *Proposition* complements, *Situation* complements and *Event* complements are CP, *wollP* and vP respectively. We argue against the mono-clausal/bi-clausal proposal (Grano 2012, 2015) for the properties mentioned in the previous sections. Larger-than-expected projections are possible in *Situation* complements and *Event* complements that are argued to be mono-clausal structures. In fact, *Situation* complements and *Event* complements can even project trivial C element such as *shuo*. Then we return to the topic of finiteness. The three types of clauses in Implicational Complementation Hierarchy are mainly determined by their semantic properties. We observe a line between the *Proposition* class and the rest two classes. *Proposition* complements contain the (semantic) operator domain while *Situation* and *Event* complements lack this domain. We further propose

According to Givón (1980), the predicates to the right in Figure 4.1 is located high in the Binding Hierarchy while the predicates to the left is located low. Givón (1980) proposes that the higher a verb is on the binding scale, the less likely it is for its complement to be syntactically coded as an independent/main clause. While the morphosyntactic properties varies significantly across languages, the semantic grouping of complement types shows a more stable distribution. Following Givón (1980) and Ramchand and Svenonius (2014), Wurmbrand and Lohninger (2020) propose that complement clauses can be grouped into three broad classes. Following Ramchand and Svenonius's (2014) terminology, Wurmbrand and Lohninger (2020) argue that complement clauses can be broadly divided into *Propositions*, *Situations* and *Events*, which may be further divided into language-specific sub-classes.

4.2.1. Propositions, Situations and Events in Ramchand and Svenonius (2014)

Ramchand and Svenonius (2014) propose that the purely formal phrase structural zones correspond to certain arrangements of basic ontological semantic notions. The semantic notion that corresponds to the V-domain is EVENTS. That means the V-domain commonly recognized in syntax is the part of the syntactic structure which denotes an event description, i.e. a property of eventuality. Ramchand and Svenonius (2014) assume that all the heads in the V-domain (or the *Event* zone) have denotations that make them descriptions of the event sort.

Situations are partial specifications of states of affairs. Ramchand and Svenonius

(2014) stipulate that events have a central place in the constitution of a situation. Other parts of the situation, such as times, worlds and grammatical functions (subjects, objects etc.) have a different status.³ The properties of situations in Ramchand and Svenonious's (2014) proposal are summarized below:

(318) Characteristics of situations

- a. Situations are elaborations of eventualities (Kratzer 2008) (hence they presuppose the existence of an eventuality, so the eventuality is closed – either existentially closed or bound by some other kind of operator)
- b. Situations have a TIME parameter, unlike events (Giorgi and Pianesi 1997)
- c. Situations have a WORLD parameter, unlike events (Lewis 1986, Austinian topic situations)
- d. Situations can have topics (the case where the Austinian topic situation is based on an individual, or a description of an individual)

(Ramchand and Svenonious 2014: 162)

Ramchand and Svenonious (2014) suggest that the T-domain in syntax denotes a situation description. This domain contains the functional head that combines with an event description without a temporal parameter to deliver a situational description with temporal parameters (corresponding to the function of aspect in Kratzer 1998, Matthewson

³Ramchand and Svenonious (2014: 28) claim that 'Situations are smaller and specific than worlds, and have no transworld reality except via the 'counterpart' relation of Lewis (1986), but they are also larger than worlds, or events for that matter, in that they represent a richer information structure.' This statement is very confusing in what '(situations) are also larger than worlds' means, since according to the situation semantics literature they cited, situations are partial specifications of worlds.

2006 and many other works on tense and aspect).

The CP domain, according to Ramchand and Svenonius (2014), corresponds to a primitive semantic sort: proposition. Though Ramchand and Svenonius (2014) claim that they treat propositions as sets of situations, the illustrations of 'proposition' in their proposal do not exactly correspond to 'sets of situations' or 'sets of worlds' in the mainstream of semantic theories but something with a narrow and slightly different definition. In Ramchand and Svenonius (2014), proposition is more of a semantic description that is an enrichment of the situational sort to include a relationship to the utterance situation. The proposition is a relationship between a situation and an assertor and contains information about the speaker and speaker attitude as well as encoding of familiarity and novelty of the information to the participants in the speech act (Ramchand and Svenonius 2014: 169). In short, a 'discourse-linked' situation is a proposition in Ramchand and Svenonius (2014), as the characteristics below indicate.

(319) Characteristics of propositions

- a. Propositions are elaborations of situations; thus they presuppose a situation, which is existentially closed.
- b. Propositions, unlike situations, are anchored to the utterance context, having 'Force' in the discourse (Bianchi 2003, Ritter and Wiltschko 2009, Wiltschko forthcoming)
- c. It is only at the level of the proposition that speaker-oriented parameters come into play (Giorgi 2010).

(Ramchand and Svenonius 2014: 164)

Some functional head needs to combine with a situational description to create a proposition. [Ramchand and Svenonius \(2014\)](#) suggest that this job is classically done by tense information in a language like English (Ramchand and Svenonius 2014: 169). A head labeled as 'Fin*' transmits a situational description to a propositional description. What it does is to 'anchor' the time argument of a situation to the utterance time (s_t^*) and the world argument (s_w^*) to the actual world in the 'utterance situation' (s^*). The denotations of the present tense and past tense are shown in [\(320\)](#).

- (320) a. $\text{Fin}_{pres}^* : \lambda R \lambda p [p = \text{Assertion}(\exists s [R(s) \ \& \ s_t = s_t^*])]$
 b. $\text{Fin}_{past}^* : \lambda R \lambda p [p = \text{Assertion}(\exists s [R(s) \ \& \ s_t \neq s_t^*])]$

Fin_{pres}^* takes a situation R and returns a set of sets of situations (λp) iff there is a situation s that holds for R and the time argument of s equals to the utterance time. Given the fact that Ramchand and Svenonius (2014) does not offer an example for the derivation, it is unclear to us what 'Assertion' might look like. In the denotation of the past tense in [\(320b\)](#), the time argument of the situation does not equal to the utterance time. The denotations Fin_{realis}^* and $\text{Fin}_{irrealis}^*$ aim to show that the situational input of these functional heads anchors the world argument.⁴ Modals also carry anchoring information. Ramchand and Svenonius (2014) claim that modals can be functional heads of Fin*. Suppose the semantic type of a situation is denoted by $\langle \delta \rangle$. In [\(321\)](#), modals take in a situational

⁴The original definitions in [Ramchand and Svenonius \(2014\)](#) are as follows:

- (1) a. $\text{Fin}_{realis}^* : \lambda P \lambda s \lambda p [p = \text{Assertion}(\exists s [R(s) \ \& \ s_w = s_w^*])]$
 b. $\text{Fin}_{irrealis}^* : \lambda P \lambda s \lambda p [p = \text{Assertion}(\exists s [R(s) \ \& \ s_w \neq s_w^*])]$

(Ramchand and Svenonius 2014: 169)

We believe that the first argument P is a typo of R since this argument disappears in the assertion. We corrected the denotations as in [\(321\)](#).

argument R (of type $\langle \delta, t \rangle$) and return an output of the type of $\langle \delta, \langle \langle \delta, t \rangle, t \rangle \rangle$. If the modal is a realis modal, then the world argument of the situation R is the same as the actual world while in the case of irrealis modals (such as counterfactuals), the world argument of the situation R does not equal to the actual world.

- (321) a. $\text{Fin}_{realis}^*: \lambda R \lambda s \lambda p [p = \text{Assertion}(\exists s [R(s) \ \& \ s_w = s_w^*])]$
 b. $\text{Fin}_{irrealis}^*: \lambda R \lambda s \lambda p [p = \text{Assertion}(\exists s [R(s) \ \& \ s_w \neq s_w^*])]$

(Ramchand and Svenonius 2014: 169)

Though [Ramchand and Svenonius \(2014\)](#) term the basic semantic sorts as propositions, situations and events, in fact, more precisely speaking, these concepts are better to be understood as ‘*propositional descriptions*’, ‘*situational descriptions*’ and ‘*event descriptions*’ to avoid confusions. The way that [Ramchand and Svenonius \(2014\)](#) define ‘propositions’ does not hinge on a situation semantics framework. In semantic theories, it is hard to draw a reliable semantic boundary between sets of worlds and sets of situations for worlds just are ‘large’ situations. The key to the definition of ‘propositions’ in [Ramchand and Svenonius \(2014\)](#) is whether the world-time-pair of a semantic component is linked to the utterance context, i.e. anchored to the utterance time and the actual world.

[Ramchand and Svenonius \(2014\)](#) assume a containment relation among the three semantic sorts: a situational sort is an elaboration of an event description and a proposition is built on a situation with the world-time pair of the situation to be connected to the utterance time and actual world via some heads. This assumption captures the facts that: a. syntactic zones correspond to certain semantic blocks; b. some functional heads only manipulate on certain types of descriptions; c. the semantic blocks are built in a step-by-

step manner that leads to the functional sequencing in syntax, which are observed and investigated by cartographic approaches. We believe that these insights are on the right track. However, some aspects of the semantic implementations proposed in [Ramchand and Svenonius \(2014\)](#) are problematic. For example, the denotation of past tense in [\(320\)](#) is not only irregular but also incorrect. The past tense is roughly defined with an unequal relation ' $s_t \neq s_t^*$ ' and does not encode the precedence relation between the utterance time and the reference time. If we define the past tense in this way, a future interpretation is also possible to be expressed by a past tense in English, which is not true.

Therefore, we will not adopt the semantic implementations of [Ramchand and Svenonius \(2014\)](#) in this dissertation. The insights we adopt from [Ramchand and Svenonius \(2014\)](#) are the following. The three well-recognized syntactic zones in the literature (C-domain, T-domain and V-domain) correspond to certain semantic units. The V-domain corresponds to event descriptions, the T-domain corresponds to larger semantic units that adds on world and time argument to the event descriptions while elements associated to the speech event are in the C-domain. There are transition areas between these zones for the semantic composition. The semantic units are built in a step-by-step manner that is reflected by the functional sequencing in syntax. These insights are also adopted by [Wurmbrand and Lohninger \(2020\)](#) in complement clauses, with a focus on the time argument associated with the complement.

4.2.2. Propositions, Situations and Events in Wurmbrand & Lohninger (2020)

Wurmbrand and Lohninger (2020) adopt the semantic terminology of propositions, situations and events in Ramchand and Svenonius (2014) and extend the proposal to complement clauses, with a specific focus on the temporal properties and subject referential properties of complements. According to Wurmbrand and Lohninger (2020), Proposition complements involve speech and epistemic contexts (weak and strong epistemic attitude in Figure 4.1). This type of complements is temporally independent and may involve speaker-oriented parameters. The Situation complements involve emotive and irrealis contexts (emotives and some strong attempt verbs in Figure 4.1). The Situation complements involve elaborate eventualities without speaker- or utterance-oriented properties, but can refer to a specific, possibly pre-determined time. Event complements are semantic properties (Chierchia 1984, Wurmbrand 2002), which lack speaker- and utterance-oriented properties and may also involve reduced argument structure and/or event properties. They usually involve modals, implicatives, aspectuals and some strong attempt verbs ('success' in Figure 4.1).

The three broad classes of complements follow an implicational 'clausehood' hierarchy with different semantic and structural complexities, demonstrated in Table 4.1. Independence refers to properties such as the presence and/or interpretation of an independent subject or tense in the complement. Transparency indicates whether the embedded clause is permeable for certain operations or dependencies. Integration gives the degree

to which the embedded predicate is an integral part of the matrix predicate. These three dimensions of properties lead to the complexity of functional projections in a complement.

Table 4.1: Implicational Complementation Hierarchy (ICH)

MOST INDEPENDENT		LEAST INDEPENDENT
LEAST TRANSPARENT	Proposition » Situation » Event	MOST TRANSPARENT
LEAST INTEGRATED		MOST INTEGRATED

The complementation hierarchy is implicational in the sense that it does not restrict the specific morphosyntactic properties corresponding to the ranking but only sets certain ‘entailment’ relations among the three classes. If a language encodes morphosyntactic distinctions among the three types of complements, these distinctions will be observed between the Proposition class and the Event class. The Situation class may align with the Proposition class or the Event class, depending on the language. However, it is impossible to observe a distinction between the Proposition class and the Situation class, but the same distinction is not encoded between the Proposition class and the Event class.

Wurmbrand and Lohninger’s proposal also demonstrate the more concrete semantic characteristics that distinguish among the three types of complements. These semantic characteristics are mainly based on temporal properties and reference of embedded subject (possibilities and properties of control).

Proposition configurations involve complements that can be assigned a truth value or a presupposed truth value (Pesetsky 1992). Some English examples with Proposition complements are shown in (322). For example, ‘which is true’ in the sentences in (323) can refer to the matrix event, meaning that ‘it is true that Nova claimed ...’ and ‘it is true

that Nova knew ...'. It can also refer to the content in the complement, meaning 'it is true that Nova bought salad'.

(322) Proposition class: admit, affirm, announce, assume, believe, claim, consider, discover, figure, find, forget (factive), imagine, know (factive), observe, say, suppose, tell (speech), wager

- (323) a. Nova claimed that she bought salad, which is true.
b. Nova knew that she bought salad, which is true.

For Proposition configurations, no specific temporal orientation of the complement is selected. The embedded clause is tied to the matrix clause through the 'now' of the propositional attitude holder (Heim 1994, Kratzer 1998, Abusch 2004, Wurmbrand 2014). Proposition infinitives behave like finite clauses in the sense that when the complement eventive is interpreted as an episodic event occurring simultaneously with the matrix event, progressive form is required and perfective form (morphologically null in English, see details in Wurmbrand 2014 for evidence) is prohibited, demonstrated by the English propositional infinitives in (324).

- (324) a. Clara believes/claims that she is eating/*eats salad right now.
b. Clara believes/claims to be eating/*to eat salad right now.

(Wurmbrand and Lohninger 2020)

The Proposition complements not only allow non-control configuration, but also allow partial control, where the referent of the matrix argument merely has to be included among the referents of the embedded subject. For example, the Greek example in (325)

is argued to involve an embedded *pro* subject (Iatridou 1988, Landau 2015 among others) which includes the matrix argument.

- (325) I maria ipe oti egrapsan ena piima.
the Mary said.3.SG that wrote.3.PL one poem
'Mary said that they wrote a poem.'

(Greek, Terzi 1997: 338, cited from Wurmbrand and Lohninger 2020)

The most common type of the Situation complements (there may be other options) involve unrealized events, which is in the future with respect to the time of the matrix event (Abusch 2004). For the predicates in (326), the truth value of the complement is unspecified at the time of the utterance but the other aspects of the content can receive a speaker assessment. For example, 'which is true' in (327a) can only mean that 'it is true that Nova asked me...'. The Situation complement 'to buy salad' is neither true nor false but can receive a speaker assessment 'which is a good idea/not easy to do on Sundays' in (327b).

- (326) Situation class: agree, ask, choose, decide, demand, desire, know (modal), need, plan, promise, refuse, tell (imperative), want, wish

- (327) a. Nova asked me to buy salad, which is true.
b. Nova asked me to buy salad, which is a good idea/not easy to do on Sundays.

(Wurmbrand and Lohninger 2020)

In a Situation complement, temporal interpretation is restricted to the future with respect to the time of the matrix predicate. Even in finite complements, the future ori-

entation must maintain, as shown in (328). In contrast to the Proposition complements, Situation complements allow perfective form of the embedded event for an episodic reading, demonstrated by the Serbian examples in (329). This class allows the relaxed form of control as well, as illustrated in (330).

- (328) a. Clara decided to fly to Paris next week.
 b. Clara decided that she will/would fly to Paris next week.
 c. * Clara decided that she flew to Paris last year.

(Wurmbrand and Lohninger 2020)

- (329) a. Jovan je tvrdio da čita/*pročita knjigu.
 Jovan AUX claimed DA read.3SG.PRS.IPFV /*read.3SG.PRS.PFV book
 'Jovan claimed to be reading the book.'
 b. Jovan je odlučio da čita/pročita knjigu.
 Jovan AUX decided DA read.3SG.PRS.IPFV /read.3.SG.PRS.PFV book
 'Jovan decided to read the (entire) book.'

(Serbian, Todorović 2015, cited from Wurmbrand and Lohninger 2020)

- (330) a. John wanted to assemble in the hall.
 b. John expected to go on vacation together. (Pearson 2016: 692)

The third class of complements, Event complements, denote tenseless events. In the complements of the predicates in (331), the embedded event has to be simultaneous with the time of the matrix event. Even in finite complements, this property must maintain, shown by the Cypriot Greek data in (332).

(331) Event class: avoid (implicative), begin, can, continue, fail, finish, forget (implicative), manage, may, must, start, stop, succeed, try

(332) a. * *simmera* eprospaθisen *na lisi* to *provliman avrio*
 today try.PFV.PST.3SG NA solve.PFV.PRES.3SG the problem tomorrow
 Lit. 'He tried today to solve the problem tomorrow.'

b. * prospaθo *na efeyan./efiyan.*
 try.1SG NA leave.IPFV.PST.3PL/leave.PFV.PST.3PL
 Lit. 'I try for them to have been leaving/to have left.'

(Cypriot Greek, cited from Wurmbrand and Lohninger 2020)

When the embedded event is episodic, non-progressive forms are possible, demonstrated by the present perfective form of the embedded predicate in Cypriot Greek and Serbian sentences in (333). The Event complements involve more semantic diversities since the (matrix) predicates can be aspectual predicates like *begin*, implicative predicates like *manage* and also in-between cases like *try*, which requires the complement event to be irrealis but at the same time be in a trying situation.

(333) a. eprospaθisen *na lisi* to *provlima.*
 try.PFV.PST.3SG NA solve.PFV.PRS.3SG the problem
 'He tried to solve the problem.' (Greek)

b. *Jovan je* pokušao *da pročita* *knjigu.*
 Jovan AUX tried DA read.3SG.PRS.PFV book
 'Jovan tried to read the (entire) book.' (Serbian)

(Wurmbrand and Lohninger 2020)

Moreover, different from the Proposition and Situation complements, Event complements require full identity between the matrix controller and the embedded subject, which

disallow partial control, as the examples below show.

- (334) a. *John tried to assemble in the hall.
 b. *John dared to work on the problem as a team.

(Pearson 2016: 692)

In summary, the semantic properties for the classification of the three classes of complements are shown in Table 4.2.

Table 4.2: Semantic classification

Properties	Proposition	Situation	Event
Temporal interpretation	embedded reference time (attitude holder's NOW); no pre-specified tense value	no embedded reference time; pre-specified tense value (most common future, modal)	tenseless, simultaneous
Type of control	partial control possible	partial control possible	exhaustive control

(Wurmbrand and Lohninger 2020)

It is unclear to us why Wurmbrand and Lohninger (2020) claims that Situation complements do not have embedded reference time in Table 4.2, since they do state in the texts that Situation complements have a reference time. For example, Wurmbrand and Lohninger (2020: 7) state that '*(Since) the reference time of irrealis complements is a possibly infinite future interval, the embedded event interval can be contained in it, thus allowing perfective.*' In this dissertation, we only take their insights of temporal flexibilities and subject referential properties in classifying the three classes of complements, setting aside the discussion of reference time in embedded contexts since it deserves a detailed investigation before we can draw a conclusion. Therefore, the idea we take from Wurmbrand and Lohninger (2020) in this chapter in classification is summarized as in Table 4.3 below.

Table 4.3: Semantic classification adopted in this chapter

Properties	Proposition	Situation	Event
Temporal interpretation	no pre-specified tense value	pre-specified tense value (most common future)	tenseless, simultaneous
Type of control	partial control possible	partial control possible	exhaustive control

4.2.3. Differences between Ramchand & Svenonius (2014) and Wurmbrand & Lohninger (2020)

Though Wurmbrand and Lohninger (2020) adopt the insights and terminology of propositions, situations and events from Ramchand and Svenonius (2014) to classify complements, the three concepts differ in several dimensions in the two proposals.

Firstly, Ramchand and Svenonius (2014) take the main clauses without clausal embedding as samples to develop their theory. Propositions are defined as ‘discourse-linked’ situations such that the world-time arguments are anchored to the ‘utterance situation’. However, ‘situations’ in complements mostly do not anchor to the ‘utterance situation’. As Wurmbrand et al. (2020) admit, even in Proposition complements (Attitude complements in earlier version of Wurmbrand and Lohninger 2020 and in Wurmbrand et al. 2020) that have their own temporal domain and no predetermined temporal interpretations, there is a temporal dependency with the matrix clause and not the speech event. Therefore, ‘propositions’ in Ramchand and Svenonius (2014) and Wurmbrand and Lohninger (2020) are not the exact same creature.

Secondly, ‘propositions’ in Wurmbrand and Lohninger (2020) cannot be simply understood as ‘sets of worlds’ or ‘sets of situations’, the common definitions for ‘propositions’ in formal semantic theories. Other than the temporal/subject referential properties, the

evidence that [Wurmbrand and Lohninger \(2020\)](#) apply to show a propositional complement is the ‘which is true’ test. This test does not rely on a situation semantics framework for propositions. In other words, whether we treat propositions as sets of worlds or sets of situations as [Ramchand and Svenonius \(2014\)](#) do, this test does not make a difference. The ‘which is true’ test does not always draw a line between Proposition complements and Situation complements. For instance, the finite complement of ‘decide’ in English is argued to be a Situation complement and the complement of ‘claim’ is a Proposition complement in [Wurmbrand and Lohninger \(2020\)](#). However, it is hard to tell a difference between the complements in (335) even we adopt the ‘which is true’ test.

- (335) a. The Major League Baseball claimed that the Yankees will play the Red Sox next week, which is true.
- b. The Major League Baseball decided that the Yankees will play the Red Sox next week, which is true.

‘Which is true’ in (335) can mean that it is true that ‘The Major League Baseball made a claim/make a decision that...’ or it is true that ‘The Yankees will play the Red Sox next week’. If we follow the common definitions for ‘proposition’ in formal semantics, both complements in (335) are propositions. If we follow the narrow definition of propositions in [Ramchand and Svenonius \(2014\)](#), both complements contain a present tense and are anchored to the utterance situation since present tense is absolute (anchoring to the utterance time) in English. Hence both complements are also propositions in [Ramchand and Svenonius \(2014\)](#).

It seems that the property that [Wurmbrand and Lohninger \(2020\)](#) targets at for Sit-

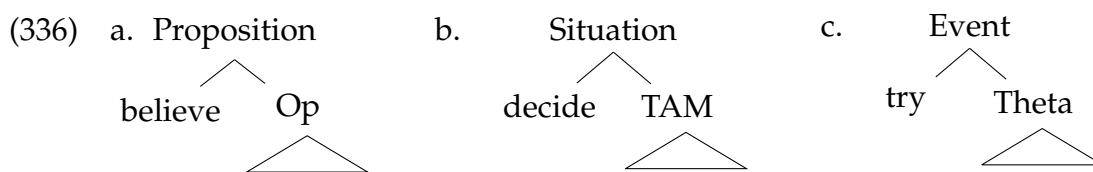
uation complements is not about semantically being a ‘situation’ or a ‘proposition’, but is about ‘veridicality’ at the utterance time. For instance, [Wurmbrand and Lohninger \(2020\)](#) claim that the truth value of a Situation complement is unspecified at the time of the utterance. Future expressions with a future modal like *will* are veridical at a future time but non-veridical at the utterance time ([Giannakidou and Mari 2018](#)). In other words, the semantic classification for the three types of complements in [Wurmbrand and Lohninger \(2020\)](#) are actually defined by temporal properties between the matrix event and the complement event rather than which semantic unit they are corresponding to (at least for Proposition complements). The temporal properties and subject referential properties of the three classes of complements might tend to indicate the correspondence of certain types of semantic units suggested by [Ramchand and Svenonius \(2014\)](#). But the mapping is not absolute, as we can see in the examples in (335). Both complements in (335) are future irrealis and semantically considered as propositions (in standard semantic theories and in [Ramchand and Svenonius 2014](#)), though the temporal flexibility between the matrix clause and the complement clause is different. The earlier version of [Wurmbrand and Lohninger \(2020\)](#) is more straightforward in highlighting this angle by naming Proposition complements as ‘*Attitude* complements’, Situation complements as ‘*Irrealis* complements’ and Event complements as ‘*Tenseless* complements’.

Therefore, even this dissertation adopts the key ingredients of [Wurmbrand and Lohninger \(2020\)](#) about temporal and subject referential (in)dependence in defining the three classes of complements, please note that from now on, the italic terms ‘*Proposition*’, ‘*Situation*’, ‘*Event*’ are merely a label of the clause types with certain interpretations rather than the

equivalents of ‘proposition’, ‘situation’, ‘event’ in formal semantic theories. Our semantic analysis does not hinge on situation semantics as well.

4.2.4. Minimal functional projections and ICH

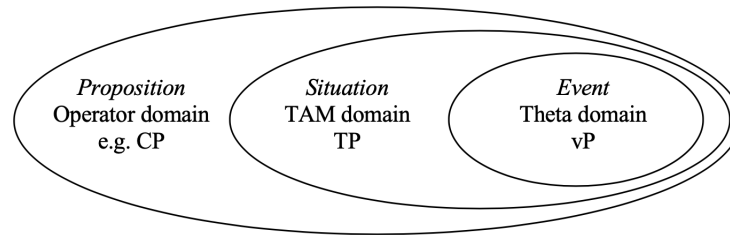
Wurmbrand and Lohninger (2020) suggest that the syntactic domains corresponding to the categories associated with an *Event*, a *Situation* and a *Proposition* are the Theta domain, the TAM domain (TMA domain in Wurmbrand and Lohninger 2020) and the Operator domain. Proposition complements contain the highest clausal domain: the Operator domain (A’-domain) which is the locus of clausal operators, context variables etc. Situation complements structurally link to the TAM domain (A-domain) which is associated with TAM properties and case and agreement. Event complements contain the simplest and lowest Theta domain in which the argument structure of the main predicate is realized. The minimal structure of the three types of clauses is shown below (adapted from Wurmbrand and Lohninger 2020: ex 33).



Wurmbrand and Lohninger (2020) suggest that functional sequencing determines the containment properties in the structural domain. That is, a *Situation* is built on an *Event* and provides the base for a *Proposition*. Figure 4.2 illustrates the containment relations among clausal domains and their semantic correspondences.

Independence, complexity and transparency are tied together via the syntactic structure, which is (in part) predictable from the meaning of a complement. Such defined

Figure 4.2: Containment and complexity



(Wurmbrand and Lohninger 2020)

syntactic and semantic complexity jointly creates the implicational scale of clausehood, summarized in (337).

- (337) a. The ICH reflects increased syntactic and/or semantics complexity from the RIGHT to the LEFT: a type of complement can never be obligatorily more complex than the type of complement to its left.
- b. The implicational relations of the ICH arise through containment relations among clausal domains.

The minimal structures shown in (336) and Figure 4.2 do not mean that languages always realize complements as the structures in (336) do. It does not mean that an *Event* complement can only be a vP and a *Situation* complement can only be a TP. The minimal structure only states that an *Event* complement at least projects the theta domain. A *Situation* complement at least projects some aspect in the TAM domain while the *Proposition* complement at least projects some aspect in the operator domain. This is adequate to derive the ICH and allow the possibilities of projecting larger-than-expected structures. However, whenever complements show differences of dependence, transparency, integration or complexity, these differences follow from the containment relation in the do-

main.

In fact, Wurmbrand and Lohninger (2020) further argue that the mapping between syntax and semantics is not absolute. Syntax feeds into semantics but does not determine it. The system developed by Wurmbrand and Lohninger (2020) allows mismatches in one direction: syntactic structure that has no consequence for interpretation is possible. Complement clauses can be realized as full clausal domains in many languages without undergoing meaning changes (Wiklund 2007 for Swedish, Manzini et al. 2017 for Southern Italian varieties etc.). For example, a syntactic CP domain without the operators that turn a *Situation* into a *Proposition* will be mapped into a *Situation*, exactly like a CP-less TAM domain. A TP without time parameters is mapped into an *Event* in the same way as a syntactic vP domain.

4.2.5. A synthesis model of complementation

Wurmbrand and Lohninger's modal of complementation has a prominent property: it does not assume a fine-grained syntactic template of complements as cartographic approaches usually do, but only sets certain lower bounds of the clause size. Namely, there is not a strict matching between a particular interpretation and a unique syntactic configuration. The mapping between syntax and semantics is not fully deterministic. Syntax restricts meaning in predictable ways, but does not fully determine it. The broad ICH categories (*Proposition*, *Situation* and *Event*) are conceptual primitives necessitating a particular syntactic and semantic composition. Different syntactic structures could map to the same semantic concept, as long as the composition includes the necessary elements to

yield a particular interpretation. However, to successfully map a syntactic configuration to a particular semantic concept, the minimal structure must be met. In other words, an *Event* complement possesses *at least* a θ domain, a *Situation* complement possesses *at least* a TAM domain and a *Proposition* complement possesses *at least* an operator domain.

This model is attractive to us for several reasons. Firstly, it provides enough flexibility to cover the variation within and across languages regarding the (morpho)syntactic realization of complements with the same meaning. For instance, a Proposition complement can be realized as a finite CP or an infinitive CP in English. Secondly, the synthesis modal allows syntactic projections that has no consequence for interpretation, therefore it paves the way for optional projections and larger-than-expected structures in single languages. For instance, Southern Italian varieties (Manzini et al. 2017) and Swedish (Wiklund 2007) allow the *Situation* complements and the *Event* complements to project domains larger than the ICH would predict. Thirdly, a synthesis modal builds on semantic selection and allows for mutual interactions between the matrix predicate and the complement. In other words, a matrix predicate can impose properties on the complement while the form of the complement also affect the interpretation that the matrix predicate would have. In Greek, the verbs *know*, *forget* or *tell* can involve different interpretations depending on the choice of clause introducer. In English, the speech meaning of *tell* occurs in a finite complement in (338a) while *tell* with the infinitive in (338b) has only the command meaning.

(338) a. I told him that he won.

b. I told him to win.

(Wurmbrand 2019)

Last but not least, the synthesis model avoids duplicating verbs in the lexicon. Instead

of assuming two lexical entries that share the same verb form, we would assume that these verbs have a flexible (e.g. underspecified) semantics and freely combine with different type of complements. Depending on which type of complement is chosen, which is often reflected in morphosyntactic coding differences, different meanings are available. For example, a predicate may have a basic meaning that can be syntactically encoded differently, but may switch to another interpretation when a non-canonical reading is coerced. For instance, the basic meaning of the complement of the English verb *decide* is a future irrealis reading, which can be realized by an infinitive (339a) or a finite clause (339b). In the finite complement, the future interpretation must be overtly marked with a future modal. If *will* is omitted, the configuration cannot be interpreted like a *Situation* context, but is instead shifted to a *Proposition* context with the performative use in cases like (339c).

- (339) a. I decided to solve the problem tomorrow.
 b. I decided that I *(will) solve the problem tomorrow.
 c. I decided that he is a nice person.

(Wurmbrand and Lohninger 2020)

4.3. Clausal (in)dependence

Examples of Mandarin predicates with complements in the context of *Proposition*, *Situation* and *Event* are demonstrated below.

- (340) a. Proposition Class: *shuo* 'say', *jueding* 'decide', *renwei* 'believe', *shengcheng*

'claim', *zhidao* 'know', *gaosu* 'tell (speech)', *queren* 'affirm', *faxian* 'find out', *wangji* 'forget (factive)', *hen yihan* 'regret', *zancheng* 'agree'

- b. Situation Class: *dasuan* 'plan', *bi* 'force', *quan* 'urge, persuade', *mingling* 'order', *xiang* 'want', *rang* 'let', *zhunbei* 'prepare', *jueding* 'decide', *qing* 'invite', *baituo* 'ask someone to do a favor'
- c. Event Class: *bimian* 'avoid', *kaishi* 'begin', *jixu* 'continue', *tingzhi* 'stop', *wangji* 'forget (implicative)', *shefa* 'try', *qitu* 'intend', *hui* 'can', *neng* 'be able to'

In the following discussion, we will investigate the morphosyntactic properties and (a part of) the semantic properties associated with these three classes of complements. The type of complements that is often considered to be finite (C.-T. James Huang 1989, Y.-H. Audrey Li 1990, T.-H. Jonah Lin 2007, 2011, N. Huang 2018) in Mandarin is the *Proposition* class. The other complements that are argued to be non-finite belong to the *Situation* class and *Event* class.

4.3.1. Temporal (in)dependence

4.3.1.1. Different time adverbs

Proposition complements and *Situation* complements allow different time adverbs in the matrix clause and the complement clause, demonstrated by the examples in (341)-(342) (time adverbs are in bold). Meanwhile, unlike the *Proposition* complements that are flexible with the correlation between the two time adverbs, the *Situation* complements only allow different time adverbs that are consistent with the future irrealis temporal proper-

ties. Other time adverbs that conflict with this property are infelicitous, as illustrated by the examples in (343)-(344).

- (341) a. **Zuotian** Yuehan shuo [Mali **mingtian** qu Shanghai].
 yesterda John say Mary tomorrow go Shanghai
 ‘Yesterday, John said that Mary is going to Shanghai tomorrow.’
- b. **Zuotian** Yuehan xiangxin [Mali **xia-ge yue** qu Shanghai].
 yesterday John believe Mary next-CL month go Shanghai
 ‘Yesterday, John believed that Mary is going to Shanghai next month.’
- (342) a. **Zuotian** Yuehan shuo [Mali **shang-ge xingqi** qu-le Shanghai].
 yesterday John say Mary last-CL week go-PFV Shanghai
 ‘Yesterday John said that Mary went to Shanghai last week.’
- b. **Zuotian** Yuhan xiangxin [Mali **shang-ge xingqi** qu kan-le yisheng].
 yesterday John believe Mary last-CL week go see-PFV doctor
 ‘Yesterday John believed that Mary went to see the doctor last week.’
- (343) a. **Zuotian** Yuehan_i dasuan [PRO_i **xia-ge yue** qu Shanghai].
 yesterday John plan next-CL month go Shanghai
 ‘Yesterday John planned to go to Shanghai next month.’
- b. **Zuotian** Yuhan quan Mali_i [PRO_i **mingtian** qu kan yisheng].
 yesterday John urge Mary tomorrow go see doctor
 ‘Yesterday John urged Mary to see the doctor tomorrow.’
- (344) a. # **Zuotian** Yuehan_i dasuan [PRO_i **shang-ge xingqi** qu Shanghai].
 yesterday John plan last-CL week go Shanghai
 Lit. ‘#Yesterday John planned to go to Shanghai last week.’
- b. # **Zuotian** Yuhan quan Mali_i [PRO_i **shang-ge xingqi** qu kan yisheng].
 yesterday John urge Mary last-CL week go see doctor
 Lit. ‘#Yesterday John urged Mary to see the doctor last week.’

On the contrary, the *Event* complements require the matrix event to be simultaneous with the complement event, thus disallow different time adverbs.

- (345) a. # **Zuotian** Yuehan_i kaishi [PRO_i **mingtian** qu jianshen].
 yesterday John begin tomorrow go take-exercise
 Lit. ‘#Yesterday John began to take exercise tomorrow.’
- b. # **Zuotian** Mali_i shefa [PRO_i **mingtian** likai Beijing].
 yesterday Mary try tomorrow leave Beijing
 Lit. ‘#Yesterday Mary tried to leave Beijing tomorrow.’
- c. # **Zuotian** Mali_i bimian [PRO_i **mingtian** jian Yuehan].
 yesterday Mary avoid tomorrow meet John
 Lit. ‘#Yesterday, Mary avoided to meet John tomorrow.’

4.3.1.2. Presence and absence of aspect markers in non-future contexts

The general pattern of aspect marking in root clauses is repeated in (346).

- (346) a. Stative predicates are not marked by aspect markers in general.
- b. Bare eventives can only denote generic readings (non-episodic) or scheduled/planned events.
- c. Eventives denoting an episodic reading are obligatorily marked by aspect.

All three classes of complements are compatible with bare eventives denoting generic interpretations. Bare predicates denoting generic readings are derived statives. Except the *Situation* complements that require the generic state to be in the future of the matrix event ((347b)), *Proposition* complements and *Event* complements by default mean that the generic state overlaps with the matrix event ((347a) and (347c)). *Proposition* complements are the most flexible with regard to temporal interpretation, hence can also allow

past generic interpretations if a past time adverb is added and also allow future generic interpretations if the future modal *hui* is added, shown by (348).

- (347) a. Yuehan shuo [Mali meitian dou jianshen].
John say Mary every-day DOU take-exercise
'John said that Mary took exercise every day.'
- b. Mali_i dasuan [PRO_i meitian jianshen].
Mary plan everyday take-exercise
'Mary planned to take exercise every day.'
- c. Mali_i shefa [PRO_i meitian dou jianshen].
Mary try every-day DOU take-exercise
'Mary tried to take exercise every day.'
- (348) a. Yuehan shuo [Mali **yiqian** mei-zhou dou jianshen].
John say Mary in-the-past every-week DOU take-exercise
'John said that Mary took exercise every week in the past.'
- b. Yuehan shuo [Mali **hui** mei-zhou dou jianshen].
John say Mary FUT every-week DOU take-exercise
'John said that Mary will/would take exercise every day.'

To denote episodic readings, the *Proposition* complements follow the same restrictions of aspect marking in finite root clauses. Namely, eventive predicates obligatorily require aspect marking. When the embedded event overlaps with the matrix event, progressive marking is obligatory. Perfective aspect marker *le*₁ obligatorily shifts the embedded event backward, demonstrated by the examples below.

- (349) a. Yuehan shuo [Mali chi pingguo].
John say Mary eat apple
'John said that Mary ate apples (Mary was/is an apple-eater).'

(✓ generic, *episodic)

- b. Yuehan shuo [Mali *(zai) chi pingguo].
 John say Mary PROG eat apple
 'John said that Mary was eating apples.'
- c. Yuehan shuo [Mali chi *(le/guo) pingguo].
 John say Mary eat PFV/EXP apple
 'John said that Mary ate an apple/ate apples.'

Situation complements and *Event* complements do not allow overt aspect markers even in episodic readings, if a *Situation* complement maintains its typical future *Situation* reading and an *Event* complement maintains its non-future and non-irrealis interpretation, in contrast to the *Proposition* complements (Huang 1989, He 2017). In (350)-(353), the progressive marker and perfective marker are disallowed.

- (350) a. * Yuehan dasuan [mingnian **zai** qu riben].
 John plan next-year PROG go Japan
- b. * Yuehan quan Mali_i [PRO_i **zai** jian Zhangsan].
 John urge Mary PROG meet Zhangsan
 (Situation)
- (351) a. * Yuehan_i kaishi [PRO_i **zai** zuo yujia].
 John begin PROG do yoga
- b. * Mali_i wangji [PRO_i **zai** likai Beijing].
 Mary forget PROG leave Beijing
 (Event)
- (352) a. * Yuehan_i dasuan [PRO_i qu-**le** riben].
 John plan next-year go-PFV Japan
- b. * Yuehan quan Mali_i [PRO_i jian-**le** Zhangsan].
 John urge Mary meet-PFV Zhangsan
 (Situation)

- (353) a. * Yuehan_i kaishi [PRO_i zuo-**le** yujia].
 John begin do-PFV yoga
- b. * Mali_i wangji [PRO_i likai-**le** Beijing].
 Mary forget leave-PFV Beijing
- (Event)

As we mentioned in Chapter 1, some *Situation* and *Event* complements also allow ‘aspect lowering’ (C.-T. James Huang 1989, Y.-H. Audrey Li 1990, Hu et al. 2001, Grano 2012, 2015, N. Huang 2018), as the examples in (354) show.

- (354) a. Zhangsan bi Lisi [PRO_i canjia-**le** bisai].
 Zhangsan force Lisi participate-PFV match
 ‘Zhangsan forced Lisi to participate in the match.’
- b. Zhangsan shefa [PRO_i zuo-**guo** zhe-dao cai].
 Zhangsan try do-EXP this-CL dish
 ‘Zhangsan tried to make this dish.’

When ‘aspect lowering’ occurs, the interpretation of a *Situation* complement is still in the future of the matrix event. But it is no longer ‘irrealis’. The complement eventuality in ‘aspect-lowering’ constructions becomes factive. Aspect-lowering is one of the robust restructuring phenomena (N. Huang 2018) in Mandarin, which indicates the transparency of the complement clauses. Two points of ‘aspect lowering’ phenomenon are of particular interests: the evaluation time and the world argument associated with the complement event. We will get into the details of aspect lowering in Section 5, now let us briefly summarize the temporal property of these constructions. In a *Proposition* complement, *guo* and *le*₁ (both are considered to be perfective in nature, though the exact meanings are different, see Lin 2003, 2006) indicate that the embedded event happened before the

matrix event. Or more strictly speaking, the event occurred before the attitude holder's 'now', as the examples in (355) show.

- (355) a. Lisi xiangxin [wo mai-**guo** zhe zhong baoxian].
Lisi believe 1SG buy-EXP this type insurance
'Lisi believes that I have previously bought this kind of insurance.'

(Huang 2018: 351)

- b. Lisi shuo [wo mai-**le** zhe zhong baoxian].
Lisi say 1SG buy-PFV this type insurance.
'Lisi said that I bought this kind of insurance.'

But perfective markers on the embedded event in the *Situation* complements and *Event* complements do not change the temporal relation between the matrix event and complement event. The future orientation of the *Situation* complement and simultaneity of the *Event* complement still hold, as we can see in (356). The perfective markers in the *Situation* and *Event* complements (if it is possible) only state that both the matrix event and the complement event occurred in the past of the utterance time: the evaluation time of the perfective aspect is provided by the matrix clause rather than the local context of the subordinate clause as *Proposition* complements in (355) do.

- (356) a. ***Zuotian** Zhangsan bi Lisi_i [PRO_i **shang-ge xingqi** zuo-le yujia].
yesterday Zhangsan force Lisi last-CL week do-PFV yoga
'Yesterday Zhangsan forced Lisi to do yoga next week.'
- b. ***Zuotian** Zhangsan_i shefa [PRO_i **di'er tian** zuo-guo zhe-dao cai].
yesterday Zhangsan try second day do-EXP this-CL dish
'Yesterday Zhangsan tried to make this dish the next day.'

Wurmbrand and Lohninger (2020) claim that *Situation* complements and *Event* com-

plements allow perfective aspect, as Greek and South Slavic languages do.⁵ However, Mandarin disallowing *le*₁ in *Situation* complements and *Event* complements seems to be a challenge for the generalization. There are two possibilities for the difference.

The first possibility is that the observation by Wurmbrand and Lohninger (2020) is not universal. According to Malchukov (2009), Slavic languages allow the uncommon combination of present tense morpheme and the perfective aspect morpheme, with meaning shifts of the two functional categories. In East Slavic languages such as Russian, present perfective root clauses denote a future reading. Namely, Russian keeps the meaning of perfective constant and shifts the meaning of present tense to denote a future reading. In South Slavic languages such as Bulgarian and Serbo-Croatian, a present perfective form is either used in a narrative discourse or denotes a generic reading. Temporal marking in narrative discourses is a complex topic in English, the most well-studied language in the field, let alone in South Slavic languages. We are unable to say more about this topic here. Setting narrative discourses aside, present perfective denoting present generic readings indicates that in these languages, the meaning of present tense does not change but the meaning of the perfective aspect shifts to a generic interpretation (a type of imperfective). Given the fact that meaning shifts of tense and aspect are possible in Slavic languages (Comrie 1976, Malchukov 2009), whether the perfective form in the *Situation* complements and *Event* complements still maintain the standard denotation of perfective in Klein (1994), Kratzer (1998) requires further investigation. Other than that, Malchukov

⁵Though this claim is not made explicitly for *Event* complements, the examples for *Event* complements from Greek and Serbian do contain a present perfective form.

(2009) suggests that the combination of past tense and perfective aspect are most common cross-linguistically while the combination of present tense and perfective aspect is most uncommon. The combination of future and perfective aspect is in between. In English, perfective is morphologically null, hence we cannot see whether perfective aspect is marked on the embedded predicate in future irrealis infinitives or in the complement of future modals. Other than Mandarin, perfective aspect is also only limited to past tense in Romance languages. Hausa, a Bantu language, also prohibits perfective aspect in future readings, see Mucha (2015) for details. It might be the case that availability of perfective aspect in future contexts (including root clauses and future irrealis complements) is not universal.

Another possibility is that the Mandarin perfective aspect marker *le*₁ is mis-analyzed. It is the perfect form rather than the perfective form in Mandarin.⁶ The meaning and the cross-linguistic variations of ‘perfect forms’ remain a controversial topic (McCoard 1978, Mittwoch 1988, 2008a, Ogiwara 1996, Tatevosov 2001, 2003, Katz 2003b, Pancheva 2003, Portner 2003, 2009, Rullmann and Matthewson 2018 among many others). Portner (2003) suggests that the English perfect involves two fundamental components of meaning: a true-conditional one involving temporal notions and a current relevance presupposition best expressed in terms drawn from the analysis of modality. Rullmann and Matthewson (2018) propose that there are two kinds of view point aspects: inclusion aspect and ordering aspect. The inclusion aspect is the standard viewpoint aspect: perfective and imperfective, with the Klein-style denotation below.

⁶We thank Susi Wurmbrand for pointing out this possibility to us.

- (357) a. $\llbracket \text{PFV} \rrbracket^{g,t_0,w_0,f,h} = \lambda P_{\langle l,st \rangle} \lambda t \lambda w. \exists e [P(e)(w) \& \tau(e) \subseteq t]$
 b. $\llbracket \text{IPFV} \rrbracket^{g,t_0,w_0,f,h} = \lambda P_{\langle l,st \rangle} \lambda t \lambda w. \exists e [P(e)(w) \& t \subset \tau(e)]$

In the denotations in (357), t_0 is the time of utterance, w_0 is the world of utterance, g is the variable assignment function. F stands for the modal base and h stands for the ordering source. Though the notation is slightly different (l represents the eventuality), the denotations in (357) are consistent with our assumptions for perfective and imperfective in Chapter 2: the perfective aspect and imperfective aspect are defined via the inclusion relation between the runtime of the eventuality and the reference time.

The ordering aspect includes the perfect and prospective, with the denotation for perfect in (358). The perfect takes in a proposition and locates this proposition in a past interval with respect to the time argument t . The denotation in (358) for perfect is almost the same as the past tense in a Priorian approach. In fact, Ogihara (1996) treats the English perfect as the same as the English past tense. The perfect is syntactically higher than the inclusion aspect, as the English sentence ‘*He might have been waiting for you*’ shows (Chomsky 1957, Pancheva 2003, Ramchand and Svenonius 2014).

- (358) $\llbracket \text{PERF} \rrbracket^{g,t_0,w_0,f,h} = \lambda P_{\langle i,st \rangle} \lambda t \lambda w. \exists t' [t' < t \& P(t')(w)]$

For languages in which perfective aspect only occurs in past contexts and there is no detectable overt morphology of perfect that has a finite/non-finite distinction, it is not easy to determine whether the overt form that reports a culminating past event is perfective or perfect. However, if the perfective aspect marker le_1 and experiential marker guo are analyzed as perfect forms, then Mandarin patterns exactly like English in not

allowing perfect forms in *Situation* complements and *Event* complements, as shown in (359).

- (359) a. * I decided to have left.
 b. * Mary tried to have met John.

Moreover, le_1 shows a similar distribution with perfect in modal constructions (details in Section 4.4.1). Mandarin le_1 is available in the complement of epistemic modals but is not allowed in the complement of root modals such as deontic modals and dynamic modals, demonstrated in the examples in (360).

- (360) a. Zhangsan **keneng** xie-**le** lunwen.
 Zhangsan might write-*le* paper
 'Zhangsan might have written the paper.' (Mod_{epistemic} > *le*)
- b. * Zuotian caipai de shihou, Zhangsan **yao** tiao-**le**-wu.
 yesterday rehearse DE time Zhangsan should dance-*le*-dance
 (*Mod_{deontic} > *le*)
- c. * Zhangsan **hui** mai-**le** zhe ben shu.
 Zhangsan be-able-to buy-*le* this CL book.
 (*Mod_{dynamic} > *le*)

Similarly, English perfect is possible under epistemic modals but impossible in the complement of dynamic modals, unless a future perfect interpretation is possible with the 'by a particular time' specification, shown by the examples in (361). If the Mandarin perfective aspect le_1 is analyzed as perfect, then Mandarin le_1 being incompatible with *Situation* complements and *Event* complements does not posit a challenge for the generalization of perfective in complementations in Wurmbrand and Lohninger (2020).

- (361) a. I might/must have won. (epistemic)

- b. * I must have left. (deontic)
- c. I must have finished this by tomorrow night. (deontic)

Nevertheless, if we analyze *le*₁ as perfect in Mandarin, *le*₁ is still not the exact counterpart of the English perfect. For example, English perfect is compatible with progressive aspect and future modal *will*, shown by the examples in (362a-363a). However, Mandarin *le*₁ is incompatible with progressive *zai* and future modal *hui*, which is unexpected if *le*₁ is the perfect.

(362) a. He might have been waiting for you.

- b. *Ta keneng zai deng-le ni.
 3SG may PROG wait-*le* 2SG

(363) a. He will have left the island by next week.

- b. *Ta xiazhou qian hui likai-le daou.
 3SG next-week before FUT leave-*le* island

A discussion about the Mandarin counterpart of English perfect is necessary to better understand the universals and variations. We have to leave this issue open now. In the rest of this dissertation, we still follow the tradition of the Mandarin literature, calling *le*₁ the perfective aspect marker. In Chapter 2 we offer a standard analysis for *le*₁ as a perfective aspect that successfully accounts for the empirical facts of root clauses, but we have not investigated the the interaction among tense, aspect and modality in embedded contexts in a systematic way with a concrete semantic analysis and the corresponding syntactic mapping, it is possible that *le*₁ may deserve a different treatment.

4.3.1.3. Compatibility with future modal *hui*

As described in Chapter 3, to denote a future reading in root clauses, overt future modals are obligatory. The exception is the futurate constructions with a covert PLAN modal that requires future time adverbs and predicates denoting plannable events. We observe a similar but different pattern between root clauses and *Proposition* complements. That is, to denote a future event, future modals are obligatory (overt *hui* and covert PLAN) for some *Proposition* complements, shown by the examples in (364a-b). The *Proposition* complement in (364c) without future time adverb or future modal *hui* is odd. The *Proposition* complement in (364d) with an uncontrollable event is also infelicitous. The sentences in (364c-d) indicate that these sentences contain a covert future modal PLAN since the requirements of a covert PLAN still remain. However, it is not the case that every *Proposition* complement has to be marked by an overt or covert future modal in future contexts. For example, the complement of *xiwang* 'hope' can have eventualities that cannot be planned, as we can see in (365a), indicating that the element denoting a future reading is not the covert PLAN.

- (364) a. Yuehan shuo [Mali **hui** jian Zhangsan].
John say Mary FUT meet Zhangsan
'John said that Mary would/will meet Zhangsan.'
- b. Yuehan shuo [Mali mingtian jian Zhangsan].
John say Mary tomorrow meet Zhangsan
'John said that Mary is meeting with Zhangsan tomorrow.'
- c. ?? Yuehan shuo [Mali jian Zhangsan].
John say Mary meet Zhangsan
'Intended: John said that Mary would/will meet Zhangsan.'

(acceptable if a context-salient future time is established)

- d. ?? Yuehan shuo [xia-zhou Huren dui jibai Huojian dui].
John say next-week Laker team defeat Rocket team
'Intended: John said that next week the Lakers would defeat the Rockets.'

(365) a. Yuehan xiwang [mingtian Huren dui jibai Huojian dui].
John hope tomorrow Laker team defeat Rocket team
'John hopes that the Lakers will defeat the Rockets tomorrow.'

- b. Yuehan xiwang [mingtian Huren dui hui jibai Huojian dui].
John hope tomorrow Laker team FUT Rocket team
'John hopes that the Lakers will defeat the Rockets tomorrow.'

Due to their temporal restrictions, the *Event* complements do not allow future modal *hui*, as shown by the examples in (366). Though the *Situation* complements require the complement event to be in the future of the matrix event, the overt future modal *hui* is prohibited in *Situation* complements, as demonstrated by the examples in (367).

(366) a. Yuehan_i mingtian kaishi [PRO_i (*hui) zuo yujia].
John tomorrow begin FUT do yoga

- b. Mali_i shefa [PRO_i (*hui) manzu keren de yaoqiu].
Mary try FUT satisfy guest DE requirement

(367) a. Yuehan_i dasuan [PRO_i mingnian (*hui) qu riben].
John plan next-year FUT go Japan
'John planned to go to Japan next year.'

- b. Yuehan quan Mali_i [PRO_i mingtian (*hui) jian Zhangsan].
John urge Mary tomorrow FUT meet Zhangsan
'John urged Mary to meet with Zhangsan tomorrow.'

4.3.1.4. Interim summary

The temporal properties reflected by the three tests for the three complement types are summarized in Table 4.4.

Table 4.4: Temporal relation between matrix and complement eventualities

complements	examples	generic interpretations			episodic interpretations		
		$t_{matrix} \circ t_{comp}$	$t_{matrix} < t_{comp}$	$t_{comp} < t_{matrix}$	$t_{matrix} \circ t_{comp}$	$t_{matrix} < t_{comp}$	$t_{comp} < t_{matrix}$
Proposition	<i>shuo</i> 'say' <i>juede</i> 'think' <i>jueding</i> 'decide'	✓	✓ (+ FUT)	✓ (+ past time adv)	✓ (+PROG)	✓ (+FUT)	✓ (+PFV/EXP)
Situation	<i>dasuan</i> 'plan' <i>bi</i> 'force' <i>quan</i> 'urge'	*	✓	*	*	✓ (*FUT, *ASPECT except PFV/EXP with restructuring)	*
Event	<i>kaishi</i> 'begin' <i>shefa</i> 'try' <i>bimian</i> 'avoid'	✓	*	*	✓ (*FUT, *ASPECT except PFV/EXP with restructuring)	*	*

From Table 4.4 we see that the *Proposition* class is the most flexible with temporal interpretations. The complement event can overlap with, precede or follow the matrix event, as long as the right marking shows up in the complement. It patterns consistently with the finite root clauses, with regard to the corresponding markings for each interpretation. *Situation* and *Event* complements both have their own restrictions on the temporal relation between the complement event and the matrix event. Such temporal properties cannot be changed by other temporal elements. For example, overt aspect markers are disallowed in *Situation* and *Event* complements in general unless restructuring ('aspect lowering') occurs. Even a perfective aspect marker shows up in the complement clause, the future and simultaneity requirement of *Situation* and *Event* complements still maintain.

Future modal *hui* is prohibited in *Situation* and *Event* complements. It is intuitive for the *Event* class since the simultaneity property of *Event* complements excludes *hui*. Interestingly, *Situation* complements express future interpretations of the complement clause. We would expect that the overt future modal *hui* in principle should be the right fit, yet

hui is prohibited in the *Situation* complements.

4.3.2. Subject referential (in)dependence

Other than temporal properties, subject reference, which has a close correlation with the temporal properties of the complement, is also aligned with ICH for the three classes. The *Proposition* complements are temporally independent and impose no subject restrictions. *Situation* complements are somewhat dependent in requiring a future orientation and have some subject restrictions. *Event* complements are fully dependent on the matrix tense and matrix argument.

In *Proposition* complements, an overt proper name or a pronoun is possible, shown in (368) and (369). Pronouns in (369) can co-refer with the matrix argument, but not necessarily. Specifically, the subject in the complement does not need to agree with a matrix argument in person or number, as shown in (370).

- (368) a. Zhangsan shuo [**Lisi** chi-le fan].
Zhangsan say Lisi eat-PFV food
'Zhangsan says that Lisi ate.'
- b. Zhangsan gaosu Lisi [**Wangwu** chi-le fan].
Zhangsan tell Lisi Wangwu eat-PFV food
'Zhangsan told Lisi that Wangwu has eaten.'
- (369) a. Zhangsan_i shuo [**ta_{i/j}** chi le fan].
Zhangsan say he eat PRF food
'Zhangsan_i says that he_{i/j} has eaten.'
- b. Zhangsan_i gaosu Lisi_j [**ta_{i/j/k}** chi le fan].
Zhangsan tell Lisi he eat PRF food
'Zhangsan_i told Lisi_j that he_{i/j/k} has eaten.'

- (370) a. Zhangsan he Lisi shuo [wo hui qu Beijing].
 Zhangsan and Lisi say 1SG FUT go Beijing
 'Zhangsan and Lisi said that I will/would go to Beijing.'
- b. Nimen juede [wo mei-you jinli].
 2PL think 1SG NEG.PFV try-one's-best
 'You think I didn't/have not tried my best.'

Situation and *Event* complements usually do not allow overt subjects. Namely, PRO is the preferred/obligatory form for these two classes. Bound variables in the form of reflexive *ziji*, complex complemented pronoun (*cpro*) or bound pronoun can occur as subjects in some *Situation* complements (Hu et al. 2001, N. Zhang 2016) but not *Event* complements.

4.3.2.1. Pronouns

According to N. Zhang (2016), complex complemented pronouns are pronouns followed by a complement in the form of 'numeral + classifier + noun'. She dubs such a pronoun a *cpro*. A similar case in English is a pronoun taking an NP complement (Postal 1966), e.g. *we honest policemen*. The sentences in (371) are *Situation* complements with a *cpro* or a bound pronoun as subjects. The examples in (371) also indicate that the *Situation* complements allow partial control. However, subjects that do not depend on the matrix argument are ungrammatical (N. Zhang 2016), as shown by the examples in (372).

- (371) a. Baba_i quan Mama_j [jin-wan tamen_{i+j} liang ge ren yiqi kan dianying].
 Dad urge Mon this-evening 3PL two CL person together see
 movie
 'Dad urged Mom to see a movie together this evening.'

(N. Zhang 2016: 288)

- b. Wo_i dasuan [tian hei yihou **women**_{*i+/*j*} yiqi qu].
 1SG plan sky dark after 1PL together go
 'I've made the plan that we go there together after it gets dark.'

(N. Zhang 2016: 289)

- (372) a. * Zhangsan dasuan [**Lisi** qu Beijing].
 Zhangsan plan Lisi go Beijing
 Intended: 'Zhangsan made the plan that Lisi will go to Beijing.'
- b. * Zhangsan quan Lisi [**Wangwu** zaodian lai].
 Zhangsan urge Lisi Wangwu earlier come
 Intended: '*Zhangsan urged Lisi that Wangwu should come earlier.'

One might argue that *cpro*, like the reflexive *ziji* 'self', can be used as either an anaphor or an adverbial (Hole 2008 calls this usage 'adverbial intensifier'), if they precede a verb, illustrated by the example in (373). Therefore, what N. Zhang (2016) claims to be overt subjects in these control constructions are not real subjects but adverbial modifiers. N. Zhang (2016) claims that one way to distinguish the argument use and the adverbial use of a *cpro* or *ziji* is with the help of focus markers *lian...dou* 'even...also'. In (374a), an argument may occur with the focus markers, but an adverbial use of *cpro* or *ziji* may not, as shown in (374b). This test works for the Situation predicate *dasuan* 'plan', as the sentence in (375) allows *lian...dou* and *cpro/ziji*.

- (373) A-Lin {**ta yi ge ren/ziji**} qu-le duchang.
 A-Lin 3SG one CL person/self go-PRF casino
 'A-Lin went to a casino himself.' (N. Zhang 2016: 281)

- (374) a. *Lian Lili dou* qu-le duchang.
 even Lili also go-PRF casino
 'Even Lili went to a casino.'

b. *Lili *lian* {**ta yi ge ren/ziji**} *dou* qu-le duchang.
 Lili even 3SG one CL person/self also go-PRF casino
 (N. Zhang 2016: 281)

(375) Baba he Mama dasuan wanshang *lian* {**tamen liang ge ren/ziji**} *dou* qu
 Dad and Mom plan evening even 3PL two CL person/self also go
 duchang.
 casino
 ‘Dad and Mom made the plan that even they two go to a casino this evening.’

(N. Zhang 2016: 287)

N. Zhang (2016) also provides examples involving overt subjects in the Event class, but we find that those so-called subjects are not subjects but adverbial-intensifiers. For example, N. Zhang (2016) suggests that the *cpro* in the sentence with the predicate *shefa* ‘try’ in (376) is also a subject. However, if we adopt the *lian...dou* test suggested by N. Zhang, we will see that *cpro* is not an argument in the complement clause but is used as an adverbial, demonstrated by the ungrammaticality of (376b).⁷

(376) a. Lili shefa jintian {**ta/*wo/*ni**} **yi ge ren** chi-fan.
 Lili try today 3SG/1SG/2SG one CL person eat-meal
 ‘Lili tried to eat alone today.’ (N. Zhang 2016: 282)

b. *Lili shefa jintian *lian* **ta yi ge ren** *dou* chi-fan.
 Lili try today even 3SG one CL person DOU eat-meal

⁷We find that most cases that can be analyzed as with overt embedded subjects in N. Zhang (2016) given the test of focus marking, are partial control cases. Exhaustive control constructions with the so-called overt embedded subjects in N. Zhang (2016) fail to pass the focus marking test and thus should not be analyzed as with overt controllees but just with adverbial intensifiers that have a pronoun component.

4.3.2.2. *Ziji* 'self'

Ziji 'self' is also argued to be able to serve as an overt subject in Mandarin control constructions (namely the *Situation* and *Event* complements). *Ziji* 'self' has long been recognized for two related meanings: reflexivity and intensification. *Ziji* is an adnominal intensifier in (377a), an attributive intensifier in (377b) and an agentive-adverbial intensifier in (377c), according to Hole (2008).

(377) a. Akiu **ziji** mingtian hui lai huanying women.
Akiu SELF tomorrow will come welcome us
'Akiu himself will come to welcome us tomorrow.'

b. wo you (wo) **ziji**-de yaoshi.
I have I SELF-'s key
'I have a key of my own/my own key.'

c. ni **ziji** xi ni de yifu.
you SELF wash your clothes
'You wash your clothes yourself.'

(Hole 2008)

We suggest that *ziji* can only be used as an overt subject in some *Situation* complements, like *dasuan* 'plan' suggested by N. Zhang (2016) in (378). The *lian...dou* test in (378b) confirms that *ziji* 'self' is used as a subject here. In the *Event* complements, *ziji* 'self' is obligatorily interpreted as an adverbial intensifier, given the fact that *ziji* in the complement of *shefa* 'try' cannot be focused by *lian...dou*, as shown in (379).

(378) a. Baba he Mama dasuan [wanshang **ziji** qu duchang].
Dad and Mom plan evening self go casino
'Dad and Mom made the plan that they go to a casino this evening.'

b. Baba he Mama dasuan [wanshang *lian* **ziji** *dou* qu duchang].
Dad and Mom plan evening even self DOU go casino

'Dad and Mom made the plan that even themselves go to a casino this evening.'

(Adapted from N. Zhang 2016: 387, ex 27)

- (379) a. Zhangsan shefa [**ziji** xi yifu].
Zhangsan try self wash clothes
'Zhangsan tried to wash clothes by himself.'
- b. * Zhangsan shefa *lian ziji dou* xi yifu.
Zhangsan try *lian* self DOU wash clothes

The interpretation of *ziji* depends on the class of complements, which is clearly observed with predicates compatible with more than one type of complements. Among these ambiguous cases are *wangji* 'forget' and *jide* 'remember'. The implicative uses of *wangji* 'forget' and *jide* 'remember' belong to the *Event* class while the factive uses of *wangji* 'forget' and *jide* 'remember' belongs to the *Proposition* class. In English, the *Proposition* complement of *forget* is represented as a finite clause and the *Event* complement is in the form of an infinitive, shown in the examples below. In English, the reflexive *myself* can appear before the verb as a nominal intensifier in a *Proposition* complement in (381a), but can only appear after the verb in an *Event* complement as an adverbial intensifier in (381b).⁸

(380) a. I forgot that I watered the plant.

b. I forgot to water the plant.

(Wurmbrand 2019)

(381) a. I forgot that I myself watered the plant.

b. I forget to water the plant myself.

⁸We thank C.-T. James Huang for pointing out this to us.

Though Mandarin does not have infinitive morphology as English does, the interpretation of *ziji* and presence/absence of aspect markers distinguish an *Event* complement from a *Proposition* complement. Ussery et al. (2016) notice that *ziji* in obligatory control constructions has to be interpreted as the adverbial meaning ‘on one’s own’ in (382a) while for non-control constructions in (382b) (an example of *Proposition* complements), *ziji* can be interpreted as a reflexive co-indexed with the matrix argument *Xiaoming*. In other words, *ziji* ‘self’ in the *Event* complements occupies a non-argument position whose subject is PRO while in *Proposition* complements, *ziji* ‘self’ is a real overt subject. The sentence in (383) is ambiguous because both adverbial reading and reflexive interpretation of *ziji* are available.

- (382) a. Xiaoming xihuan [**ziji** chi shousi].
 Xiaoming like adverb eat sushi.
 ‘Xiaoming likes to eat sushi by himself.’
- b. Xiaoming_i xiangxin [**ziji**_i nenggou dedao zhe fen gongzuo].
 Xiaoming believe reflexive can get this CL job
 ‘Xiaoming believes that he can get this job.’

(Ussery et al. 2016: 3)

- (383) Xiaoming wangji [**ziji** dai shubao le].
 Xiaoming_i forget adverb/reflexive_i bring backpack ASP
 ‘Xiaoming forgot to bring the backpack by himself.’ / ‘Xiaoming forgot that he brought the backpack.’

(Ussery et al. 2016: 3)

Consistent with the aforementioned observations of the three complementation classes, in the factive usage of *wangji* ‘forget’, *ziji* ‘self’ is interpreted as a bound pronoun instead

of an adverbial intensifier. In (384), the overt subject in the *Proposition* complement can be bound by the matrix argument (*ziji* ‘self’ in 384a) or be a free variable (pronoun in 384b) or a proper name (*Wangwu* in 384c). Furthermore, when there is a perfective aspect marker le_1 on the embedded predicate, it shifts the embedded event to the past of the attitude holder’s now in (384), as le_1 works in the *Proposition* class. But in the implicative usage of *wangji* ‘forget’, *ziji* can only be interpreted as an adverbial intensifier rather than a bound pronoun, shown in (385). No actuality-entailment effect is observed for implicative *wangji* ‘forget’ and perfective aspect marker le_1 is not allowed in (385b). A similar pattern can be observed with *jide* ‘remember’ in (386).

- (384) a. Xiaoming_i wangji [**ziji**_i dai(-le) shubao le].
 Xiaoming forget self bring-PFV backpack SFP
 ‘Xiaoming_i forgot that he_i had brought the backpack.’
- b. Xiaoming_i wangji [**ta**_{i/j} dai(-le) shubao le].
 Xiaoming forget 3SG bring-PFV backpack SFP
 ‘Xiaoming_i forgot that he_{i/j} had brought the backpack.’
- c. Xiaoming wangji [**Wangwu** dai(-le) shubao le].
 Xiaoming forget Wangwu bring-PFV backpack SFP
 ‘Xiaoming forgot that Wangwu had brought the backpack.’
- (385) a. Xiaoming_i wangji [PRO_i **ziji** dai shubao] le.
 Xiaoming forget on-one’s-own bring backpack SFP
 ‘Xiaoming has forgotten to bring the backpack on his own.’
- b. Xiaoming_i wangji [PRO_i **ziji** dai-(*le) shubao].
 Xiaoming forget on-one’s-own bring-PFV backpack.
 ‘Intended: Xiaoming forgot to bring his backpack on his own.’
- (386) a. Ni chumen zhiqian, qianwan jide [ziji guan-hao men].
 2SG go-out before have-to remember self close-good door

'You have to remember to close the door by yourself before you go out.'

(*Event* complement)

- b. Wo hen qingchu jide [zuotian chumen shi ziji guan-hao-le
1SG very clear remember yesterday go-out time self close-good-PFV
men].
door

'I remember clearly that I myself closed the door.'

(*Proposition* complement)

To summarize, *Proposition* complements allow overt subjects and the reference of the subject does not depend on the matrix argument. The more preferred form of embedded subjects for the *Situation* class is the null form PRO. But *Situation* complements occasionally allow minimal pronouns such as *cpro*, bound pronouns or *ziji* 'self' to serve as subjects, which of course, need to be bound by the matrix controller. Moreover, *Situation* complements allow a relaxed form of control (partial control). *Event* complements disallow any form of overt subjects and the null subject PRO fully depends on the matrix controller.

4.4. Structural complexities

In this section, we focus on the distribution of modals and sentence-final-particles to reflect the structural complexities of the three classes of complements under discussion. We will show that *Proposition* complements allow both epistemic modals and circumstantial modals as long as the use of the modal is semantically feasible. *Situation* complements and *Event* complements disallow modals that are above TP or need to be licensed by a

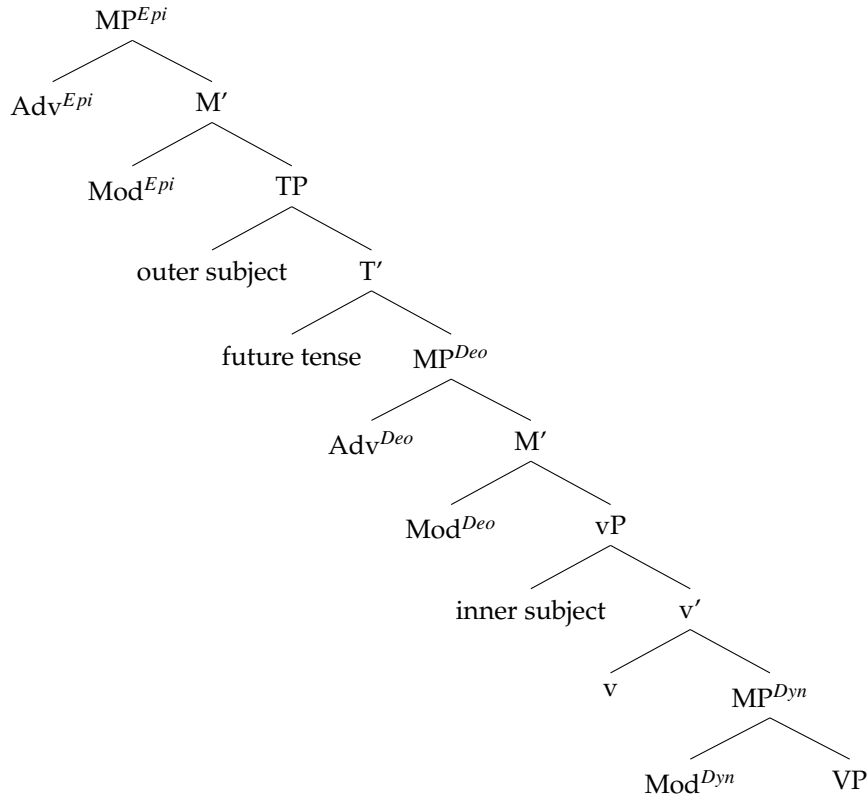
T⁰ with tense (epistemic modals and overt future modals), but allow a limited number of circumstantial modals. *Proposition* complements allow sentence-final-particles that are able to be embedded in the Low C domain: *le₂*, *laizhe* and *eryi*. But the rest two classes do not.

4.4.1. Distribution of modals in complements

4.4.1.1. The syntactic hierarchy of modals in Mandarin main clauses

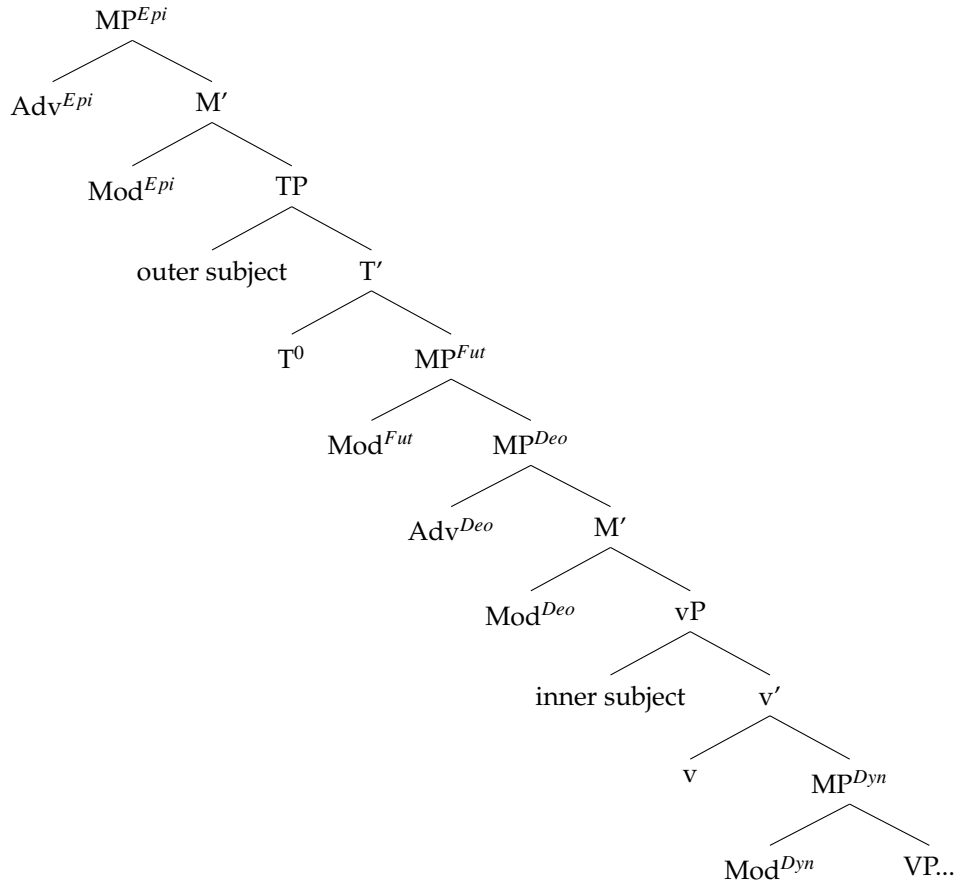
Consistent with the cross-linguistic picture of modality (Jackendoff 1972, Zubizarreta 1982, Iatridou 1990, Brennan 1993, Abusch 1997, Cinque 1999, Butler 2003, Stowell 2004, Hacquard 2006, 2009, Portner 2009 among many others), Mandarin epistemic modals are located in a higher position than circumstantial modals. Guided by a cartographic approach, W.-T. Dylan Tsai (2010: 219) proposes the syntactic hierarchy of modals in Mandarin as in (387). W.-T. Dylan Tsai (2010) suggests that some modalities seem to pattern similar to adverbs while some act like verbs in Mandarin with regard to syntactic diagnostics such as preposing and VP-ellipsis. But no matter which syntactic category we conclude for a specific modal element, the relative hierarchy in the structure aligns with their semantics: epistemic adverbs/modals > deontic adverbs/modals > dynamic adverbs/modals.

(387)



It is not the case that all the slots in the hierarchy have to be filled. In fact, some modals can only occupy certain slots, but modals like *hui* and *yao* can occupy most slots and thus have a relatively full fledge of modal interpretations. Some modals are incompatible with each other due to semantic conflicts. We differ from W.-T. Dylan Tsai (2010) in not to analyze *hui* as a future tense, but to analyze the future element as a modal in nature. Hence the future modal is located in between the epistemic modal and the deontic modal, below TP. Our hierarchy of Mandarin modals will be: epistemic adverbs/modals > future modals > deontic adverbs/modals > dynamic adverbs/modals, illustrated in (388).

(388)



W.-T. Dylan Tsai (2010) adopts the list of modal elements in (389) (with our rough translations, the exact semantics are not relevant now) to demonstrate his arguments. In the data, epistemic elements are specified by the superscript E, deontic elements by the superscript D, future elements by F and ability modals (dynamic) by A. To help facilitate the target interpretation, we add a context for some of the examples in W.-T. Dylan Tsai (2010).

- (389) a. Epistemic adverb: *yiding* 'certainly, definitely', *dagai* 'perhaps'
- b. Deontic adverb: *bixu* 'obligatorily, must'
- c. Deontic modal: *yao* 'have to'
- d. Future modal: *yao, hui*

e. Dynamic modal: *hui* ‘can (ability)’

The examples in (390a) and (391a) indicate that the epistemic modal scopes over the future modal and the infelicity of the sentences in (390b) and (391b) shows that future modal is located in a higher position than deontic modals.

- (390) a. *Context: You are with your friend on the platform of the train station. You know that the train blows the horn 5 minutes before leaving. The train is blowing its horn.*

You tell your friend:

Huochē **yiding**^E (shì) **yao**^F kāi lè, cǎi hui yìzhì míng qìdì.
 train definitely COP *yao* start SFP *cǎi hui* continuously blow air-horn

‘The train is definitely going to leave, that’s why it keeps blowing its horn.’

(Adv_{Epi} > Mod_{Fut})

- b. *Context: The manager of the train is looking at the time schedule of the train and says:*

Huochē **yiding**^D **yao**^F kāi lè, wǒmen de yìzhào shíjiānbǎo
 train obligatorily *yao* start SFP 1PL have-to follow time-schedule
 fache.
 depart

‘Lit: The train has to be going to leave, we have to follow the schedule.’

(*Adv_{Deo} > Mod_{Fut})

- (391) a. Akiu **dagai**^E **hui**^F qù xiānchéng, wǒ bù shì hěn quèdìng.
 Akiu perhaps *hui* go county-town 1SG NEG COP very certain
 ‘Perhaps Akiu will go to the county town, I am not quite sure.’

(Adv_{Epi} > Mod_{Fut})

- b. # Akiu **bixu**^D **hui**^F kāichē, fǒuzé chē mǎi lè yě měi yòng.
 Akiu must *hui* drive otherwise car buy PFV also NEG.PFV use

‘*Akiu must will drive, otherwise it is useless to buy a car.’

(*Adv_{Deo} > Mod_{Fut})

The sentence in (392a) suggests that epistemic elements scope over deontic elements and the sentence in (392b) indicates that deontic elements are higher than dynamic elements.

- (392) a. *Context: You are with your friend on the platform of the train station. You know that the manager of the train used to keep blowing the air-horn to tell the passengers that they must get on the train as soon as possible. The train is blowing its horn. You tell your friend:*

Huochē **yiding**^E (shì) **yao**^D kāi lè, cǎi huì yìzhì míng qìdì.
train definitely COP *yao* start SFP *cǎi huì* continuously blow air-horn

‘The train definitely has to leave, that’s why it keeps blowing its horn.’

(Adv_{Epi} > Mod_{Deo})

- b. Akiu **bixu**^D **hui**^A kāichē, fǒuzé chē mǎi lè yě měi yòng.
Akiu must *hui* drive otherwise car buy PFV also NEG.PFV use
‘Akiu must know how to drive, otherwise it is useless to buy a car.’

(Adv_{Deo} > Mod_{Dyn})

4.4.1.2. Aspect markers and modals

Unlike modals in Romance languages which can be marked by aspect morphology, Mandarin modals cannot be modified by aspect markers. When it comes to aspect marking in the complement of modals, we observe that Mandarin perfective aspect markers are incompatible with the complements of circumstantial modals but are fine with epistemic

modals. Progressive marker *zai* are compatible with complements of epistemic modals, future modals and deontic modals, but not dynamic modals. In (393), both progressive and perfective aspect markers (perfective marker *le*₁ and experiential marker *guo*) in the complement of an epistemic modal are perfectly fine.

- (393) a. Zhangsan **keneng zai** xie lunwen.
 Zhangsan might PROG write paper
 ‘Zhangsan might be writing a paper.’
- b. Zhangsan **keneng xie-le/guo** lunwen.
 Zhangsan might write-PFV/EXP paper
 ‘Zhangsan might have written paper.’

(Mod_{Epi} > Asp)

The sentences in (394)-(395) show that the complements of future modals and deontic modals are compatible with progressive marker but not with perfective aspect markers, unless some other temporal elements such as *yijing* ‘already’ (for the case of future modals), *xian* ‘in advance, before hand’ (for the case of deontic modals) are inserted. It is still unclear to us the deeper motivation of why elements like *yijing*, *xian* that change the temporal relation rescue the bad sentences with future modals and deontic modals taking perfective complements, we have to leave this topic to future research.

- (394) a. Mingtian zaoshang liu-dian, Zhangsan **hui zai** paobu.
 tomorrow morning six-o’clock Zhangsan FUT PROG run
 ‘Zhangsan will be running tomorrow morning at six.’
- b. *Mingtian zaoshang liu-dian, Zhangsan **hui likai-le** Nanjing.
 tomorrow morning six-o’clock Zhangsan FUT leave-PFV Nanjing
- c. Mingtian zaoshang liu-dian, Zhangsan **hui yijing** likai-le Nanjing.
 tomorrow morning six-o’clock Zhangsan FUT already leave-PFV Nanjing

'Zhangsan will have already left Nanjing by six tomorrow.'

(Mod_{fut} > Asp)

- (395) a. Zuotian caipai de shihou, Zhangsan **yao** yizhi **zai** tiaowu.
yesterday rehearse DE time Zhangsan should continuously PROG dance
'Zhangsan had to be dancing all the time yesterday when rehearsing.'
- b. *Zuotian caipai de shihou, Zhangsan **yao** tiao-**le/**guo-wu.
yesterday rehearse DE time Zhangsan should dance-PFV/EXP-dance
- c. Zuotian caipai de shihou, yanyuan **yao** xian
yesterday rehearse DE time actors should in-advance
hua-**le/**guo-zhuang.
do-PFV/EXP-make-up
'Actors had to have worn their make-up in advance in the rehearsal yesterday.'

(Mod_{Deo} > Asp)

Last but not the least, the complements of dynamic modals are incompatible with complements marked with progressive or perfective aspects, shown by the examples below.

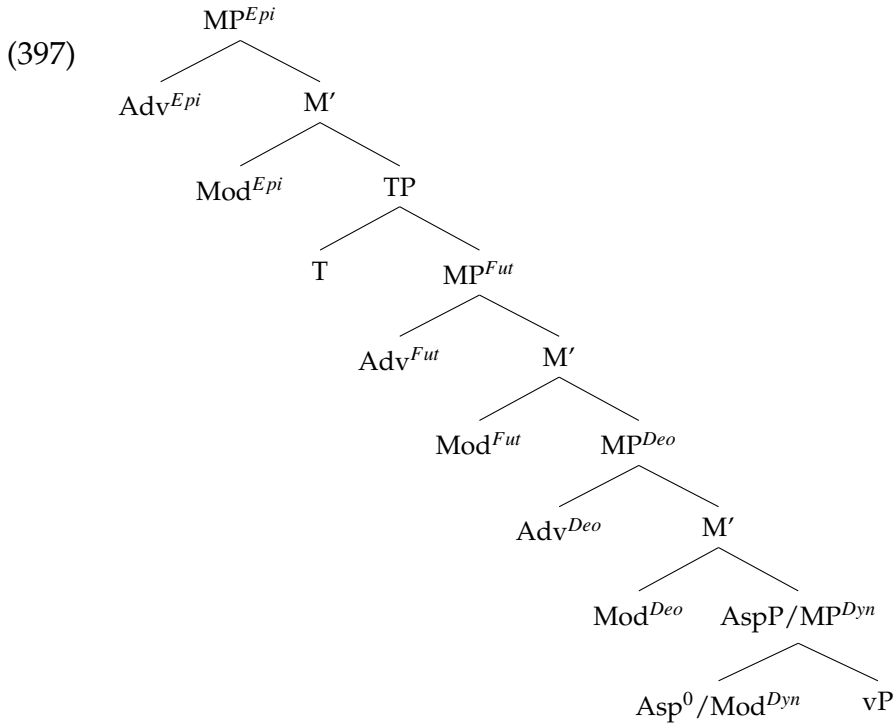
- (396) a. *Zhangsan **hui** **zai** mai zhe ben shu.
Zhangsan be-able-to PROG buy this CL book.
- b. *Zhangsan **hui** mai-**le/**guo zhe ben shu.
Zhangsan be-able-to buy-*le*/EXP this CL book.

(*Mod_{Dyn} > Asp)

The compatibility with aspect markers in the complements of modals suggest that modal phrases are located higher than aspectual phrases. Dynamic modal phrases are not compatible with aspectual phrases. They neither serve as complements of the Asp head nor take complements with aspect projections. Hence we propose that dynamic

modal phrases (Mod_{Dyn}) compete with aspectual phrases for the same position in syntax.

The syntactic hierarchy of TAM domain in Mandarin thus is summarized in (397).



4.4.1.3. Modals in complement clauses

Depending on the type of complement clauses, the compatibility with modals varies.

The *Proposition* class allows the most structural complexity than the others, hence is the most flexible to allow the full fledge of modals. In (398), *Proposition* complements allow the episodic modal *keneng* ‘might’. In (399), the future modal *hui* ‘will/would’, deontic modal *bixu* ‘must’ and dynamic modal *neng* ‘be able to’ are able to occur (not all of them at the same time) in the complement clause.

- (398) a. Zhangsan shuo Lisi **keneng** mai-le jiu.
 Zhangsan say Lisi might buy-PFV alcohol
 ‘Zhangsan said that Lisi might have bought alcohol.’

- b. Zhangsan zhidao Lisi **keneng** mai-le jiu.
 Zhangsan know Lisi might buy-PFV alcohol
 'Zhangsan knows/knew that Lisi might have bought alcohol.'
- (399) a. Zhangsan shuo Lisi **hui/bixu/neng** mai jiu.
 Zhangsan say Lisi FUT/must/be-able-to buy alcohol
 'Zhangsan said that Lisi would/must/was able to buy alcohol.'
- b. Zhangsan zhidao Lisi **hui/bixu/neng** mai jiu.
 Zhangsan know Lisi FUT/must/be-able-to buy alcohol
 'Zhangsan knows that Lisi will/must/is able to buy alcohol./Zhangsan knew
 that Lisi would/must/was able to buy alcohol.'

The distribution of modals is more limited in the *Situation* class and the *Event* class. Researchers have noticed long ago that modals are in general unavailable in these two classes (Huang 1989, Li 1995), demonstrated by the examples in (400) where the future modal *hui* 'will', deontic modals *yinggai* '(deontic) should', *keyi* 'may' and dynamic modal *neng* 'can' are bad in the complements. The examples in (401) further show that epistemic modals *yinggai* '(epistemic) should' and *keneng* 'might' are incompatible with the *Situation* and the *Event* class.

- (400) a. Wo bi Lisi [{***hui**/***neng**/***yinggai**} lai].
 I force Lisi will/can/should come
 'I forced Lisi to come.' (Situation)
- b. Lisi shefa [{***hui**/***neng**/***keyi**} lai].
 Lisi try will/can/may come
 'Lisi tried to come.' (Event)
- (Huang 1989: 189-90)

- (401) a. Wo bi Lisi [{***yinggai**/***keneng**} lai].
 1SG urge Lisi should/might come

'I forced Lisi to come.'

- b. Lisi shefa [{*yinggai/*keneng} lai].
Lisi try should/might come
'Lisi tried to come.'

The exception to the generalization is the modal *yao*. Hu et al. (2001) observe that *yao* can occur in *Situation* complements, shown by the examples in (402). *Event* complements, though much less common than the *Situation* class, also allow *yao* in some cases, as we can see in (403).

- (402) a. Wo zhunbei mingtian [yao canjia yi-ge hui].
I plan tomorrow will attend one-CL meeting
'I plan to attend a meeting tomorrow.'

(Y. Li 1985, cited from Hu et al. 2001:1122)

- b. Wo quan/bi ta [yao lai].
I persuade/force he will come
'I tried to persuade/force him to come.'
- (Hu et al. 2001: 1123)

- (403) a. Zhangsan shefa [yao jinru huichang].
Zhangsan try yao enter venue
'Zhangsan tried to enter the venue.'

- b. *Zhangsan neng [yao shuo riyu].
Zhangsan can yao say Japanese

Grano (2015) suggests that *yao* is the reminiscent of the abstract future morpheme *woll* and it is optionally overt in Mandarin. We disagree with Grano (2015). We argue that *yao* in *Situation* complements or *Event* complements are not *woll* but a deontic modal or a dynamic modal depending on the semantics of the matrix predicate. In complements of bouletic attitude predicates associated with a directive force, *yao* should be analyzed

as a deontic modal while for the complements of those without a directive force, *yao* is a dynamic modal expressing the attitude holder's volition.

In Chapter 3, we suggest that *hui* is the most basic future modal in Mandarin. Though *yao* also have the future usage, it is constrained. For instance, *yao* is odd with negation as a future modal, illustrated by the examples below.

- (404) a. *Mingtian bu hui/*yao xiayu.*
tomorrow NEG *hui/yao* rain.
'Tomorrow it will not rain.'
- b. *Huochē bu hui/*yao zài yī-gè xiǎoshí nēi dàodà Shànghǎi zhàn.*
train NEG *hui/yao* in one-CL hour within arrive Shanghai station
'The train will not arrive the Shanghai station in one hour.'

But when it occurs in *Situation* complements, *yao* can be negated by *bu*, shown in (406a). The complement with *bu-yao* exactly means the negation of the original sentence, which means the meaning of *yao* does not change in these cases and thus cannot be the future modal. Unlike the basic future modal *hui*, *yao* can be used as a deontic modal in imperatives, as the examples in (405) show. We believe that *yao* in (402b) and (406a) is also a deontic modal because the complement also has an imperative flavor, confirmed by the fact that *bu-yao* can be replaced by the pseudo-imperative particle *bie* (Liao and Wang 2019) without changing the meaning of the sentence, shown by the example in (406b). Predicates allowing *yao* in an *Situation* complement are usually object control bouletic predicates that are semantically compatible with a directive force, such as *quan* 'persuade, urge', *bi* 'force', *mingling* 'order', *qing* 'invite, ask somebody to do a favor' etc.

- (405) a. (Ni) *yao zhunshi!*
2SG *yao* be-on-time

'Be on time!'

- b. * **Hui** zhunshi!
hui be-on-time
'Be on time!'

- (406) a. Wo quan/bi ta [bu-yao lai].
1SG persuade/force 3SG NEG-*yao* come
'I tried to persuade/force him not to come.'
- b. Wo quan/bi ta [bie lai].
1SG persuade/force 3SG *bie* come
'I tried to persuade/force him not to come.'

Not all the *yao*s in *Situation* complements are deontic modals. *Yao* in complements of subject control predicates such as *zhunbei* 'prepare, plan' and *xiang* 'want' in (407) is a dynamic modal expressing the volition instead of the directive force of the subject. *Yao* in *Event* complements (once it is grammatical), e.g. the one in (408), shares the same analysis.

- (407) a. Wo zhunbei mingtian [yao canjia yi-ge hui].
1SG plan tomorrow *yao* attend one-CL meeting
'I plan to attend a meeting tomorrow.'
- b. Wo xiang [yao zaodian zou].
1SG want *yao* earlier leave
'I want to leave earlier.'
- (408) Zhangsan shefa [yao jinru huichang].
Zhangsan try *yao* enter venue
'Zhangsan tried to enter the venue.'

The evidence for our proposal again comes from negation. Negation of the deontic *yao* can be exchanged by pseudo-imperative particle *bie*. The sentences in (409) are odd with

bie, indicating that *yao* is not the deontic version. *Bu-yao*, on the contrary, is grammatical (at least significantly better than *bie*, though negation alone without the modal is the most natural option). This can be naturally accounted for if we assume *yao* is the dynamic version, which cannot be replaced by *bie* (Liao and Wang 2019), as the examples in (410) indicate.

- (409) a. Wo zhunbei [??**bie/bu-yao/bu** canjia zhe-ge hui].
 1SG prepare *bie*/NEG-MOD/NEG attend this-CL meeting
 'I prepare to not attend this meeting.'
- b. Zhangsan shefa [***bie/bu-yao/bu** jian Lisi].
 Zhangsan try *bie*/NEG-MOD/NEG see Lisi
 'Zhangsan tried to not meet with Lisi.'
- (410) a. Wo **bu-yao** chi liulian.
 1SG NEG-MOD eat durian
 'I am not willing to eat durian.'
- b. *Wo **bie** chi liulian.
 1SG BIE eat durian

We have to admit that in some cases, *bie* can also occur in complements of predicates without an imperative flavor, like sentences in (411) below. The matrix predicates seem to have a slightly different reading of 'consider the plan, make the plan' for *dasuan* and 'try to achieve the goal of' for *shefa*. The complements express the content of the plan or the goal. We suggest that these are examples of coercion where the *Situation* complement or the *Event* complement is coerced to a *Proposition* complement denoting a propositional reading.

- (411) a. Zhangsan dasuan *bie/bu-yao* tai zao dao.
 Zhangsan plan *bie*/NEG-MOD too early arrive

'Zhangsan planned not to arrive too early.'

- b. Zhangsan shefa bie/bu-yao tai zao dao.
Zhangsan try bie/NEG-MOD too early arrive
'Zhangsan tried not to arrive too early.'

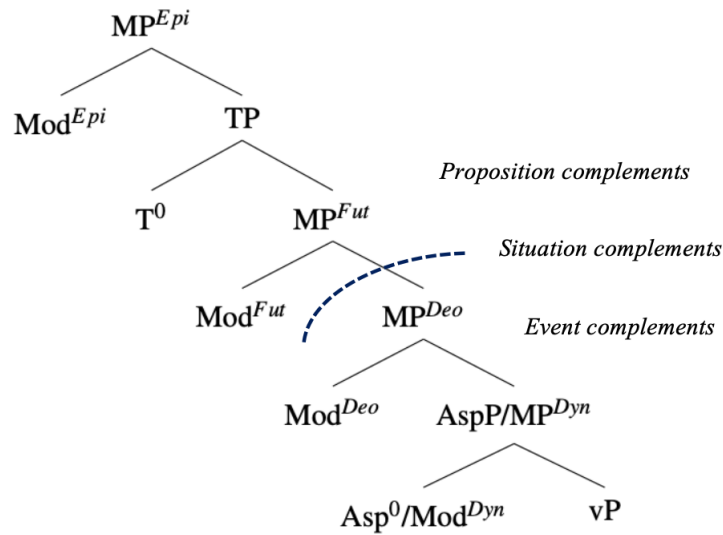
In summary, *yao* in *Situation* complements and *Event* complements is not a future modal *woll*. It is either a deontic modal or a dynamic modal. Given the syntactic hierarchy of modals in (388) (simplified and repeated in (412)), the distribution of modals among complements draws a line between *Proposition* complements and the rest two classes. *Proposition* complements allow all the modals on the hierarchy, especially the future modal *hui* licensed by T (see details in Section 6) and epistemic modals above T. In Section 6, we will argue that *Situation* complements also bear a covert future modal *woll*. But without tense, this future modal has to be covert. The *Situation* complements and *Event* complements are compatible with deontic or dynamic modal *yao*, which is below future modals.⁹ Namely, *Situation* complements and *Event* complements allow modals below T.

⁹In general, it is difficult to have modals in *Event* complements. Other than *shefa* 'try', *bimian* 'avoid' also allows *yao* in its complements, which seems to be a deontic modal rather than a dynamic modal. Negation is odd in the complement of *bimian* 'avoid', which we do not know the reason yet.

- (1) a. Lisi mei lai shi wei le bimian [**yao** he jiu].
Lisi NEG.PFV come COP because-of PFV avoid *yao* drink alcohol.
'Lisi didn't come to avoid to (be asked to) drink alcohol.'
b. ?? Lisi mei lai shi wei le bimian [**bu-yao** he jiu].
Lisi NEG.PFV come COP because-of PFV avoid NEG-*yao* drink alcohol.

The *Event* class of complements are categorized based on the temporal properties, but this class is the most diverse among the types of predicates. It will be difficult to have a generalization on the modals that are available in *Event* complements since different matrix predicates will also impose their semantic constraints. Therefore, we do not step further to make a generalization about the distinction between the *Event* complements and *Situation* complements with regard to the distribution of modals. But one thing is certain: it is easier to have *yao* in *Situation* complements than the *Event* complements.

(412)



4.4.2. Sentence-final particles in complements

Mandarin sentence-final particles (SFPs) are often considered to be operators in C domain or functional phrases beyond CP (S.-W. Tang 2010, Paul 2014, Pan 2015, T.- H. Jonah Lin 2015, Paul and Pan 2017 among others). Paul and Pan (2017) suggest that SFPs project in three layers in CP: the innermost Low CP right on top of TP (which Paul and Pan terms it as ‘Low C domain’), the second-highest ForceP and the topmost speaker/hearer-related PropositionP. Most Mandarin SFPs are prohibited in embedded, non-root contexts. Only SFPs in the Low C domain are acceptable in embedded contexts. According to Paul and Pan (2017), three SFPs are able to be embedded and project in the Low C domain: *le₂*, *laizhe* and *eryi* ‘only’. Paul (2018) suggests that an overt Low C realized by SFPs is not obligatory in Mandarin, since there are many cases where a sentence is well formed without any SFPs.

A few comments are necessary for the syntactic derivations of SFPs. As Tang (2015)

summarizes, there are two ways to derive the sentence-final word order of the these particles in Mandarin. One way is to claim that the phrase containing the SFP is head final and its complement is based generated as a left-branched complement, as sketched in (413a). A theoretical problem with this approach is the inconsistency in setting the head parameter in Mandarin, given that Mandarin is head initial in the clausal domain (C.-T. James Huang 1982). The other way is to claim that the SFP is head initial and the clause in the complement undergoes movement to the specifier of the phrase, deriving the apparently sentence final order, as shown in (413b). The problem for this approach is the puzzling motivation of such an obligatory movement.

- (413) a. [_{XP} clause [_X particle]]
 b. [_{XP} clause_i [_X particle] t_i]]

Eryi, *le₂* and *laizhe* are predicative SFPs (S.-W. Tang 2015) which diachronically originate from a verb (*yi* in *eryi* means ‘stop’ in archaic Chinese, *le₂* originates from the verb *liao* ‘finish, complete, end’ and *lai* in *laizhe* originates from the the intransitive verb *lai* ‘come’). We follow the insights of S.- W. Tang (2016) that these SFPs are originally a predicate that comments on the preceding clausal subject and later got grammaticalized. Therefore, we assume that they are based-generated in a sentence-final position with the complement on its left, following the analysis in (413a).

Le₂ and *laizhe* in the Low C domain are sensitive to the temporal properties of their complements and thus are claimed to be tense or aspect related. The exact semantic contributions of these two SFPs go beyond our current goal (Xiong 2003, Shen 2004, Q. Chen 2005, 2006 among others). We simply follow the observations of Zhu (1982) for *laizhe* and

a more general characterization of *le*₂ by Li and Thompson (1981). Namely, *laizhe* indicates that the event has occurred in the past (in most cases it is the ‘recent past’, but not necessarily). In (414a), the use of *laizhe* indicates that the interrogation occurred before the time of ‘telling’. *Le*₂ indicates that we are talking about a ‘currently relevant state’, which can be roughly translated into English in perfect forms or ‘it turns out to be the case that...’. *Le*₂ often carries the inchoative reading of ‘a change of state’, i.e. the situation at hand is (conceived of as) new (Zhu 1982). For example, the sentence in (414b) with *le*₂ says that the current relevant state is the result state of a past event of Zhangsan’s eating, similar to the reading of ‘Zhangsan has eaten’ in English.

- (414) a. Yangma gaosu Jinzhi, Laoyezi shen Jinxiu laizhe.
 Yangma told Jinzhi, old-man interrogate Jinxiu SFP
 ‘Yangma told Jinzhi, that the old gentleman interrogated Jinxiu.’

(Q. Chen 2003: 313)

- b. Zhangsan chi-le fan le.
 Zhangsan eat-PFV meal SFP
 ‘(It turns out to be the case that) Zhangsan has eaten.’

T.-H. Jonah Lin (2011, 2015), N. Zhang (2019) among others observe that some constructions (often considered to be finite contexts) allow SFPs in the domain of Low C while some environments (often considered to be non-finite contexts and control constructions) do not.¹⁰ For instance, *laizhe* and *le*₂ are possible in the complement clause

¹⁰The two SFPs are glossed differently among the authors cited here. Pan (2015) glosses *laizhe* as ‘recent past’, *le*₂ as ‘inchoative’, T.- H. Jonah Lin (2011) glosses *le*₂ as sentence-final perfect particle, N. Zhang (2019) glosses *le*₂ and *laizhe* as sentence-final aspectual particles. To focus on the key pattern, we uniformly gloss them as SFP. The rest of the examples maintain the original glossing and translations from the cited literature.

of *kanjian* ‘see’ and *quexin* ‘be certain’, as shown in (415). These contexts are Proposition contexts.

- (415) a. Wo kanjian [Zhangsan gangcai zai zher **laizhe**].
 I see Zhangsan just-now at here SFP
 ‘I saw that Zhangsan was here just now.’
- b. Wo quexin [ta yijing qu-guo tushuguan **le**].
 I to.be.certain he already go-EXP library SFP
 ‘I am sure that he has already been to the library.’

(Pan 2015: 833)

T.-H. Jonah Lin (2011, 2015) and N. Zhang (2019) claim that control constructions (root modals and control verbs in T.-H. Jonah Lin 2011 and N. Zhang 2019) disallow *le₂* and *laizhe*. The following examples use *le₂* as illustrations, but N. Zhang (2019) claims that the observation holds for *laizhe*. The scope relation is determined by the possible readings. The ‘inchoative’ reading associated with *le₂* in (416) is possible when *le₂* takes the widest scope over the whole sentence (SFP > Modal), meaning ‘It turns out to be the case that Zhangsan is able to go to Taipei’. However, the reverse scope is impossible.

- (416) a. Zhangsan [[neng qu Taipei] **le**].
 Zhangsan be-able-to go Taipei SFP
 ‘It has become the case that Zhangsan is able to go to Taipei.’

(*le* > *neng*)

- b. * Zhangsan neng [qu Taipei **le**].
 Zhangsan be-able-to go Taipei SFP
 Intended: ‘Zhangsan is able to have gone to Taipei.’

(**neng* > *le*)

(Lin 2011: 53)

N. Zhang (2019) argues that sentences with predicates from the *Proposition* class such as *tingshuo* ‘hear’ is fine with le_2 in the complement while an *Event* complement with *shitu* ‘try’ in the matrix is bad with le_2 . The similar pattern is observed in the *Situation* complement in (417c).¹¹

- (417) a. Wo mei tingshuo [Ajie ding-hao piao le].
 I not hear Ajie order-ready ticket SFP
 ‘I did not hear that Ajie had finished ordering of the ticket.’
- b. *Ajie mei shitu [mingtian-zhongwu (jiu) ding-hao piao le].
 Ajie not try tomorrow-noon then order-ready ticket SFP
 (N. Zhang 2019: 976)
- c. *Zhangsan mei dasuan [qu Taipei le].
 Zhangsan NEG.PFV plan go Taipei SFP

Both le_2 and *laizhe* are sensitive to temporal-aspectual properties of their complements and they semantically encode some sort of temporal-aspectual information. Hence the incompatibility with le_2 and *laizhe* in *Situation* complements and *Event* complements is due to semantics conflicts. For instance, *Situation* complements often denote future irrealis interpretations and *Event* complements require temporal simultaneity between the matrix

¹¹We agree with N. Zhang’s observation that the *Event* complement in (417b) with le_2 is bad. However, in contrast to N. Zhang’s judgement, when le_2 scopes over the whole matrix clause in (1a) and (1c), we find (1a) is fine to have a reading of ‘It has turned out to be the case that I no longer heard about that thing’ while (1b) is able to obtain a reading of ‘It has turned out to be the case that Ajie no longer tried to finish ordering the ticket by tomorrow noon’. In N. Zhang (2019), she claims that both sentences in (1) are ungrammatical.

- (1) a. Wo mei tingshuo na jian shi le.
 I not hear that CL thing SFP
 ‘It has turned out to be the case that I no longer heard about that thing.’
- b. Ajie mei shitu [mingtian-zhongwu (jiu) ding-hao piao] le.
 Ajie not try tomorrow-noon then order-ready ticket SFP
 ‘It has turned out to be the case that Ajie no longer tried to finish ordering the ticket by tomorrow noon.’
- (N. Zhang 2019: 976, the glosses are from N. Zhang and the translations are ours.)

and the complement, which is incompatible with the past reading encoded by *laizhe*.

Now let's turn to another SFP in the Low C domain: *eryi* 'only'. Even though Paul and Pan (2017) claim that *eryi* 'only' and *le₂*, *laizhe* all belong to the same broad layer of CP, they claim that *le₂* and *laizhe* compete for the same syntactic position while *eryi* project higher. In (418a), *le₂* and *laizhe* cannot cooccur, indicating that there are semantic conflicts between them or they are competing for the same syntactic position.

- (418) a. *Wo chi wanfan le laizhe /laizhe le.
 I eat dinner SFP SFP SFP SFP
 Lit. 'I had my dinner just now.'

(Pan 2015: 832)

- b. [_{OnlyP} [_{S.AspP} [_{TP} Ta bu qu Bali] [_{S.Asp⁰} le]] [_{Only⁰} eryi]]...
 she Neg go Paris SFP ONLY

'She only does not go to Paris anymore, (but she will still visit France.)'

(Pan 2015: 835)

- c. [_{OnlyP} [_{S.AspP} [_{TP} Tamen gangcai zhibuguo chao jia] [_{S.Asp⁰} laizhe]]
 they just.now no.more.than quarrel row SFP
 [_{Only⁰} eryi]]...
 ONLY

'They were only quarrelling just now, (not fighting.)'

(Pan 2015: 836)

In (418b-c), *eryi* is able to cooccur with and follow *le₂/laizhe* linearly. In (419), switching the order between *eryi* and *le₂/laizhe* is ungrammatical, indicating that *eryi* is projected higher than the other two SFPs, as summarized in (420).

- (419) a. *Ta bu qu Bali eryi le.
 she Neg go Paris ONLY SFP

(Intended meaning ‘She only does not go to Parish anymore, (but she will still visit France.)’)

- b. *Tamen gangcai zhi-buguo chao jia eryi laizhe.
they just.now no-more-than quarrel row ONLY SFP

(Intended meaning ‘They were only quarrelling just now, (not fighting.)’)

(420) *eryi* > *le₂/laizhe* > TP

Eryi can scope over the matrix clause, as we can see in (421a-423a). In (421b-c), (422b-c), (423b-c), each complement consists of two coordinated sentences to help facilitate the reading in which *eryi* is within the complement. However, *eryi* is able to occur in *Proposition* complements but is infelicitous in *Situation* complements and *Event* complements, as shown in (421b-423b).¹²

- (421) a. Zhangsan shuo/renwei [Lisi na-le shu] **eryi**, bing meiyou
Zhangsan say/think Lisi take-PFV book ONLY BING NEG.PFV
xuan-chuan Lisi na-le shu.
advertise Lisi take-PFV book
‘Zhangsan only said/thought that Lisi took the book, yet Zhangsan didn’t
advertise that Lisi took the book.’
- b. Zhangsan shuo/renwei [Lisi na-le shu **eryi**, bing meigyou zuo qita
Zhangsan say/think Lisi take-PFV book ONLY BING NEG.PFV do other
de shi].
DE matter
‘Zhangsan said/thought that Lisi only took the book, yet Lisi didn’t do any
other things.’

¹²*Eryi* being focus sensitive to elements in *Situation* complements and *Event* complements does not prove that *eryi* is located in the complement clause. According to the alternative semantic analysis for focus by Rooth (1985, 1992), the focus element takes a discourse-variable that introduces the the set of focus alternatives determined by the context.

- (422) a. Zhangsan dasuan [jian Lisi] **eryi**, (bing meiyou fuzhuxingdong).
 Zhangsan plan meet Lisi ONLY BING NEG.PFV take-real-action
 ‘Zhangsan only planned to meet Lisi, yet didn’t take real action.’
- b. ?? Zhangsan dasuan [jian Lisi **eryi**, er bu daying ta renhe yaoqiu].
 Zhangsan plan meet Lisi ONLY yet NEG promise 3SG any request
 ‘Zhangsan planned to only meet Lisi and yet not to promise anything to him.’
- (423) a. Zhangsan shefa [jian Lisi] **eryi**, bing meiyou zuo qita de shi.
 Zhangsan try meet Lisi ONLY BING NEG.PFV do other DE thing
 ‘Zhangsan only tried to meet Lisi, yet he didn’t do any other things.’
- b. ?? Zhangsan shefa [jian Lisi **eryi**, er bu cong ta nali dedao renhe dongxi].
 Zhangsan try meet Lisi ONLY yet NEG from 3SG there obtain any thing
 ‘Zhangsan tried to only meet Lisi, yet not to gain anything from Lisi.’

Based on the previous discussion, we conclude that SFPs in the Low CP domain are compatible with *Proposition* complements but are prohibited in *Situation* and *Event* complements.

4.5. Clausal transparency: restructuring

4.5.1. Three restructuring phenomena

There are three sets of robust restructuring phenomena in Mandarin complement clauses: aspect lowering, inner topicalization, focus fronting (C.-T. James Huang 1989, 2017; Y.-H. Audrey Li 1990, Shyu 1995, Ernst and Wang 1995, Grano 2012, 2015; T.-H. Jonah Lin 2015, Paul 2002, 2005, 2015; N. Huang 2018), which indicates the transparency of the

complement clauses. These restructuring phenomena are observed among *Situation* complements and *Event* complements, but not *Proposition* complements. Restructuring phenomena show that *Situation* complements and *Event* complements are more transparent than *Proposition* complements.

Inner topicalization (also object preposing/fronting) (Ernst and Wang 1995, Shyu 1995, Paul 2002, 2005, 2015; T.-H. Jonah Lin 2015 among others) refers to the preposing of the object to a position following the matrix subject and the matrix predicate, which introduces some kind of contrast. The inner topic is different from regular topics because rather than occurring in a position before the subject, it follows the subject. Inner topicalization is clause bounded. In (424), the preposing object needs to be within the same clause as the embedded predicate. However, in (425) with predicates taking a *Situation* complement (425b) and an *Event* complement (425a), inner topicalization is available, indicating that there is no clause boundary between the matrix predicate and the embedded predicate for this syntactic operation.

(424) a. Wo xiangxin [Lisi [**zhe-pian baogao**₁] xie-wan-le t₁].
 I believe Lisi this-CL report write-finish-PFV
 'I believe that Lisi has already written this report.'

b. * Wo [**zhe-pian baogao**₁] xiangxin [Lisi xie-wan-le t₁].

(N. Huang 2018: 351)

(425) a. Wo [**zhe-pian baogao**₁] hui shefa [jinkuai xie-wan t₁]
 I this-CL report will try as soon as possible write-finish
 'I will try to finish this report as soon as possible.'

b. Lisi [**jinzhan baogao**₁] dasuan [zai zhe zhou nei tijiao t₁]
 Lisi progress report plan at this week in submit

'Lisi plans to submit the progress report this week.'

(N. Huang 2018: 351)

Focus fronting also applies for *Situation* complements and *Event* complements, but is blocked in *Proposition* complements. In (426) and (427), the *wh*-phrase with a universal interpretation and a focus element in a *lian...dou* phrase with an 'even...' interpretation have to be within the embedded clause. In the *Situation* complements and *Event* complements in (428), focus fronting is possible out of the embedded clause.

(426) a. Lisi xiangxin [Zhangsan [**shenme shi**]₁ dou ziji chuli t₁].
Lisi believe Zhangsan what matter all self handle
'Lisi believes that Zhangsan handles everything himself.'

b. *Lisi [**shenme shi**]₁ dou xiangxin [Zhangsan ziji chuli t₁].

(N. Huang 2018: 352)

(427) a. Lisi xiangxin [Zhangsan [**lian zhe zhong xiao shi**]₁ **dou** ziji chuli t₁].
Lisi believe Zhangsan even this type small matter all self handle
'Lisi believes that Zhangsan handles even trivial matters like these himself.'

b. *Lisi [**lian zhe zhong xiao shi**]₁ **dou** xiangxin Zhangsan [ziji chuli t₁].

(N. Huang 2018: 352)

(428) a. Lisi [**shenme shi**]₁ dou {shefa/ dasuan} [ziji chuli t₁].
Lisi what matter all try plan self handle
'Lisi tries/plans to handle everything himself.'

b. Lisi [**lian zhe zhong xiao shi**]₁ **dou** {shefa/ dasuan} [ziji chuli t₁].
Lisi even this type small matter all try plan self handle
'Lisi tries/plans to handle even trivial matters like these himself.'

(N. Huang 2018: 352)

The last restructuring phenomenon in Mandarin is ‘aspect lowering’, as we mentioned in Chapter 1. Some *Situation* and *Event* complements allow ‘aspect lowering’ (C.-T. James Huang 1989, Y.-H. Audrey Li 1990, Hu et al. 2001, Grano 2012, 2015, N. Huang 2018). In Section 3, we talked about the temporal property with this type of constructions, now we continues to talk about the world argument associated with the embedded complement. When ‘aspect lowering’ occurs, the often observed ‘future irrealis’ interpretation of a *Situation* complement is no longer ‘future-irrealis’. The embedded event becomes factive. The world argument associated with the complement closely relates to such an actuality entailment effect (Hu et al. 2001, Grano 2015).

In general, the event in the complement of an epistemic modal or a *Proposition* predicate is in the possible worlds accessible from the actual world, hence does not need to occur in the actual world. The denotations in (429) are two toy semantics of the *Proposition* predicate *believe* and the epistemic modal *must*. (429a) says that *believe* takes a proposition *p*, an entity argument *x* and a world argument (by default this world argument will be saturated by the actual world), returns true if for all the doxastic worlds accessible from the actual world and are compatible with *x*’s belief, the proposition holds in those doxastic worlds. Similarly, the epistemic modal *must* requires that based on the knowledge of the speaker (an epistemic modal base *MB*), in the accessible worlds ranked as the best according to the ordering source provided by the context, the proposition holds in those best worlds. The actual world is not necessarily among these accessible worlds, hence in (430), the embedded event occurs in the doxastic worlds in (430a) and the worlds compatible with what Zhangsan’s said in (430b). The actual world where the matrix event

holds is possible to be out of those worlds.

(429) a. $[[\text{believe}]] = \lambda p_{\langle s,t \rangle} \lambda x \lambda w [\forall w' \in \text{DOX}(x, w) \rightarrow p(w')]$

b. $[[\text{must}]] = \lambda p_{\langle s,t \rangle} \lambda w [\forall w' \in \text{BEST}(\text{MB}, w) \rightarrow p(w')]$

(430) a. Zhangsan xiangxin [Lisi jian-le Wangwu], er shishi shang Lisi shui ye
Zhangsan believe Lisi meet-CL Wangwu but fact on Lisi who YE
mei jian.

NEG.PFV meet

'Zhangsan believes that Lisi met Wangwu, but in fact Lisi did not meet any-one.'

b. Zhangsan shuo [Lisi jian-le Wangwu], er shishi shang Lisi shui ye
Zhangsan say Lisi meet-CL Wangwu but fact on Lisi who YE
mei jian.

NEG.PFV meet

'Zhangsan said that Lisi met Wangwu, but in fact Lisi did not meet anyone.'

But in the actuality entailment situation, the complement event 'actually happened', indicating that the world argument associated with the complement is identical to the one associated with the matrix clause. Therefore, one cannot negate the occurrence of the complement event, as the examples in (431) demonstrate.

(431) a. Zhangsan bi Lisi [zuo-le yujia], #keshi Lisi meiyou zuo.

Zhangsan force Lisi do-PFV yoga but Lisi NEG.PFV do

'Zhangsan forced Lisi to do yoga, # but Lisi didn't do it.'

b. Zhangsan qing Lisi [zuo-guo baogao], #Lisi meiyou lai.

Zhangsan invite Lisi do-EXP report Lisi NEG.PFV come

'Zhangsan invited Lisi to give a talk, # Lisi didn't come.'

c. Lisi shefa [xiuli-guo zhe-tai jiqi], #buguo zhe-tai jiqi meiyou
Lisi try repair-EXP this-CL machine, but this-CL machine NEG.PFV
na qu xiu.

bring go repair

'Lisi had previously tried to repair this machine, but this machine was not brought to be fixed.'

Grano (2012, 2015) is the first one to link the Mandarin aspect lowering phenomenon with 'actuality entailment' observed among circumstantial modals or restructuring predicates with perfective morphology in Romance languages (Hacquard 2006, 2008, 2009). In the Italian examples in (432), the complement event of the modal and *volere* 'want' indefeasibly took place in the actual world.

- (432) a. Gianni **ha potuto** parlare a Maria, #ma non lo ha fatto.
Gianni can-pst-pfv talk to Maria but not it do-pst-pfv
'Gianni was able to talk to Maria, #but he didn't do it.'
- b. Gianni **ha voluto** parlare a Maria, #ma non lo ha fatto.
Gianni want-pst-pfv talk to Maria but not it do-pst-pfv
'Gianni wanted to talk to Maria, #but he didn't do it.'

(Italian, Hacquard 2008: 2)

Though both phenomena involve actuality entailment, the Mandarin-type actuality entailment is different from the Romance-type. In Romance languages, the past-perfective can inflect on modals. According to Hacquard (2006, 2009), the perfective aspect scopes over the modal or the restructuring predicate. However, in Mandarin, perfective aspect is inflected on verbs or on stative predicates (only in some constructions such as with a durative complement), Mandarin modals cannot be marked by aspect markers. Moreover, actuality entailment does not occur when the perfective aspect appears on the matrix predicate but occurs when the perfective aspect is marked on the embedded predicate. In Hacquard (2009), the event in the actual world is achieved by a principle of Preservation

of Event Description (PED) in (433). Presumably, PED might be effective in Mandarin actuality entailment.

- (433) Preservation of Event Description (PED): for all worlds w_1, w_2 , if e_1 occurs in w_1 and in w_2 , and e_1 is a P-event in w_1 , then ceteris paribus, e_1 is a P-event in w_2 as well.

(Hacquard 2009: 298)

We are unable to provide a detail analysis to the actuality effect of ‘aspect lowering’ constructions at this stage. Mandarin actuality entailment is not merely a syntactic problem or merely a semantic problem. It is a mix of both. To understand this phenomenon, we need to first have a general analysis for the semantic composition of complement clauses and a syntactic analysis about the structure of ‘aspect lowering’. The focus of a syntactic account will center around whether there is a local aspect projection in the complement (C.-T. James Huang 1989, 2017; Y.-H. Audrey Li 1990, Hu et al. 2001, Grano 2012, 2015, Grano and Zhang 2018 among others). Then we also need a semantic story for the experiential marker *guo* and the matrix predicates that allow such constructions. None of these problems is easy to handle, hence we have to leave it for future research. Still, we would like to have a clear description and generalization about this phenomenon, which the next section turns to.

4.5.2. Properties of aspect lowering

This section is devoted to a detailed investigation about the properties associated with aspect lowering. We show that between the two perfective marker *le*₁ and *guo*, some pred-

icates are compatible with both in aspect lowering while others only allow one (usually *guo* is better than *le*). Speaker variations in acceptability of aspect lowering and actuality entailment are observed (Y.-H. Audrey Li 1990, Grano and Zhang 2018). We also try to answer the following questions related to the aspect lowering phenomenon: a. Does aspect lowering lead to actuality entailment regardless? b. What actually occurs when actuality entailment happens? Moreover, we point out that the actuality entailment effect in complementation is also observed in serial verb constructions and suggest the two related phenomena should be investigated under the same umbrella.

4.5.2.1. Factors influencing acceptability and speaker variations

Though both *le*₁ and *guo* have a perfective semantics (J.-W. Lin 2003, 2006), their compatibility with aspect lowering depends on the matrix predicate, which is idiosyncratic. For example, *qing* ‘invite’ and *bi* ‘force’ are compatible with either *le*₁ or *guo* (434), but *tongzhi* ‘inform’ and *jiao* ‘teach’ are better with one than the other, as shown in (435). Moreover, the embedded predicate also plays a role in the acceptability of aspect lowering. For instance, if the embedded predicate is a resultative compound, perfective *le*₁ is more acceptable than experiential marker *guo*, as illustrated in (436).

- (434) a. Zhangsan qing Lisi [zuo-**guo/le** jiangzuo].
 Zhangsan invite Lisi do-EXP/PFV lecture
 ‘Zhangsan had invited Lisi to give a talk.’
- b. Xiaodi bi Akiu [he-**guo/le** jiu].
 Xiaodi force Akiu drink-EXP/PFV alcohol
 ‘Xiaodi forced Akiu to drink.’

- (435) a. Jingcha tongzhi jiashu [renling-**le/?guo** sizhe de yiwu].
 police inform family-members claim-PFV/EXP the-dead DE relict
 'The police informed the family to claim the relicts of the victim.'
- b. Dajie jiao Xiaoming [tan-**?le/guo** gangqin].
 elder-sister teach Xiaoming play-PFV/EXP piano
 'The elder sister taught Xiaoming to play piano.'
- (436) Lisi shefa dang-shang-**?guo/le** shizhang.
 Lisi try become-upEXP/PFV mayor
 'Lisi tried to become the Mayor (and he did succeed).'

Other than the matrix predicate, embedded predicate and aspect markers, other elements in the context also affect our acceptance of aspect lowering. For instance, *dasuan* 'plan' allows aspect lowering of *guo* when it is negated by *mei*. However, the affirmative case in (437b) is degraded compared to its negative counterpart. Even the utterance of B in (437c) with a frequency complement *hao ji ci* 'several times' is claimed to be acceptable by C.-T. James Huang (2017), we find the sentence degraded compared to the negation form and other aspect lowering cases such as the ones in (434).

- (437) a. Lisi mei dasuan/zhunbei [xie-**guo** zhe-yang de shu].
 Lisi NEG.PFV plan/get ready write-EXP this-kind MOD book
 'Lisi has never planned/gotten ready to write this kind of book. ' / (Not '#
 Lisi did not plan/get ready to have written this kind of book.')

(N. Huang 2018: 351)

- b. ?? Lisi dasuan/zhunbei [xie-**guo** zhe-yang de shu].
 Lisi plan/get ready write-EXP this-kind DE book
- c. A:

Zhangsan conglai mei dasuan [qu-**guo** riben].
 Zhangsan have-ever NEG.PFV plan go-EXP Japan

'Zhangsan has never planned to go to Japan.'

B:

You a. Ta dasuan [qu-**guo**] hao ji ci, keshi conglai dou
have SFP 3SG plan go-EXP good several times but have-ever DOU
mei qu cheng.
NEG.PFV go succeed

'He has planned so. He has planned several times but never succeeded.'

(C.-T. James Huang 2017)

Speaker variations in the acceptability of aspect lowering and actuality entailment are shown in the literature. For example, our consultants have different judgements for the following sentences in (438) from Y.-H. Audrey Li (1990). According to Y.-H. Audrey Li (1990), (438a) and (438c) does not trigger actuality entailment effect, different from our intuitions and those reported in the literature (Hu et al. 2001). Moreover, we find aspect-lowering of *guo* in (438b) odd with the matrix predicate *quan* 'persuade, urge', which Y.-H. Audrey Li (1990) reports to be grammatical. According to a sentence acceptability experiment by Grano and Zhang (2018), among the 36 native Mandarin speakers (age 18-24, 12 female and 12 male) recruited from Chongqing Medical University using a 1-5 scale (from least acceptable to most acceptable), *quan* with an embedded *guo* is only moderately acceptable (mean = 3.29). Moreover, according to Grano and Zhang (2018), not only embedded *guo* is marginal with *quan*, but also no actuality effect is detected.

- (438) a. Wo qing ta [PRO chi-**guo** fan], keshi ta bu yuanyi lai.
1SG invite 3SG eat-EXP food but 3SG NEG willing come
'I have invited him to eat but he was not willing to come.'

(Y.-H. Audrey Li 1990: 38)

- b. Wo quan ta [PRO jie-**guo** yan], keshi ta bu ken jie.
 1SG persuade 3SG quit-EXP cigarette but 3SG NEG will quit
 'I persuade him to quit smoking but he will not stop.'

(Y.-H. Audrey Li 1990: 19)

- c. Wo bi ta [PRO chi-**guo** yao], keshi ta bu ken chi.
 1SG force 3SG eat-EXP medicine but 3SG NEG will eat
 'I forced him to take his medicine but he will not.'

(Y.-H. Audrey Li 1990:19)

4.5.2.2. Dissolution of some so-called aspect lowering cases

Y.-H. Audrey Li (1990), C.-T. James Huang (2017) claim that actuality entailment does not always occur in aspect lowering. For instance, the sentences in (439) do not require the embedded event to actually occur in the actual world. Following Hu (2017), we suggest that though (439a) superficially looks like aspect lowering, *le* in the complement is actually a resultative morpheme meaning 'finished' rather than a real perfective aspect marker in the true aspect lowering cases.

- (439) a. Wo quan ta [PRO chi-**le** zhe wan fan], keshi ta mei chi.
 1SG urge 3SG eat-PFV this bowl rice but 3SG NEG.PFV eat
 'I urged him to eat this bowl of rice, but he didn't.'

(Adapted from Y. Li 1985)

- b. ? Dajie jiao Xiaoming [tan-**guo** gangqin].
 Elder-sister teach Xiaoming play-EXP piano
 'The elder-sister taught Xiaoming to play piano.'

(judgement from C.-T. James Huang 2017, the original sentence is from Y.

Huang 1994:29)

Hu (2017) shows that *le* can be replaced by other resultative morphemes *diao* ‘off’ and *wan* ‘complete’, as shown in (440a). With a resultative compound in the embedded clause in (440b), a real perfective aspect marker *le*₁ is ungrammatical. A similar analysis for *le* is proposed by J.-W. Lin (2017) in accounting for *le* cooccurring with future modal *hui*. Mandarin future modals are incompatible with the perfective aspect marker *le*₁. In (441a), though *le* cooccurs with the future modal *hui*, J.-W. Lin (2017) argues that this *le* is a resultative morpheme like *diao* ‘off’ instead of a real perfective aspect marker since *le* in (441a) can be replaced by *diao* while in (441b) where *diao* is odd as a resultative morpheme, *le* is also odd. When the complement of *hui* is a resultative compound, *le*₁ can no longer attach to the compound, as shown in (441c), in contrast to the sentence in (441d) in which *le*₁ is totally fine with resultative compounds. Therefore, it is reasonable to assume that *le* in (439a) is not a real perfective aspect marker.

(440) a. Wo quan ta [chi-le/diao/wan zhe-wan fan].
 1SG urge 3SG eat-finish/off/complete this-CL rice
 ‘I urge him to finish eating this bowl of rice.’

b. *Wo quan ta [chi-diao/wan-le zhe-wan fan].
 1SG urge 3SG eat-off/complete-PFV this-CL rice

(Hu 2018:225)

(441) a. Ta hui sha-le/diao ni.
 3SG FUT kill-*le/diao* 2SG
 ‘He will kill you.’

b. *Ta mingtian (hui) xie-le/diao xin.
 3SG tomorrow FUT write-*le/diao* letter

(J.-W. Lin 2017: 15, footnote 11)

c. *Ta hui sha-diao-le ni.
 3SG FUT kill-off-PFV 2SG

- d. Ta sha-diao-le Lisi.
3SG kill-off-PFV Lisi.
'He killed Lisi.'

If *le* in (439a) is not a real perfective marker, then strictly speaking (439a) is not an aspect lowering case. Taking Grano and Zhang's experimental results into account, the predicate *quan* 'persuade, urge' is marginal in licensing aspect lowering, not as robust as other cases such as *qing* 'invite' and *bi* 'urge, force'. We suggest that cases where *le* can be replaced by *diao/wan* and does not trigger actuality entailment should not be taken as aspect lowering. It is certain that no grammatical aspect projection exists in the complement of these cases, though it is inconclusive about whether the real aspect lowering cases has local aspect projection.

4.5.2.3. The meaning of 'actuality' in actuality entailment

Even we exclude sentences like (439a), the sentence in (439b) (repeated below in (442a)) and the sentence in (442b) are still potential aspect lowering examples that do not trigger actuality entailment. Interestingly, both *jiao* 'teach' and *shefa* 'try' are predicates that take an *Event* complement which holds a simultaneous relation with the matrix predicate. This draws our attention to an important question that the Mandarin literature often neglects: what are the deterministic factors for us to judge the event in the complement to be actual? Depending on which stage and which circumstance relevant to the event is under consideration, we may have different answers to the question of whether actuality entailment occurs.

- (442) a. Dajie jiao Xiaoming [tan-**guo** gangqin].
 elder-sister teach Xiaoming play-EXP piano
 ‘The elder-sister taught Xiaoming to play piano.’
- b. Lisi cengjing shefa zuo-**guo** zhe-dao cai, (keshi mei zuo
 Lisi previously try make-EXP this-CL dish but NEG.PFV make
 chenggong).
 successful
 ‘Lisi had tried to make this dish, but he wasn’t successful in making it.’

(Adapted from N. Huang 2018: 357)

For example, a piano-teaching event (*jiao... tan gangqin* ‘teach... play piano’) usually involves the participation of students, but not necessarily. In a scenario in which the elder-sister played the songs in the first three lessons of *John Thompson’s Easiest Piano Course* with explanations about the techniques, it is totally fine to utter the Mandarin sentence in (443a) even Xiaoming was just listening and did not even touch the piano. In this scenario, a more precise translation of (443a) is ‘The elder sister taught Xiaoming how to play piano/The elder sister taught Xiaoming about playing the piano’. A similar reading is obtained in (443b) in which the direct object is replaced by *wuli* ‘physics’. In a scenario in which the elder sister demonstrates physical experiments or explaining Newton’s laws of motion, (443b) is totally acceptable without Xiaoming taking any action.

- (443) a. Dajie jiao Xiaoming [tan gangqin].
 elder-sister teach Xiaoming play piano
 ‘The elder-sister taught Xiaoming to play piano.’
- b. Dajie jiao Xiaoming wuli.
 elder-sister teach Xiaoming physics
 ‘The elder-sister taught Xiaoming physics.’

In other words, the matrix object is not the controller, i.e. Xiaoming is not necessarily

the agent of the complement event. For Mandarin *jiao* 'teach', the subject does not have a strong impact on the indirect object. It is just a process/activity of knowledge delivery. It does not encode the result of the student learning the skill, nor does it encode the actual participation of the embedded event by the student. We might have different strategies to analyze (442a). On the one hand, if (442a) is not a control construction, then it should be discussed in a different background since aspect lowering is typically in control constructions. On the other hand, if we consider (442a) to be a control construction, then the controllee is not necessarily Xiaoming. If the controllee is not Xiaoming but is the Elder-sister, then the Elder-sister did actually play the piano and actuality always holds with or without aspect lowering. No matter which way we go, it is improper to take (442a) as an example to argue against the correlation between aspect lowering and actuality entailment.

Now let's turn to the case with *shefa* 'try'. Setting aspect lowering aside, what's special with the predicate *shefa* 'try' is that it is an in-between case when we consider whether its complement is irrealis or realis (Sharvit 2003, Wurmbrand and Lohninger 2020). The complement is irrealis because the subject is still making an effort to approach the realization of the complement event. But meanwhile, 'try' requires that some action must be taken to achieve the complement event. In (442b), again similar to the 'teach' case, we do not have strong arguments to claim that *zuo zhe-dao cai* 'make this dish' lexically entails 'successfully make this dish',¹³ as shown by the fact that *zuo zhe-dao cai* marked by the

¹³'Make this dish' in English does encode the completion of the creation, yet whether the dish is successfully made is not entailed.

perfective/experiential marker can deny the success of the dish in (444).

- (444) Wo zuo-le/guo zhe-dao cai, mei zuo chenggong.
1SG make-PFV/EXP this-CL dish NEG.PFV make success
'I (had tried to) make this dish and didn't succeed in making a good one.'

We suggest that for cases in which we are uncertain about what it means for an event to 'actually happen', using resultative compounds is a more reliable test for actuality entailment. When we replace *zuo* 'make' with a resultative compound *zuo-chu* 'successfully make out' that lexically encodes the success in (445a), actuality is entailed. Similar cases are shown in (446). Due to reasons that are still unknown to us, if the embedded resultative compound is *wancheng* 'complete', factivity is marginally cancellable when it is marked by the experiential marker *guo*. However, when the same resultative compound is marked by the perfective aspect marker *le*₁, actuality entailment is obtained. Based on these facts, we cannot conclude that (442b) deny the correlation between actuality entailment and aspect lowering.

- (445) a. Lisi cengjing shefa [**zuo-chu**-guo/le zhe-dao cai], #keshi mei zuo
Lisi previously try make-out-EXP/PFV this-CL dish but NEG make
chu-lai.
out-come
'Lis had tried to make out this dish, # but he wasn't successful in making it.'
- b. Lisi cengjing shefa [**wancheng**-guo zhe-dao cai], ? keshi mei
Lisi previously try complete-EXP this-CL dish but NEG.PFV
zuo-cheng.
make-successful
'Lisi has previous tried to complete this dish, but didn't succeed.'
- c. Lisi cengjing shefa [**wancheng**-le zhe-dao cai], #keshi mei
Lisi previously try complete-PFV this-CL dish but NEG.PFV
zuo-cheng.
make-successful

'Lisi has previous tried to complete this dish, but didn't succeed.'

- (446) a. Lisi shefa [**dang-shang** shizhang], buguo meiyou chenggong.
Lisi try beome-up mayor but NEG.PFV succeed
'Lisi try to become the Mayor, yet didn't succeed.'
- b. Lisi shefa [**dang-shang**-?guo/le shizhang], #buguo meiyou chenggong.
Lisi try become-up_{EXP/PFV} mayor but NEG.PFV succeed.
'Lisi tried to become the Mayor, #but he didn't succeed.'

In summary, constructions in which *le* is a resultative morpheme are not real aspect lowering constructions. Cases like *dasuan* 'plan' that relies on other licensing factors such as negation and cases like *quan* that are marginal with aspect lowering, do not trigger actuality entailment. Strictly speaking, these cases are not robust aspect lowering constructions. For examples that robustly license aspect lowering, the *Situation* complements (often bearing a future irrealis interpretation without aspect lowering) trigger actuality entailment. For *Event* complements that requires a simultaneous temporal relation, we may have different opinions on the occurrence of which stage of the embedded event qualifies as 'actuality entailment'. But once the embedded predicate is a resultative compound and aspect lowering occurs, actuality of the embedded event is entailed. Therefore, we conclude that constructions that robustly allow aspect lowering trigger actuality entailment.

4.5.2.4. Connection with verb series constructions

Verb series constructions are structures taking two verbs to describe the same event. Each verb denotes a subevent. Usually the first verb is a modification of the event denoted by the second verb and the second subevent is usually the goal of the first. Perfective aspect

marker *le*₁ can attach to the first verb or the second verb. Interestingly, when the perfective aspect is on the first verb, the realization of the second subevent is cancellable. However, when the aspect marker is on the second verb, factivity of the second subevent is entailed and thus cannot be cancelled in the actual world, demonstrated by the examples below.

- (447) a. Aming na-**le** wo-de bi xiezi, ?jieguo yi-ge zi ye mei
 Aming take-PFV 1SG-DE pen write-letter result one-CL letter YE NEG.PFV
 xie.
 write.
 ‘Aming took my pen to write, and turned out to not have written a single word.’
- b. Aming na wo-de bi xie-**le** zi, #jieguo yi-ge zi ye mei
 Aming take 1SG-DE pen write-PFV letter result one-CL letter YE NEG.PFV
 xie.
 write.
 ‘Aming took my pen to write, #and turned out to not have written a single word.’
- (448) a. Lisi kai-**le** Zhangsan-de che qu kuaidi. Zhongtu che paomao
 Lisi drive-PFV Zhangsan-DE car pick package half-way car break-down
 le, mei qu-cheng.
 SFP, NEG.PFV pick-success
 ‘Lisi drove Zhangsan’s car to pick his package. The car broke down half-way,
 and he didn’t succeed in picking up his package.’
- b. Lisi kai Zhangsan-de che qu-**le** kuaidi. #Zhongtu che paomao
 Lisi drive Zhangsan-DE car pick-PFV package half-way car break-down
 le, mei qu-cheng.
 SFP, NEG.PFV pick-success
 ‘Lisi drove Zhangsan’s car to pick his package. # The car broke down half-
 way, and he didn’t succeed in picking up his package.’

We observe a parallelism between verb series constructions and complementations

involving aspect lowering, indicating that control constructions involving aspect lowering may have a compact structure similar to verb series constructions. The connection between the two constructions deserves further scrutiny.

4.5.2.5. Aspect doubling

Y.-H. Audrey Li (1985) reports that the following sentences in (449) with one overt aspect marker on the matrix predicate and another aspect marker on the complement predicate are acceptable¹⁴. This is an extreme version of aspect lowering, which we term it as ‘aspect doubling’.

- (449) a. Wo qing-le Zhangsan chi-guo fan le.
I invite-PRF Zhangsan eat-EXP food PRT
‘I have invited Zhangsan to eat a meal.’
- b. Wo qing-guo Zhangsan chi-le fan le.
I invite-EXP Zhangsan eat-PRF food PRT
‘I have invited Zhangsan to eat a meal.’
- c. ?Wo qing-le Zhangsan chi-le fan le.
I invite-PRF Zhangsan eat-PRF food PRT
‘I have invited Zhangsan to eat a meal.’
- d. ?Wo qing-guo Zhangsan chi-guo fan le.
I invite-EXP Zhangsan eat-EXP food PRT
‘I have invited Zhangsan to eat a meal.’

(Y.-H. Audrey Li 1985: 378, cite from Grano 2015:159)

Aspect doubling involves more controversy in acceptability than aspect lowering. Other than the fact that we don’t see a consistent generalization of this phenomenon in the

¹⁴C.-C. Tang (1990) claims that examples similar to those in (449c-d) are grammatical.

literature, most of our consultants (including mainland speakers and Taiwan speakers) find double aspect marking in obligatory control constructions odd and their judgements for sentences in (449) are shown in (451), different from Y.-H. Audrey Li (1985).

- (450) a. ?? Wo qing-le Zhangsan chi-guo fan le.
 I invite-PRF Zhangsan eat-EXP food PRT
 'I have invited Zhangsan to eat a meal.'
- b. * Wo qing-guo Zhangsan chi-le fan le.
 I invite-EXP Zhangsan eat-PRF food PRT
 'I have invited Zhangsan to eat a meal.'
- c. * Wo qing-le Zhangsan chi-le fan le.
 I invite-PRF Zhangsan eat-PRF food PRT
 'I have invited Zhangsan to eat a meal.'
- d. ? Wo qing-guo Zhangsan chi-guo fan le.
 I invite-EXP Zhangsan eat-EXP food PRT
 'I have invited Zhangsan to eat a meal.'

The less controversial aspect doubling case is the one in (451). Though some speakers find it redundant to have two aspect markers, most speakers accept this sentence and find it much more natural than the aspect doubling cases in (449). As we discuss in the previous subsection, strictly speaking, *jiao* 'teach' is not an object control predicate like *qing* 'invite', *bi* 'force', *quan* 'urge' etc. Whether it is a subject control predicate in Mandarin is still inconclusive. Therefore, we conclude that aspect doubling is ungrammatical in Mandarin.

- (451) Dajie jiao-guo Xiaoming tan-guo gangqin.
 Elder sister teach-ASP Xiaoming play-ASP piano.
 'Elder sister taught Xiaoming to play piano.'

(Y. Huang 1994:29, cited from Hu et al. 2001:1126)

4.5.2.6. Interim summary

We have demonstrated that though there are speaker variations in the acceptability of aspect lowering, aspect lowering is a robust restructuring phenomenon in Mandarin. We notice the following factors that influence the acceptability: matrix predicate, the form of embedded predicate, aspect marker and negation. Complements that robustly license aspect lowering entail actuality, which is parallel to the performance of verb series constructions. In general, control constructions do not allow aspect doubling unless in very few cases in which the status as a control predicate of the matrix verb is still questionable.

4.6. Accounting for the Mandarin data

4.6.1. Phenomena under discussion and ICH

So far, we have discussed the morpho-syntactic properties associated with clausal (in)dependency, structural complexities and clausal transparency in Mandarin complement clauses. For clausal (in)dependence, we target at temporal (in)dependence and reference (in)dependence of the embedded subject. Distribution of modals and sentence-final particles aim to reveal structural complexities. Inner topicalization, focus fronting and aspect lowering demonstrate clausal transparency. The details of the phenomena under discussion are summarized in Table 4.5.

The ICH effect is observable in Mandarin. The morphosyntactic properties summarized in Table 4.5 are aligned with ICH and draw a line between *Proposition* complements

Table 4.5: Properties among three classes of complements

Properties		morpho-syntactic tests	Propositions	Situations	Events
(In)dependence	temporal reference	different time adverbs	✓	✓	×
		aspect markers	free	*PROG PFV/EXP (restructuring only)	*PROG PFV/EXP (restructuring only)
		future modal <i>hui</i>	✓	×	×
	subject reference	syntactic forms	lexical DPs <i>pro</i>	PRO <i>cpro</i> , reflexive, pronoun	PRO
		reference	non-control/ control (partial control possible)	control (partial control possible)	exhaustive control
Complexity	distribution of modals	modals higher than <i>hui</i>	✓	×	×
		modals below <i>hui</i>	✓	✓	(✓)
	SFPs in Low C	<i>le₂, laizhe, laizhe</i>	✓	×	×
Transparency		inner topicalization	×	✓	✓
		focus fronting	×	✓	✓
		aspect lowering	×	✓	✓

Table 1: Implicational Complementation Hierarchy (ICH)

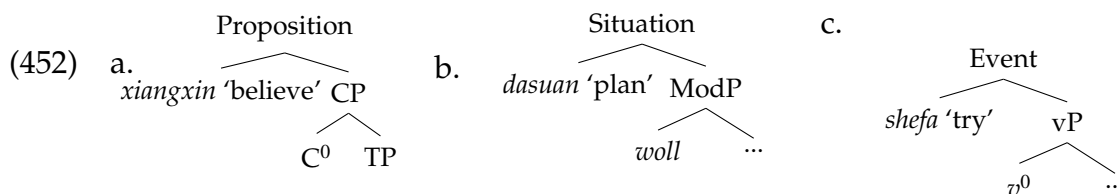
MOST INDEPENDENT		LEAST INDEPENDENT
LEAST TRANSPARENT	Proposition » Situation » Event	MOST TRANSPARENT
LEAST INTEGRATED		MOST INTEGRATED

and the other two complements. Mandarin *Proposition* complements are most independent, most complex and least transparent. *Event* complements and *Situation* complements are less independent, less complex and more transparent. *Proposition* complements do not impose constraints on temporal reference and pattern as independent root clauses when they express non-future and future interpretations. They are also flexible in reference and syntactic forms of the embedded subject. The embedded subject can refer to a matrix argument (control), but not necessarily. *Event* complements require the matrix event to be simultaneous with the complement event and only allow exhaustive control and PRO. With regard to temporal (in)dependence and subject referential (in)dependence, *Proposition* complements are the most independent while the *Event* complements are the most dependent. The *Situation* complements are in between and pattern closely with the *Event* complements in disallowing aspect markers (unless aspect lowering occurs) and future modals. A clear line between *Proposition* complements and the rest two classes is also observed when it comes to transparency. *Situation* and *Event* complements allow restruc-

turing detected by inner topicalization, focus fronting and aspect lowering that triggers actuality entailment, while *Proposition* complements do not. Whenever a morphosyntactic property manifests a distinction among the three types of complements, different options are chosen by the *Proposition* complements and the *Event* complements. Cross-linguistically, the *Situation* complements can pattern with either. But in Mandarin, the *Situation* complements often pattern the same as the *Event* complements.

4.6.2. Functional projections in Mandarin complements

Following Wurmbrand (2014), Wurmbrand and Lohninger (2020), we propose that the minimal functional projection of the Mandarin *Proposition*, *Situation* and *Event* complements are CP, *woll*P and vP respectively, as illustrated in (452).



Proposition complements can flexibly combine with SFPs in the Low C domain, hence it apparently contains the operator domain. *Event* complements are the most dependent and transparent, hence we assume that their minimal structure is also simple with the necessary theta information of the embedded predicate. *Situation* complements are in between and contain a covert future modal *woll* to shift the event to the future of the matrix event. The idea of a covert future modal *woll* comes from the analysis for English infinitives by [Abusch \(1988, 2004\)](#), [Wurmbrand \(2014\)](#) and extends to Mandarin in C.-T. James [Huang \(2017\)](#). Following [Abusch \(1985, 1988\)](#), Wurmbrand (2014) proposes that

future markers *will* and *would* in English are decomposed into two parts: a true tense and a future modal *woll* that shifts the reference time to the future. *Will* is the spell-out of the present tense and *woll* and *would* is the spell-out of the past tense and *woll*. Wurmbrand (2014) proposes that in English, the future irrealis reading in a *Situation* complement is obtained via the covert *woll* with no tense. It is reasonable to assume that Mandarin *Situation* complements also contain a covert *woll*, given the future irrealis reading of *Situation* complements. But whether *Situation* and *Event* complements are like English infinitives without tense is still questionable.

Wurmbrand's arguments for future *Situation* infinitives lacking tense in English come from the different behaviors among future infinitives, finite *will*-contexts and finite *would*-contexts. In (453a), future infinitives can refer to a time before the utterance time, i.e. the complement event could happen yesterday. But this interpretation is impossible in the finite *will* clause in (453b). When embedded under a matrix present future, the future infinitive in (454a) is possible but the finite *would*-clause in (454b) is not (unless *would* is interpreted as a conditional).

- (453) a. Leo decided a week ago to go to the party yesterday.
 b. Leo decided a week ago that he will go to the party (*yesterday).
- (454) a. John will promise me tonight to tell his mother tomorrow that...
 b. *John will promise me tonight that he would tell his mother tomorrow
 that... [*unless conditional]

The key to the infelicity of (453b) and (454b) is that the tense encoded in the overt future modal conflicts with the temporal adverb. Infinitives, in contrast, do not have an

embedded tense. Therefore, as long as the temporal relation between the matrix event and the complement event qualifies for the restriction of the matrix predicate, the temporal relation between the embedded event and the utterance time is unspecified. This leads to the flexibility of time adverbs in (453a) and (454a).

The tests in Wurmbrand (2014) cannot be directly extended to Mandarin. As we discuss in Chapter 2, Mandarin bears a covert present tense and a covert past tense. The challenge for Mandarin is that tensed sentences and tenseless sentences do not make a difference morphologically. Moreover, whether the Mandarin present tense is absolute like English (i.e. present tense is always taking the utterance time as the evaluation time) or relative like Japanese or Hebrew (i.e. present tense can take an anaphoric evaluation time) has to be diagnosed in embedded contexts. In this dissertation, we have not dived into the semantic analysis of temporal interpretations in embedded contexts within a tensed analysis. Actually, there is a gap in the literature about the right analysis for embedded contexts in a tensed framework due to the well-known complexities of such a realm. It goes beyond the scope of this dissertation to explore the formal semantic analysis for embedded contexts and we have to save this topic for future research. Hence whether *Situation* complements and *Event* complements bear tense or not remains a problem.

At this stage, we are unaware of any direct Mandarin-internal evidence supporting the lack of tense in the *Situation* complements. But the assumption of lacking tense in *Situation* complements is an appealing hypothesis for us because it provides one way to capture the fact that posteriority of time in *Situation* complements cannot be expressed by an overt future modal *hui* as *Proposition* complements or root clauses do. Overt future

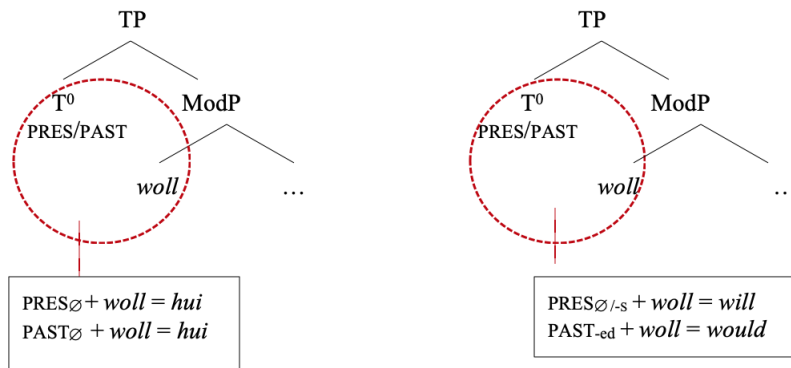
modals are prohibited in *Situation* complements, similar with the fact that English future irrealis infinitives require posteriority but never allow overt future modal *will*. We assume that like English *will*, *hui* in Mandarin has to be licensed by tense even though we do not go for a decompositional view of *hui*.

The reason why we do not go for a decompositional view of *hui* is that in principle, *woll* can combine with the covert present tense and the covert past tense to spell-out as *hui*. Namely, *hui* should be the counterpart of *will* and *would* in English. There is evidence in Chapter 3 supporting the claim that *hui* can be either the counterpart of *would* or *will* in embedded contexts, repeated in (455) below. In the example in (455), *hui* can either take the utterance time or the time of Mary's speech as the evaluation point for future.

- (455) a. Mali liang-zhou qian shuo ta hui zai yi-zhou hou gen ta laogong
 Mary two-week ago say 3SG FUT at one-week after with 3SG husband
 lihun.
 divorce
 'Mary said two weeks ago that she would divorce with her husband in one
 week/ Mary said two weeks ago that she will divorce with her husband in
 one week.'
- b. $t_{\text{say}} < s^* < t_{\text{divorce}}$ OR $t_{\text{say}} < t_{\text{divorce}} < s^*$

In principle, based on the properties of *hui* in embedded contexts, we can assume the structures of English and Mandarin sentences with overt future modals as in (456).

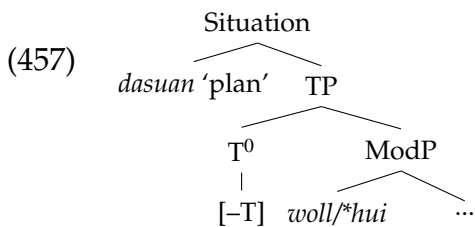
(456)



But as we discussed in Chapter 3, a root clause with *hui* only has a present future reading rather than a past future reading. In fact, this observation is also true for English. English *will* can be used in embedded and unembedded contexts, taking the utterance time as the evaluation time for future. However, English *would* cannot be used in root clauses as well (Enç 2004, Wurmbrand 2014), i.e. a past future reading in a root clause cannot be expressed by *would*. For example, ‘The kid would become the King’ is infeasible when it is unembedded. As far as we know, we are unaware of any proposal in the literature explaining why past future reading with *would* is impossible in unembedded contexts. Similarly, we have no idea why *hui* in a root clause always picks the utterance time as the evaluation time rather than a context-salient past time, if PAST + *woll* spells-out as *hui*. Therefore, we do not go for a decompositional approach for *hui* and merely go for a conservative assumption that *hui* has to be licensed by tense. To capture the absolute property of *hui* in root clauses, we build the requirement of ‘future of the utterance time’ in the presupposition of *hui*, as proposed in Chapter 3.

The assumption of overt modal *hui* being licensed by tense can be manipulated by proposing that Mandarin *Situation* complements do not project T at all, or even *Situation*

complements project T, T is deficient with a [-T] feature, shown in (457). *Proposition* complements project T like root clauses with concrete semantic tenses, hence it bears the [+T] feature on T and patterns similarly with root clauses in temporal interpretations. An efficient T thus licenses *hui*, suppling the right temporal argument for *hui* as the evaluation time. The deficient T or lack of T in *Situation* complements, on the contrary, fails to license overt future modal *hui*. Hence even *Situation* complements are semantically compatible with a future modal, it can never be overly realized as *hui* but has to be a covert *woll*.



The claim we make here further predicts that *Event* complements disallow *hui* as well. The *Event* complements being incompatible with *hui* is due to the semantic constraints of temporal simultaneity, rather than syntactic constraints. The prediction here is a nice by-product of our claim, without any unwelcome results conflicting with the semantic constraints. Given the containment properties among structural domains, if the functional category licensing *hui* is missing in the TAM domain of *Situation* complements, which constitutes a contrast between *Situation* complements and *Proposition* complements, it will be missing in *Event* complements as well, according to ICH. Our analysis thus provides one possible way to capture why *Situation* complements disallow overt future modal, otherwise the syntactic distribution of *hui* among the three classes of complements can only be captured by stipulations.

4.6.2.1. Larger-than-expected projections

In (452), we propose the minimal functional projections of the three classes of complements in Mandarin. Our proposal admits the tendency of having a larger clause size of *Proposition* complements than *Situation* and *Event* complements due to the containment relation of functional domains. However, our proposal is essentially different from analyses that designate a specific clause size to a specific type of complement, e.g. Grano (2012, 2015). Our analysis follows the insights in Wurmbrand (2001, 2015), C.-T. James Huang (2017), N. Huang (2018), Wurmbrand and Lohninger (2020) among others in allowing more flexibilities in complement clause sizes. What (452) shows is the lower bounds of clause sizes: *Proposition* complements project *at least* a CP, *Situation* complements project *at least* a *wolIP* and *Event* complements project *at least* a vP. Following Wurmbrand and Lohninger (2020), we do not set the upper bounds of the clause size of a complement since we believe that the mapping between syntax and semantics is not absolute. In other words, *Situation* complements and *Event* complements can even bear larger-than-expected projections. This is also consistent with the idea of *Canonical Structural Realization* (CSR) (canonical structural realization) of s-selection (Grimshaw 1981) such that a certain type of meaning tends to be realized as certain syntactic structures, yet as in many languages the c-selection correspondence is not complete, yielding non-canonical structures.

For instance, N. Huang (2018) shows that the three classes of complements can be in-

roduced by *shuo*¹⁵ and are compatible with *ye* ‘also’, which are both elements projected high in a clause. N. Huang (2018) concludes that *Situation* complements and *Event* complements can also be a clause (CP). We note that in a root clause, *ye* precedes the future modal *hui* but not the other way around, as demonstrated in (458). This indicates that *ye* is located higher than *hui*. Given our assumptions that *hui* has to be licensed by tense and present tense supplies the time argument for *hui*, *ye* ‘also’ is higher than T⁰. That *shuo* precedes *ye* but not the other way around shows that *shuo* occupies a syntactically higher position than *ye*.

(458) a. Zhangsan mingtian ye hui lai.
 Zhangsan tomorrow YE FUT come
 ‘Zhangsan will also come tomorrow.’

b. *Zhangsan mingtian hui ye lai.
 Zhangsan tomorrow FUT YE come

(459) a. Zhangsan_i juede [(*)ye] shuo ziji_i (ye) jian-guo na-ge ren].
 Zhangsan think YE SHUO self YE see-EXP that-CL person
 ‘Zhangsan_i thinks/thought that he_i have/had also seen that person before.’

b. Zhangsan dasuan [(*)ye] shuo nian-di (ye) dao Ouzhou dujia].
 Zhangsan plan YE SHUO year-end YE to Europe go-on-vacation
 ‘Zhangsan plans/planned to also take a vacation in Europe at the end of the year.’

c. Lisi changshi [(*)ye] shuo (ye) huan yixia biede xifalu].
 Lisi try/tried YE SHUO YE change a-bit another shampoo
 ‘Lisi tries to also switch to another shampoo.’

¹⁵*Shuo* is commonly used among Taiwan Mandarin speakers and Singapore Mandarin speakers, but is less common among Mandarin speakers from mainland China.

N. Huang (2018) presents two possible options for the status for *shuo*: a complementizer or a functional head that originates in a lower domain, e.g. the inflectional domain. Either analysis has its advantages and problems. In the Appendix, N. Huang (2018) lists the facts showing that *shuo* does not behave like prototypical complementizer. According to Paul (2014), firstly, *shuo* cannot appear in the fronted clause in the afterthought constructions formed by fronting an embedded clause, nor can it be stranded, as shown in (460). Secondly, there is often an intonational break right after *shuo*, indicating that *shuo* fails to form a unit with the rest of the clause. Thirdly, *shuo* cannot appear in clausal subjects and N. Huang further notes that *shuo* cannot appear in the clausal complement of a noun either, as shown in (461a).

- (460) a. *Shuo shenghuo li que-le dian shenme, wo zongshi juede.
 SHUO life in lack-PFV a bit what I always feel
 'That something is missing in life, I have always thought so.'
- b. *Shenghuo li que-le dian shenme, wo zongshi juede shuo.

(adapted from Paul 2014, cited from N. Huang 2018: 369)

- (461) a. [(**Shuo*) Lisi bu hui chuxi ta haizi-de biye dianli] shi
 SHUO Lisi NEG will attend his child's graduate ceremony make
 dajia gandao hen jingya.
 everyone feel very surprised
 'That Lisi won't be attending his child's graduation surprised everyone.'
- b. Zongcai founen-le [(**shuo*) gongsi jiang caiyuan] de yaoyan.
 CEO deny-PFV SHUO company FUT layoff MOD rumor
 'The CEO denied rumors that the company will lay off workers.'

(N. Huang 2018: 369)

Other than the non-prototypical behavior of *shuo*, *shuo* does not block inner topicaliza-

tion and focus fronting, as shown in (462). Therefore, treating *shuo* as a complementizer poses a counter-example to the cross-linguistic generalization that restructuring phenomena are incompatible with complementizers.

- (462) a. Lisi **zhe-pian baogao** hui shefa [(shuo) zai zhe zhou nei xie-wan].
 Lisi this-CL report will try SHUO at this week in write-finish
 'Lisi will try to finish writing this report this week.'
- b. Lisi **zhe-pian baogao** dasuan [(shuo) zai zhe zhou nei tijiao].
 Lisi this-CL report plan SHUO at this week in submit
 'Lisi plans to submit this report this week.'
- c. Lisi **shenme shi dou** shefa [(shuo) ziji chuli].
 Lisi what matter all try SHUO self handle
 'Lisi tries to handle everything himself.'
- d. Lisi **lian zhe-jian bowuguan dou** dasuan [(shuo) cangan yixia].
 Lisi even this-CL museum all plan SHUO visit a bit
 'Lisi plans to even check out this museum.'

(N. Huang 2018: 359, highlights are added by us)

It is true that *shuo* is atypical if we treat it as a complementizer. Meanwhile, *shuo* will remain atypical as well compared to other categories in the inflectional domain. Treating *shuo* as a functional head from the inflectional domain will not help us much in identifying what it is. The fact that *shuo* can appear in all three types of complements show that *shuo* is neither the Mandarin counterpart of *that* in English, nor the Mandarin counterpart of *for* in Standard English or *for* in *for to* infinitives in Belfast English (Henry 1992)¹⁶. In standard English, *that* takes a finite clause and *for* takes a non-finite clause with an

¹⁶We thank C.-T. James Huang for drawing our attention to *for-to* infinitives.

overt subject, as shown in (463). In Belfast English, *for* shows up in infinitives without overt subject as well, as demonstrated by (464). Moreover, *for to* infinitives can also be used as exclamations and as a subject, as illustrated in (465). However, *shuo* can combine with all types of complements, different from *that* and *for* in standard English. *Shuo* also cannot head a sentential subject, different from *that, for* in standard English and *for* in *for to* infinitives.

(463) a. John believe that Mary is here.

b. Mary would like for John to walk.

(464) a. I tried for to get them.

b. I persuaded John for to go home. (Henry 1992: 283)

(465) a. For to let that mongrel into my yard!

b. For to pay the mortgage is difficult. (Henry 1992: 282-283)

Kratzer (2006) and Moulton (2009) argue that ‘that’ as a complementizer has its semantic function: it selects for a proposition and returns a description of an individual that carries content. Hence a clause headed by *that* can be used as an argument of a predicate (either as the sentential subject of a predicate or as the sentential object of a predicate) and modify a noun via predicate modification since the output of ‘that’ is an entity with some content equal to the proposition. If Kratzer (2006) and Moulton (2009) are on the right track, *shuo* apparently does not bear such a function. The only similarity among *that, for* and *shuo* is that they can introduce a clausal complement. We follow the insights of N. Huang (2018) and propose that *shuo* is better to be analyzed as a semanti-

cally bleached complementizer. Namely, *shuo* is a complement clause introducer, but it does not contribute anything for complementation: a. the presence of *shuo* is optional; b. it is irrelevant for temporal interpretations of the complement; c. it does not s-select a certain type of complement and it does not change the properties of its complements, e.g. it does not turn an event into a proposition or turn a proposition into an argument of the matrix predicate. *Shuo* is semantically vacuous and just pass up its input. Following Kratzer (2006), we call *shuo* a trivial complementizer with the denotation below. In the denotation in (466), *shuo* takes in any type of arguments and returns the same argument without adding anything to the meaning.

$$(466) \quad \llbracket \text{shuo} \rrbracket = \lambda p.p$$

(Kratzer 2006)

Therefore, *shuo* can introduce a full-fledged CP with the complexities observed in a finite root clause or a reduced CP in which certain functional projections are missing. This is consistent with Wurmbrand and Lohninger's model in allowing an operator domain that has no consequence of interpretation to be projected in *Situation* complements and *Event* complements. Moreover, treating *shuo* as a trivial complementizer also provides room for the atypical behavior of *shuo* not blocking inner topicalization and focus fronting. The wide-attested fact of CP blocking topic/focus movement in other languages is not attested for *shuo* because *shuo* is merely a general clause introducer and it cannot be taken as evidence for an Operator domain. Nevertheless, N. Huang (2018) observes that *shuo* does block aspect lowering even though it does not block inner topicalization and focus fronting, demonstrated by the examples below.

- (467) a. Lisi cengjing shefa (*shuo) zuo-guo zhe-dao cai, (keshi mei...).
 Lisi previously try SHUO make-EXP this-CL dish but NEG.PFV
 'Lisi had tried to make this dish...'
- b. Lisi mei dasuan (*shuo) xie-guo zhe-yang de shu.
 Lisi NEG.PFV plan SHUO write-EXP this-kind MOD book
 'Lisi did not plan to write this kind of book.' (N. Huang 2018: 358)

If we assume that the lack of semantic contribution of *shuo* leads to its unusual behavior of not blocking restructuring, the reason why *shuo* does block aspect lowering cannot be simply attributed to the fact that a CP headed by *shuo* blocks such an operation. Though we have not offered an analysis for aspect lowering, we suspect that compared to other restructuring phenomena in Mandarin, aspect lowering is the most integrated construction in which the complement clause only contains a vP/VP. Any type of head will intervene the integration between the matrix predicate and the complement predicate, thus *shuo* will block aspect lowering.

4.6.2.2. Alternation of interpretations

Following Wurmbrand and Lohninger (2020), we adopt a synthesis approach for complementation. Namely, the meaning of a complementation configuration comes from both the matrix verb and the complement clause. As long as the combination of the matrix verb and the complement clause successfully yield an interpretation result, a predicate is flexible to take different types of complements. In certain cases, a predicate can also shift its meaning slightly to accommodate the meaning of the complement. Of course, verbs differ in being more or less specific of their meanings, allowing and disallowing flexibility in complementation. For example, 'forget' in English and Mandarin both allow

a *Proposition* complement ((468a) - (469a)) or an *Event* complement ((468) - (469)). But 'try' in English and Mandarin both only take an *Event* complement.

(468) a. I forgot that I watered the plant.

b. I forgot to have watered the plant.

(469) a. Xiaoming wangji [ziji dai-le shubao] le.
Xiaoming forget self bring-PFV backpack SFP
'Xiaoming forgot that he had brought his backpack.'

b. Xiaoming wangji [ziji dai shubao] le.
Xiaoming forget on-one's-own bring backpack SFP
'Xiaoming forgot to bring his backpack by himself.'

(470) a. John tried to come earlier.

b. * John tried that he will come earlier.

(471) a. Zhangsan shefa zaodian dao.
Zhangsan try earlier arrive
'Zhangsan tried to arrive earlier.'

b. * Zhangsan shefa [ta hui zaodian dao].
Zhangsan try 3SG FUT earlier arrive
'Lit: Zhangsan tried that he will arrive earlier.'

If the matrix predicate requires an X-type complement and the complement is a Y-type complement, the last resort for mismatching is coercion (Wurmbrand et al. 2020). Pustejovsky (1995) defines coercion as "a semantic operation that converts an argument to the type which is expected by a function, where it would otherwise result in a type error" (Pustejovsky 1995: 111). One well-known case of complement coercion is the sentence 'I began the book'. The predicate *began* requires an event denoted by a VP complement

instead of an entity denoted by a DP. In the case of ‘*I began the book*’, *began* coerces the complement ‘the book’ into an event that involve ‘the book’, e.g. ‘reading the book’ or ‘writing the book’.

In the coercion situation for complementation, the meaning of the matrix predicate often change slightly to accommodate the mismatching complement. For some speakers, coercion is easy to obtain while for some speakers coercion is more difficult. Hence it is very likely to observe disagreement in judgements for these cases. For example, *zhunbei* ‘prepare, plan’ takes a future irrealis *Situation* complement and *shefa* ‘try’ takes an *Event* complement in general. These two types of complements usually do not take overt subjects in Mandarin. However, the sentences in (472) from Hu et al. (2001) are cases of coercion if *cpro* (‘pronoun + one + CL +person’) is not taken as an adverbial modifier but is forced to be interpreted as an embedded subject.¹⁷ These cases both have a very long adjunct between the matrix predicate and the overt embedded subject (He 2017, C.-T. James Huang 2017). Many of our consultants found (472) unnatural and prefer to replace *cpro* with a pure adverbial modifier *yi ge ren* ‘on one’s own’ in (473) or reinterpret *zhunbei* ‘plan, prepare to’ as *pansuan* ‘consider the plan, make the plan’ and *shefa* ‘try’ in (472b) as ‘try to achieve the goal of...’. For some speakers, (472b) is even considered to be ungram-

¹⁷The *cpro* in (472) is better analyzed as an adverbial instead of an overt subject since it does not pass the focus marker test, as illustrated below.

- (1) a. ?? Wo zhunbei mingtian xiawu tian hei yihou *lian wo yi ge ren* dou lai.
 I prepare tomorrow afternoon sky dark after LIAN 1SG one CL person DOU come
- b. ?? Ni zuihao shefa [jintian xiawu san le hui yihou *lian ni yi ge ren* dou lai].
 you had-better try today afternoon end ASP meeting after LIAN 2SG one CL person DOU come

matical. When *zhunbei* 'plan, prepare to' is reinterpreted as *pansuan* 'consider the plan, make the plan', *zhunbei* no longer requires a controlled embedded subject (C.-T. James Huang 2017), as the sentence in (474) shows.

- (472) a. Wo zhunbei [mingtian xiawu tian hei yihou **wo yi ge ren** lai].
I prepare tomorrow afternoon sky dark after I one CL man come
'I plan to come alone tomorrow afternoon after it gets dark.'
- b. Ni zuihao shefa [jintian xiawu san le hui yihou
you had-better try today afternoon end ASP meeting after
ni yi ge ren lai].
you one CL person come
'You had better try to come by yourself this afternoon after the meeting is over.'
(Hu et al. 2001: 1131)

- (473) a. Wo zhunbei [mingtian xiawu tian hei yihou **yi ge ren** lai].
I prepare tomorrow afternoon sky dark after one CL man come
'I plan to come alone tomorrow afternoon after it gets dark.'
- b. Ni zuihao shefa [jintian xiawu san le hui yihou
you had-better try today afternoon end ASP meeting after
yi ge ren lai].
one CL person come
'You had better try to come alone this afternoon after the meeting is over.'

- (474) Wo zhunbei [tian hei yihou **nimen** xian guolai].
1SG prepare sky dark after 2PL XIAN come-over
'I prepare that you guys come here first after it gets dark.'

(Adapted from C.-T. James Huang 2017)

4.6.3. Existence of the semantic Operator domain and finiteness

In the previous sections, we disagree with the approach that relates the distinction between *Proposition* complements and *Situation/Event* complements to a clause size difference of CP vs vP (Grano 2015, 2017). However, we do agree with one insightful aspect of Grano's proposal: *Proposition* complements contain the Operator domain which syntactically corresponds to CP, while *Situation/Event* complements lack this domain. Different from Grano's analysis, we distinguish CPs with semantic consequences of interpretation from CPs with elements that are syntactically best analyzed as C elements but do not make any semantic contributions (e.g. *shuo*). Moreover, as long as the minimal structure that matches the semantic selections of the matrix predicate is projected, other functional projections such as negation, focus sensitive elements such as *ye* 'also' are free to occur as long as they do not conflict with the semantic constraints. We agree with Grano (2015, 2017) that the distribution of epistemic modals, SFPs in the low CP domain among the three types of complements and possibility of restructuring are due to the presence and absence of a *semantic* operator domain. However, it is not the case that *Situation/Event* complements are limited to the syntactic structure of vP and are unable to project CP. They are able to project structures larger than vP: negation, *ye* 'also', modal phrases headed by *woll* or *yao*, CPs headed by *shuo*. Hence proposals that try to tie the so-called 'finite' clauses to CP and 'non-finite' clauses to smaller clause sizes are empirically inadequate. Furthermore, as N. Huang (2018) points out, even with *shuo*, the elements such as (some) modals, overt subject that are disallowed in *Situation* and *Event* complements are still prohibited. We suggest that *shuo* is a trivial complementizer, hence it is invisible for all syntactic and

semantic operations except in aspect lowering cases where *shuo* as a head intervenes the integration between the matrix predicate and the embedded predicate, blocking aspect lowering.

Now we have taken Mandarin as a case study and demonstrated the morphosyntactic properties associated with the three classes of complements in Mandarin. The ICH effect is observable in Mandarin. The type of clauses to the left of the ICH hierarchy (*Propositions* » *Situations* » *Events*) is more independent, complex and less transparent than the ones to its right. A language may not distinguish between some or all of the three classes regarding certain morphological or syntactic properties and a language typically do not make as many distinctions as given in the ICH. Some of the classes are collapsed and behave uniformly regarding a range of distributional properties. In Mandarin, we often see a line between *Proposition* complements and the other two classes: *Situation* complements and *Event* complements. The distinction between the two groups shows parallelism with the finite vs. non-finite distinction in other languages, summarized as in (475). We will mainly use English as an example for comparison, but will also introduce other languages when necessary.

(475) a. Overttness of embedded subjects:

English finite complements and Mandarin *Proposition* complements allow overt subjects. Non-finite complements in English and *Situation/Event* complements in Mandarin do not allow overt subjects in general. ¹⁸

¹⁸Overt subjects are licensed in English infinitives if *for* is present. Some partial control cases of *Situation* complements allow overt pronouns, reflexive *ziji* and *pro* that are bound variables as overt embedded subjects.

b. Distribution of epistemic modals and overt future modals:

Epistemic modals and overt future modals are prohibited in English non-finite clauses and Mandarin *Situation/Event* complements.¹⁹

c. Availability of restructuring:

Mandarin *Situation/Event* complements allow restructuring while *Proposition* complements do not. Languages such as German, Polish, Dutch etc. also show a similar pattern (Wurmbrand 2015).

We suggest that the parallelism originates from two sources. The parallelism between Mandarin *Proposition* complements and finite clauses in other languages in the distribution of epistemic modals and compatibility of restructuring, is due to the fact that these clauses possess an Operator domain (e.g. CP with meaningful C elements). Though Mandarin does not possess complementizers such as English *that* that signal the existence of an Operator domain, SFPs serve as a piece of evidence for the presence of such a domain. Epistemic modals scope higher than SFPs, thus the availability of epistemic modals in *Proposition* complements if the Operator domain exists. Furthermore, the existence of CP blocks restructuring, hence focus fronting and inner topicalization are not observed in *Proposition* complements.

The distribution of *hui* and referentially independent overt subjects can be captured

¹⁹Some *Situation* complements in English and Mandarin can allow overt future modals, such as the complement of *decide/jueding* 'decide'.

- (1) a. The organization committee decided that the conference will be postponed to September.
b. Gongsi jueding Zhangsan hui zai xiangmu jieshu hou waipai dao haiwai qu.
company decide Zhangsan FUT at project finish after send-out arrive oversea go
'The company decided that Zhangsan will be sent out abroad after this project is completed.'

by presence of tense. The fact that Mandarin *Situation* complements do not allow overt future modals like English non-finite *Situation* complements is captured by the unified assumption for English and Mandarin that the overt future modal needs to be licensed by tense. Therefore, even the future irrealis complements are semantically compatible with a future modal, this modal cannot be overt. In this dissertation, we have not offered a theory about the distribution of overt embedded subjects. Given the fact that Mandarin is a tensed language with covert tenses, a Case-based theory for overt DPs is potentially applicable for Mandarin (Huang 1989). Namely, a tensed clause is able to assign nominative case for the overt embedded subject while a tenseless clause cannot, leading to the realization of PRO in *Situation/Event* complements in Mandarin and non-finite clauses in English. The possibility of an overt embedded subject (a bound variable) in the partial control *Situation* complements in Mandarin calls for a further explanation (N Zhang 2016, Sundaresan and McFadden 2009), which we leave for future research.

It is time for us to turn to the very difficult question: how do we view finiteness in Mandarin? Before we can talk about finiteness in Mandarin, we need to be clear about the relation between finiteness and ICH in languages in which finiteness is (more or less) well-defined: Does finiteness determine ICH? Can we or should we define finiteness by s-selection, i.e. the semantic properties that classify the three classes of clauses?

Following Wurmbrand et al. (2020); Wurmbrand and Lohninger (2020), we argue that finiteness does not determine ICH and we should not define finiteness by selection. ICH is a descriptive generalization derived by the containment relations of clausal domains. The clausal properties of independence, complexity and transparency are empirical ob-

servations coming from the way clauses are built. Wurmbrand et al. (2020) argue that ICH is a more fundamental observation for complementation while finiteness is a clausal property that is sensitive to it in an ‘implicational’ manner. Namely, it is not the case that *Proposition* complements have to be finite and *Event* complements have to be non-finite universally. If *Event* complements only have the finite representation (if the property of defining finiteness is clear in the language), *Situation/Proposition* complements to the left of *Event* complements on the ICH scale would also only have the finite option. It is impossible for a *Proposition* complement to be non-finite if the *Event* complements only possess the finite version in the language.

The evidence comes from languages that overtly mark finiteness morphologically. For example, though English *Event* complements can only take the non-finite form, as shown in (476d), *Proposition* complements can be finite clauses or infinitives, shown by the control example and ECM example in (476a-b). Therefore, it is not correct to assume that all *Proposition* complements are finite. *Situation* complements in English mostly go for the non-finite form but also allow the finite form, as shown by the example in (476c). According to Wurmbrand and Lohninger (2020), in Cypriot Greek all clauses are marked as finite with tense and agreement inflections. Bulgarian and Macedonian hold a similar pattern as Greek in not allowing infinitives (lack of agreement) in any context, as shown by the example in (477). Therefore, it is also incorrect to claim that all *Event* complements are non-finite, if we follow the assumption that finiteness is expressed by agreement in these languages (Wurmbrand and Lohninger 2020; Wurmbrand et al. 2020).

(476) a. Clara claimed to have left/that he left.

- b. Clara believed John to be smart/that John is smart.
- c. Clara decided to leave/that he would leave.
- d. Clara tried to win/??that she would win.

((476a, c,d) cited from Wurmbrand and Lohninger 2020)

- (477) a. eprospaθisen {*oti/na} lisi to provlima.
 try.PFV.PST.3SG {*that/NA} solve.PFV.PRS.3SG the problem
 'He tried to solve the problem.'

(Cypriot Greek, cited from Wurmbrand and Lohninger 2020)

- b. Lea se opitvaše {*če/da} čete kniga
 Lea REFL try.PRF.3.SG {*that/DA} read.PRS.3SG book
 'Lea tried to read a book.'

(Bulgarian, cited from Wurmbrand et al. 2020)

- c. Lea probala {*deka/da} čita kniga
 Lea try.PRF.3.SG {*that/DA} read.PRS.3SG book
 'Lea tried to read a book.'

(Macedonian, cited from Wurmbrand et al. 2020)

Though we cannot tell whether a clause is finite or not based merely on its temporal and referential properties, the possibility of having finite/non-finite forms of a clause does follow ICH, a hierarchy classified by the temporal and referential properties. Wurmbrand and Lohninger (2020) take the micro-parametric variation regarding finiteness in South Slavic languages to show this point. South Slavic languages adopt agreement to express finiteness. Bosnian, Croatian, Serbian and Slovenian all disallow infinitive complements for verbs that take *Proposition* complements. Verbs taking *Situation* complements allow infinitives in all four languages, but exhibits variations. Bosnian, Slovenian and

Serbian allow infinitives or finite forms, but Croatian strongly dis-prefers any finite form. The *Event* complements permit infinitives in Bosnian, Croatian, Serbian and Slovenian. In Croatian and Slovenian, infinitive is the only possible form. A finite complement clause is allowed in Serbian and possibly in Bosnian. But the judgements for Bosnian differ and the distribution is not fully determined. The finiteness preferences among a sample of nine languages are summarized in Table 4.7.

Table 4.7: Finiteness preferences across languages

Language	Proposition	Situation	Event
Bulgarian, Greek	finite	finite	finite
Romanian, Akan	finite	finite	(non-)finite
English	(non-)finite	(non-)finite	non-finite
Serbian	finite	(non-)finite	(non-)finite
Bosnian, Slovenian	finite	(non-)finite	non-finite
Croatian	finite	non-finite	non-finite

(Wurmbrand and Lohninger 2020: Table 8)

Table 4.7 shows that there is no absolute mapping between the type of clauses and realization of finiteness. ‘(Non-)finite’ suggests that finite form and non-finite form are both available for this class. In languages where all clauses are possible to be marked as finite morphologically, the distinction among the three types of complements is still detected by the type of clause introducer (Greek, Bulgarian, Macedonian), availability of overt embedded subjects (Serbian) etc. This indicates that the complementation hierarchy determines the coding of finiteness but not the other way around. Furthermore, Table 4.7 demonstrates an implicational relation of availability of finite/non-finite forms: *Proposition* complements are never ‘less’ finite than *Situation* complements and *Event* complements. Languages can have finite (Bulgarian, Greek) or non-finite forms (English) for

all three types of complements, but we cannot find a language with *Proposition* complements being limited to the non-finite form and *Event* complements being limited to the finite form. If the language allows a finite vs. non-finite distinction, the *Proposition* complements are more 'finite' than the *Event* complement.

The idea of '*finiteness*' adopted in the Mandarin literature, in our view, is more often treated as a descriptive term of the observations about independence, transparency and complexity of clausehood. In the discussion, we see a close relation among clause size, temporal/referential independence, transparency, complexity and finiteness, because these observations center around the universal ICH derived from the containment relation among structural domains. Thus are destined to be intertwined. Temporal/referential independence are properties adopted to classify the three classes of complements that build the hierarchy. ICH is derived via the containment relation of clausal domains, hence transparency, complexity and the size of clauses are direct empirical reflections of these domains, even though syntactic clause sizes are not always the absolute mapping of meaning.

The properties of Mandarin that are parallel to the finite/non-finite distinction in English can be explained by the existence of an Operator domain and tense. Specifically, SFPs are elements in the Operator domain hence *Situation/Event* complements lacking this domain are incompatible with SFPs that are able to be embedded. The commonality shared by *le₂* and *laizhe* is that both are sensitive to tense (and aspect).²⁰ Epistemic modals

²⁰One potential possibility can also be due to the semantic conflict between these two SFPs and the complementation requirements of the configuration (mainly the semantic properties of the matrix predicate in this case), a topic we leave for future research.

are elements high above TP (Cinque 1999) and scope above SFPs such as *le₂* and *laizhe*, hence are also located in the Operator domain. The existence of an Operator domain (a contentful CP) also blocks restructuring, therefore inner topicalization and focus fronting are also blocked in *Situation/Event* complements. Complements that match the future-irrealis requirement of the matrix predicate are able to license overt future modals if it is tensed. Overt subjects in the complement may follow the Case-driven analysis for overt DP distribution in English, with the same assumption that a tensed T is able to license nominative case while a deficient T cannot.

One possible way to think about the property of expressing finiteness in Mandarin, if we keep this concept in the theory to capture the parallelism between English and Mandarin, is to define it via tense. Morphosyntactic properties that draw a line between finite and non-finite clauses include availability of future modal *hui* and potentially the availability of referentially independent subjects. The root clauses that serve as independent assertions possess a T with concrete semantic tenses, license referentially independent overt subjects and bear an Operator domain given the fact that SFPs and epistemic modals are all available in root clauses. It is natural to assume that they are finite clauses. *Proposition* complements show a similar pattern of flexible temporal interpretations with the same morphosyntactic marking, contain an Operator domain and are referentially independent for subjects. Based on these similarities, we propose that Mandarin *Proposition* complements also contain semantic tenses and a syntactic T with a [+T] feature. They are finite clauses in Mandarin. In contrast, a non-finite clause is tenseless without a syntactic T (or a deficient T with a [-T] feature). *Event* complements do not project TP or only

carries a deficient T with the [-T] feature, showing a different temporal reference and subject reference pattern (not only semantically but also syntactically) from root clauses and *Proposition* complements. *Situation* complements are often non-finite in Mandarin, given our assumption that future modal *hui* has to be licensed by a [+T] T⁰ with semantic tense and the fact that overt future modal *hui* is not available in *Situation* complements. In general, this class of complements also disallow overt embedded subjects. However, some *Situation* complements also allow finite clauses, given the facts that they allow the overt future modal *hui* and referentially independent embedded subjects. For example, in (478a), on the one hand, the complement of *jueding* ‘decide’ has constrained temporal reference like other *Situation* complements, i.e. denote a future irrealis interpretation. On the other hand, *jueding* ‘decide’ also allow *hui* and independent overt subjects, like other *Proposition* complements, demonstrating a similar pattern with the finite complement of English ‘decide’. Therefore, we suggest that even *Situation* complements are often non-finite in Mandarin, some of them can also take finite clauses.

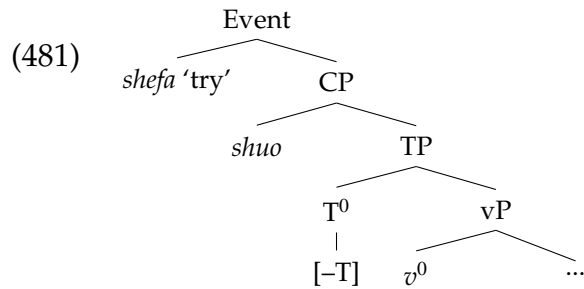
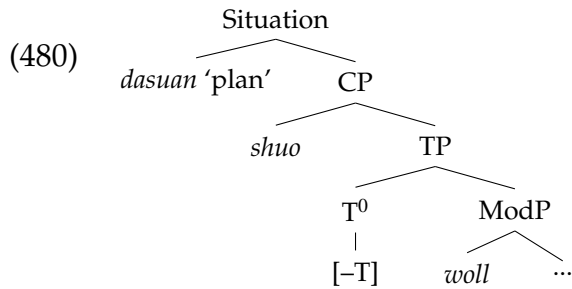
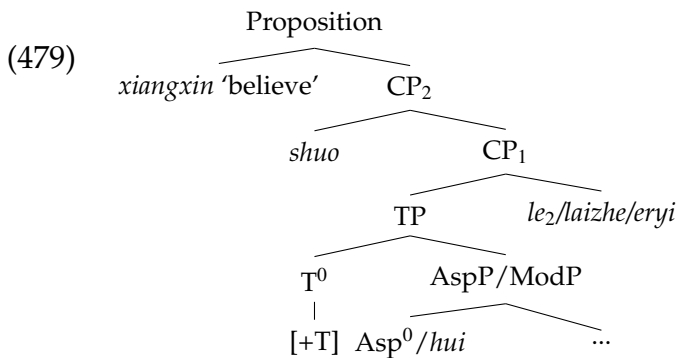
- (478) a. Gongsì jueding xia-ge yue Zhangsan hui jieshou zi-gongsì de
 company decide next-CL month Zhangsan *hui* take-over son-company DE
 yewu.
 business
 ‘The company decided that Zhangsan will take over the business of the subsidiary company next month.’
- b. The company decided that Zhangsan will take over the business of the subsidiary company next month.

In summary, the property expressing finiteness is tense in Mandarin. Elements that bear a [+T] feature (tense from the TAM domain) or elements need to be licensed by

[+T] (overt future modal *hui*) are projected in finite clauses and are disallowed in non-finite clauses. *Proposition* complements are finite in Mandarin while *Event* complements are non-finite. *Situation* complements more often take the non-finite form, yet are also able to be finite. Finiteness related to the three types of complements are summarized in Table 4.8. The possible functional projections among the three classes of complements are demonstrated in (479)-(481).

Table 4.8: Finiteness in Mandarin

Language	Proposition	Situation	Event
Mandarin	finite	(non-)finite	non-finite



4.7. Conclusions

In this chapter, we systematically investigate the (in)dependence, complexities and transparency of Mandarin complement clauses based on various morphosyntactic tests. We

observe three types of complement clauses: *Proposition* complements, *Situation* complements and *Event* complements. The minimal functional domains of *Proposition*, *Situation* and *Event* complements are the Operator domain (e.g. CP), TAM domain (e.g. *wollP*) and Theta domain (e.g. vP) respectively. Complements possess minimal structures, but are also possible to have larger-than-expected projections. The containment relation among the minimal functional domains determines an Implicational Complementation Hierarchy (ICH). Whenever a morphosyntactic distinction is observed among the three types of complements, a clause is always more dependent, more transparent, more integrated, less complex than those to its left. Finiteness is also encoded according to ICH. Namely, if a language allows/requires a finite form in a type of complement, all types of complements further to the left on ICH also allow/require a finite form.

The property expressing finiteness in Mandarin is tense. If a clause prohibits categories that possess [+T] or are licensed by [+T], the clause is non-finite and is the Mandarin counterpart of infinitives in English. These are *Situation* complements and *Event* complements in Mandarin. If a clause allows categories associated with [+T], then it is finite. These are *Proposition* complements in Mandarin. Elements that are not sensitive to [\pm T] are available for the three classes of complements as long as these elements successfully yield an interpretable reading. The meaning of a predicate and the complement interacts dynamically. Some predicates are flexible with different types of complements while some predicates are strict with a certain type of complements. Coercion is the last resort to handle mismatching. In general, the meaning of the predicate will change a bit to accommodate an 'imperfect' complement.

Chapter 5

Conclusions and future research

5.1. General conclusions

This dissertation offers a systematic investigation of the temporal interpretations of root clauses and complement clauses in Mandarin involving functional projections of tense, aspect and modality, with a focus on the semantic analysis for root clauses and a more syntactic analysis for complement clauses.

This dissertation investigated the potential of the non-future tense approach and the two-null-tense approach in accounting for the Mandarin data. We compare the possible directions of the two analyses in accounting for constraints on temporal adverbs, perfective aspect reporting past eventualities and PEDT (plural eventualities in different temporal locations). This dissertation concludes that a two-null-tense analysis can capture the facts as good as a non-future tense approach. PEDT is the most challenging fact for the two-null-tense analysis. However, we show that two null tenses can also capture the Mandarin-type PEDT. Adjunct PEDT is derived if we assume coordination of two tense phrases. Dead individuals are compatible with present tense in English, hence Subject PEDT involving dead individuals is not an argument against the existence of two null tenses. The advantage of a two-null-tense hypothesis is that it easily captures the parallelism between English and Mandarin in lacking present perfective by maintaining a simple and unified analysis for the aspectual system and a regular analysis for the tense system. We conclude that the two analyses perform equally well in empirical coverage. But the two-null-tense approach builds on more general and unified assumptions for perfective and the tense system, hence is theoretically a better option.

This dissertation also provides the first thorough investigation on future readings in Mandarin, taking into account the following factors: constraints on eventualities, time adverbs, tense and aspect. Specifically, we argue that the overt future morpheme *hui* and the covert future morpheme PLAN contain both a futurity component and a modal component. We argue that *hui* contains an epistemic modal base constrained by bouletic or inertial ordering sources. *Hui* presupposes that its complement is non-perfective and the evaluation time is the utterance time. Hence perfective aspect is incompatible with *hui* and *hui* in root clauses only denotes a present future reading. We observe that *hui* can have non-future usages only in NPI licensing contexts and modal concords. Other than *hui*, this dissertation also contributes the first formal analysis for futurate constructions in Mandarin. The futurate constructions contain a covert future modal PLAN with specific presuppositions. On top of the non-perfective requirement, PLAN also presupposes the existence of a plan that requires the eventuality to be able to be scheduled. PLAN has more flexibility of the evaluation time when the time adverb is not indexical.

Based on the understanding of the root clauses, in this dissertation we investigate the temporal interpretations, distribution of aspect, modals and sentence-final-particles in complement clauses. Following [Wurmbrand and Lohninger \(2020\)](#), we categorize complement clauses into three groups based on their temporal/subject referential (in)dependence: *Propositions*, *Situations* and *Events*. The Implicational Complementation Hierarchy is also observed in Mandarin. The *Proposition* complements are more independent, more complex and less transparent than *Situation/Event* complements. We argue that a *Proposition* complement contains at least a CP, a future irrealis *Situation* complement contains at least

a *wollP* and an *Event* contains at least a vP. Though all three types of complements have the option to project a syntactic CP (headed by the trivial complementizer *shuo*), only the *Proposition* complements contain the semantic Operator domain (CP), allowing sentence final particles and functional projections related to the Operator domain. This dissertation suggests that *Proposition* complements contain semantic tenses and syntactic tenses as root clauses do, hence are able to license *hui* and overt subjects. *Situation* complements and *Event* complements not only lack the (semantic) Operator domain, but also lack semantic tenses. We follow the insights of decompositional approaches for English overt future modals by assuming that Mandarin *hui* is licensed by tense. Thus the overt future modal *hui* is incompatible with *Situation* complements even though it is perfectly fine in *Proposition* complements when denoting future irrealis readings. Finiteness in Mandarin, can be defined by tense. Namely, tensed complements are finite (*Proposition* complements) while complements without tense are non-finite (*Situation* complements disallowing *hui* and *Event* complements).

5.2. Future Research

This dissertation aims to make a contribution in deeper understanding of tense, aspect, modality, complementation, finiteness and the interaction among these concepts, taking Mandarin as a case study. Limited by space, there are many open issues and loose ends in this project that are important to shed lights on general properties of human languages and cross-linguistics variations.

The first topic for future research is the semantic analysis for complement clauses.

In our investigation of temporal interpretations in Mandarin root clauses, we show that both the non-future tense analysis and two-null-tense analysis work empirically for Mandarin, with a preference for the two-null-tense analysis due to its simple assumptions of the tense and aspect system. We are curious about what this analysis would say for complement clauses. Temporal interpretations and morphological markings are slightly different in complement clauses than in root clauses. For instance, the matrix predicate is often unmarked by aspect markers even the sentence is denoting an epistemic reading. In Chapter 4, we have also shown the difference in future marking of complement clauses depending on the meaning of the matrix predicate and the complement clauses. To test the potential of the current analysis, our next step is to aim for a semantic analysis for complement clauses.

Other than a theory for finite complements (*Proposition* complements) and non-finite complements (*Situation/Event* complements) in the language, phenomena such as ‘sequence of tense’ and ‘double access’ observed for languages with overt tense morphology deserve further investigations to see if they have Mandarin counterparts and potential cross-linguistic variations (if they are observed in Mandarin). In this dissertation, we have proposed two covert future modals: *PLAN* and *woll*. The semantics of *woll* contains the forward shifting component, yet we have not looked into the details of its modal component and the difference between *PLAN* and *woll*. Once the analysis for finite complements and infinitives is done, we can then move on to the long-lasting puzzle of ‘aspect lowering’ in Mandarin.

The second topic of our interest is the non-future usages of future morphemes. One

of the contributions of this dissertation is the generalization of properties associated with environment licensing non-future usages of future morpheme *hui* in Mandarin: NPI licensing environment and modal concords. The reason why these contexts license non-future usages is still unknown to us and deserves further investigation to shed lights on the nature of future morphemes in tenseless languages.

The third topic that we would like to investigate in the future is the SFP *le*₂ and the ‘perfect’ usages in Mandarin. In Chapter 2, we mentioned that *le*₂ may play part of the role of ‘perfect’ in English. Also, the interaction between *le*₁ and modals patterns similarly in some aspects to the interaction between perfect and modals in English. Other than that, the Mandarin translations of English perfect sentences often involve the aspectual adverb *yijing* ‘already’. Therefore, what are the semantic building blocks of English perfect and how these building blocks are composed in another language in which we have no idea about what the exact counterpart of ‘perfect’ is are interesting. Moreover, English (present) perfect have different interpretations: experiential perfect, resultative perfect and universal perfect etc. Whether these interpretations are also observable in Mandarin and how we are going to analyze them remain an unexplored topic.

Last but not least, this dissertation makes the claim that the non-culminating reading is better to be implemented independently via a covert operator rather than the perfective aspect. But a theory to account for the three possibilities of interpretations (culmination entailment for resultative compounds, partial success readings and failed attempt readings) in Mandarin and possibly in other languages is still missing. Non-culminating accomplishments are widely observed in many languages. Based on a small sample of

languages (English, Hindi, Mandarin, Russian), we notice that partial success readings are common for languages that allow non-culminating accomplishments, failed attempt readings are less common. We would like to take on this topic in the future as well.

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