T(ENSE) IN MANDARIN CHINESE:
FORM AND MEANING

A Dissertation

Presented to the Faculty of the Graduate School

of Cornell University

in Partial Fulfillment of the Requirements for the Degree of

Doctor of Philosophy

by

Nan Li

August 2016

T(ENSE) IN MANDARIN CHINESE:

FORM AND MEANING

Nan Li, Ph.D.

Cornell University 2016

This dissertation shows how Mandarin Chinese encodes temporality without tense morphology within the framework of the Minimalist Program (Chomsky 1993 *et seq.*). I propose that Mandarin has a T(ense) projection in its clause structure, which is headed by a phonologically null element $\emptyset_{y\check{o}u}$ in a non-future episodic sentence. It is optionally pronounced as *yǒu* when the negation marker *méi* moves obligatorily out of its base position under Neg(ation) to attach to it in a non-future negative episodic sentence.

Evidence to support this proposal comes from the fact that $\emptyset_{y\check{o}u}$(/*méiyǒu*) demonstrates two major properties of a T(ense) head: the location of the temporal interpretation of a sentence and the divider of interpretation domains for quantifiers, as proposed in Diesing's (1992) Mapping Hypothesis. Semantic analyses on the temporality of a non-future eventive episodic sentence in Mandarin show that its temporal interpretation is located on $\emptyset_{y\check{o}u}$. It is realized as *yǒu* phonologically, when the negation marker *méi* undergoes obligatory head movement from Neg to attach to it in a non-future negative episodic sentence. This constitutes the first piece of evidence for the TP proposal for Mandarin. The second piece of evidence comes from the observation that strong or presuppositional quantifiers, which include not only canonical ones such as *měigèrén* ('everyone') but also non-canonical ones such as universal free choice expressions *(wúlùn) wh- dōu* ('no matter wh-') and scalar quantifiers such as *(lián)... dōu* ('even'), are interpreted above $\emptyset_{y\check{o}u}$(/*méiyǒu*), whereas weak or existential quantifiers such as *yǒurén* ('someone') or *méiyǒurén* ('nobody') and *yǒu/méiyǒu*-existential sentences are

interpreted below $\emptyset_{y\delta u}$(/*méiyǒu*). This property of $\emptyset_{y\delta u}$(/*méiyǒu*) is consistent with the role played by T in Diesing's (1992) Mapping Hypothesis, which says that presuppositional quantifiers are interpreted above T and existential quantifiers are interpreted below it.

BIOGRAPHICAL SKETCH

Nan Li was born in November 1981. After completing her undergraduate studies at Tianjin University in China in 2003, she went to the University of Tübingen in Germany where she received M.A. in English Linguistics, Medieval English Language and Literature, and China Studies, in 2009. At the same year, she came to Cornell.

To My Parents.

ACKNOWLEDGEMENTS

When I left Tübingen to come to Cornell, a friend of mine gave me a postcard as a farewell souvenir, which says "Das Leben ist ein einziges Abenteuer" ('Life is a unique adventure'). In some sense, this anticipated my Ph.D. years at Cornell. Without doubt, the biggest harvest of this seven-year adventure is the completion of this dissertation. I have been extremely lucky to study with each member on my committee whose influences can be seen throughout this dissertation.

My thanks first and foremost go to my committee chair Molly Diesing. To me, Molly is not only a supervisor who has provided me with constant support and unwavering patience throughout my graduate years, she is also a mentor who has given me tremendous trust and encouragement that have helped me get through personal and academic difficulties. Her academic influence on me is best attested by this dissertation. I would like to thank her for encouraging me to work on this topic and for her detailed comments on drafts at different stages. The inconsistencies she pointed out in previous drafts have helped me reflect on the subject matter and sharpen the arguments developed here. I would also like to thank her for the syntax class in my first year, which has given me lots of fun memories. The way that she weaves fun in her teaching is what I aspire to have.

One major reason that I came to Cornell is because of Mats Rooth, whose work on focus has a great influence on me in the early stage of my linguistic journey. I was very lucky and honored to have him as the chair of my A-exam committee. I would like to thank him for recommending that I take logic classes in the first year of my graduate life, which has benefitted me in my study of semantics since then. Discussions with Mats on various semantic topics were always fun, and I have learnt a lot from him. In particular, the chapter on free choice items in this dissertation is a direct result of his seminar in 2014.

Like Molly and Mats, John Whitman has been on my committee throughout my graduate years. I would like to thank him for his constant support and encouragement over the years. Discussions with him have always been fruitful and inspiring. It is also John who explicitly encouraged me to pursue my intuition on existential constructions in Mandarin, without which there would not have been Chapter 3, and without this chapter there would not have been a sensible connection among all the chapters.

Miloje Despić joined my dissertation committee in a later stage, but his academic influences are no less important. I would like to thank him for his insightful comments and questions on binding in Mandarin. His agreeable personality has made him an excellent peer and friend of mine.

Part of Chapter 2 in this dissertation has been presented in CLS 50, NACCL26, EACL9, and Cornell Workshop on Aspect. I would like to thank the audiences at those occasions.

I would also like to thank other former or current faculty and staff at Cornell, who have been very supportive over the years. They are John Bowers, Abby Cohen, Draga Zec, John Hale, Roni Katzir, Michael Weiss, Harold Hodes, Sarah Murray, Will Starr, Wayne Harbert, Sally McConnell-Ginet, Wayles Browne, Dorit Abusch, Angie Tinti, Holly Boulia, Michael Williamson, Bruce McKee, Felicia Teng and Stephanie Divo. Thanks to the generations of CLCers for being part of my graduate life; especially my cohort David Lutz, Neil Ashton, Linda Heimisdottir, Natalia Buitrago! Special thanks to Cara DiGirolamo for being the dedicated and competitive badminton partner that I had wished for.

My decision to pursue a Ph.D. in Linguistics originated from the semantic lectures and seminars taught by Sigrid Beck at Tübingen. I would like to thank her for her inspiration and encouragement.

TABLE OF CONTENTS

CHAPTER 1

INTRODUCTION

1.1   The main issue

Time is one of the fundamental elements of human perceptions of the world. Its significance to human beings is reflected in human languages among other things. Many languages employ a small set of affixes to systematically differentiate the concept of past, present, and/or future. English, for instance, attaches to verbs *-s* to mark present when the subject is third person singular, and *-ed* to mark past for all number and persons. This system is called *tense*, and I will call it *morphological tense* in the sense that this tense system marks temporality with overt morphology. Within the framework of the Minimalist Program (Chomsky 1993 *et seq.*), a functional head called *T(ense)* is proposed to encode the temporal information of a sentence; this head projects to a Tense Projection (TP). In English, for example, T encodes temporality via some relationship set up between it and the tense morpheme on inflected verbs. However, not every human language utilizes morphological tense. Mandarin Chinese is such a language, where verbs do not take any inflectional markings for temporality at all. Clearly, native speakers of Mandarin understand each other without confusion about temporality. Thus, how temporality is expressed in Mandarin becomes an issue that bears theoretical relevance to the question of the universality of TP. In other words, given that there is no morphological tense in Mandarin, can one still propose a T in the clause structure of Mandarin sentences that is on a par with T in other languages with morphological tense such as English?

Two approaches to the above question have been discussed in the literature . One approach, which considers morphological tense indicative of structural T(ense), and vice versa, argues that there is no TP in Mandarin and temporal interpretation of a sentence

depends on linguistic devices such as aspectual markers, Aktionsarten and temporal adverbials, or non-linguistic devices such as contexts, or sometimes both. This approach, which I call *the no-T approach*, can be found in Smith 1997; Smith & Erbaugh 2005; Lin 2006; Bittner 2012 among others. The other approach, which I call *the null-T approach*, argues that Mandarin has a phonologically null TP based on the assumption of the universality of TP (Huang et al. 2009 a.o.), temporal interpretation of specific constructions (Simpson & Wu 2002; Tsai 2008b; Sun 2014), or comparison to other tense languages (Sybesma 2007).

This dissertation addresses the question from the perspective of negative sentences and proposes that TP is realized in Mandarin. It utilizes two general properties that T has been proposed to have as diagnostics. On the semantic side, T is argued to encode the temporality of a sentence; on the syntactic side, T is proposed in Diesing's (1992) Mapping Hypothesis to 'draw a line' in the clause structure with respect to quantifier interpretations. Specifically, presuppositional quantifiers are interpreted above T, whereas existential quantifiers are interpreted below T.

I show that a phonologically null element $\emptyset_{y\check{o}u}$ in an episodic eventive sentence, which is pronounced as *yǒu* when attached by the negation marker *méi*, encodes non-future temporality, and it resides in T (Chapter 2)[1,2]. I then show in Chapter 3 that canonical presuppositional quantifiers such as *měigèrén* ('everyone') are interpreted above $\emptyset_{y\check{o}u}$(/*méiyǒu*), whereas existential quantifiers are interpreted below it. This property of $\emptyset_{y\check{o}u}$(/*méiyǒu*) is consistent with the role that T plays in Diesing's (1992) Mapping

---

[1]As is shown in Section 2.6 of Chapter 2, $\emptyset_{y\check{o}u}$(/*méiyǒu*) only appears in episodic sentences with predicates of events (Davidson 1967) or Davidsonian states (Maienborn 2005). Negation of episodic sentences with predicates of Kimian states (Maienborn 2005), the copular verb *shì* ('be'), adjectival predicates, as well as modals all takes the negation marker *bù*, which is considered a prefix. I will leave out the question whether TP also exists in these episodic sentences in this dissertation. See Sun 2014 for a proposal.

[2]Unless noted otherwise, I will use the term *episodic eventive sentence* as a cover term for both episodic eventive sentences and episodic sentences that describe Davidsonian states.

Hypothesis. To strengthen the argument, I discuss two non-canonical presuppositional quantifiers: universal free choice items *(wúlùn) wh- dōu* ('no matter wh-') (Chapter 4) and scalar quantifiers *(lián) ... dōu* ('even') (Chapter 5). I show that they too are interpreted above $\emptyset_{y\check{o}u}$(/*méiyǒu*).

1.2   The syntactic framework

The dissertation is written within the framework of the Minimalist Program (Chomsky 1993 *et seq.*). In this framework, the derivation of a sentence has three components: structure building (Syntax), Logical Form (LF), and Phonological Form (PF). Derivations start in the Syntax and transfer completed units known as *phases* to LF for interpretation and to PF for phonological realization. While both LF and PF receive 'products' from Syntax, they are considered two independent systems that do not interact with each other.

Three syntactic operations are mentioned in this dissertation. They are *Merge*, *Move*, and *Agree*. Merge is the basic structure building operation that puts two linguistic items into one. Move is the operation that moves a linguistic item from one structural position to another. Following the copy theory of movement (Nunes 1995), one can equate Move to Copy + Merge. Agree is the linguistic operation which establishes dependency via features.

In particular, I assume with Pesetsky & Torrego 2007 that syntactic features have two parameters: interpretability and valuation. Combination of these two parameters generates four types of syntactic features: interpretable and valued features (**[iF, +val]**), interpretable and unvalued features (**[iF, -val]**), uninterpretable and valued features (**[uF, +val]**), and, uninterpretable and unvalued features (**[uF, -val]**). Features that match each other, i.e., having the same syntactic functions, enter into a relation called *feature sharing*,

after which uninterpretable features get deleted and unvalued features share the value of a valued feature, if there is one. A grammatical derivation will have all uninterpretable features deleted and all unvalued features valued before LF[3].

For example, Pesetsky & Torrego (2007) proposes that T in English has an interpretable but unvalued tense feature **[iF, -val]** and inflected verbs in *v* have an uninterpretable but valued tense feature **[uF, +val]**. For the derivation to succeed, T Agrees with the inflected verb in *v* to get its tense feature; meanwhile, the inflected verb gets its uninterpretable tense feature deleted. Thus, there is no uninterpretable feature left in the derivation, which is illustrated in (1.1).

(1.1) T in English: Agree with *v*:
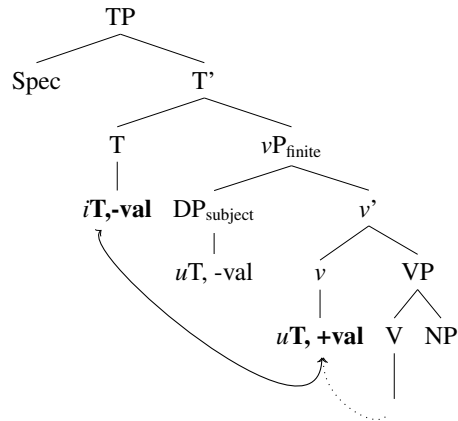
1.3 The semantic framework

The semantic framework of this dissertation is based on Heim & Kratzer 1998. In this framework, the meaning of a sentence is equated with the truth conditions of the sentence

---

[3]A note on arrow representation in this dissertation: dotted arrows: movement; solid double-headed arrows: successful Agree-operation; dashed double-headed arrows: unsuccessful Agree-operation.

(Tarski 1935/1956). In other words, to understand a sentence is to know under what condition the sentence is true. The meaning of a sentence is also assumed to obey compositionality which says that the meaning of a sentence depends on the meaning of its lexical items and the way they combine with each other (Frege 1923-6).

Technically, denotations can be characterized in terms of semantic types across syntactic categories. Two basic types are (a.) type e for individuals; (b.) type t for truth-values. The semantic domain for type e is defined as $D_e := D$, and the semantic domain for type t is $\{0,1\}$. Semantic types are built recursively, defined in (1.2).

(1.2) Semantic types (Heim & Kratzer 1998: 28):

    i. e and t are semantic types.

    ii. If σ and τ are semantic types, then $< \sigma, \tau >$ is a semantic type.

    iii. Nothing else is a semantic type.

(1.3) gives several semantic types that are used in this dissertation.

(1.3)   i. properties such as *to dance*: $< e, t >$

    ii. quantificational phrases such as *everyone*: $<< e, t >, t >$

    iii. quantifiers such as *every*: $<< e, t >, << e, t >, t >>$

Semantic derivations proceed via a small set of rules, which are shown in (1.4)[4].

(1.4) The basic rules for semantic derivations:

---

[4]In Heim & Kratzer 1998, $[\![\alpha]\!]$ means the denotation of a linguistic expression α.

i. *Functional Application* (FA): if α is a branching node, $\{\beta, \gamma\}$ is the set of α's daughters, and $[\![\beta]\!]$ is a function whose domain contains $[\![\gamma]\!]$, then $[\![\alpha]\!] = [\![\beta]\!]$ $([\![\gamma]\!])$.

ii. *Predicate Modification* (PM): if α is a branching node, $\{\beta, \gamma\}$ is the set of α's daughters, and $[\![\beta]\!]$ and $[\![\gamma]\!]$ are both in $D_{<e,t>}$, then $[\![\alpha]\!] = \lambda x \in D_e.[\![\beta]\!](x) = [\![\gamma]\!](x) = 1$.

iii. *Predicate Abstraction* (PA): if α is a branching node whose daughters are a relative pronoun and β, then $[\![\alpha]\!] = \lambda x \in D. [\![\beta]\!]^x$.

1.4   Scope properties in Mandarin

One scope property that sets Mandarin apart from languages like English is that the former has no surface scope ambiguity (Huang 1982 a.o.). For example, an English sentence such as (1.5) is ambiguous.

(1.5) Some student ate every apple in the basket.

On one reading, (1.5) means that there was a certain student who ate all the apples, in which scenario there was only one student. In this reading, the existential quantifier *some student* is said to have scope over the universal quantifier *every apple*. On the other reading, where the scope of the two quantifiers is reversed, the sentence means that for every apple in the basket, there was a possibly different student who ate it. In this scenario, the relation between the number of apples and the number of boys may be many to many.

By contrast, the above scope ambiguity between quantifiers is not observed in Mandarin. For example, the Mandarin counterpart of (1.5) is not ambiguous and only has

the reading where the existential quantifier scopes over the universal quantifier, which is illustrated in (1.6)[5].

(1.6) 有　(一)　个　学生　　吃　了　篮子　里　　的　　每　　(一)　个
　　　 yǒu　(yí)　gé　xuéshēng　chī　le　lánzi　lǐ　　de　　měi　(yí)　gè
　　　 YOU　(one)　CL　student　　eat　LE　basket　inside　POSS　every　(one)　CL
　　　 苹果。
　　　 píngguǒ.
　　　 apple
　　　 'Some student ate every apple in the basket.' (∃ ≫ ∀, *∀ ≫ ∃)

In fact, this property of Mandarin is not only between quantifiers but also between any two operators that have scope properties such as between universal quantifiers and negation operators. The Mandarin sentence in (1.7) is not ambiguous, whereas its English counterpart in (1.8) is. As is shown, the scope interpretation of (1.7), like the one of (1.6), follows the surface left-to-right linear order, with the word on the left scoping over the word on the right.

(1.7) 每　　个　人　　都　　没有　　说话。
　　　 měi　gè　rén　dōu　méiyǒu　shuōhuà.
　　　 every　CL　people　DOU　not.R　talk
　　　 'Everyone did not talk.' (∀ ≫ ¬, *¬ ≫ ∀)

(1.8) Everyone did not talk. (∀ ≫ ¬, ¬ ≫ ∀)

In the Minimalist program, subject is assumed to be base-generated at Spec *v*P and moves to Spec TP. The fact that Mandarin does not have surface scope ambiguity can be considered as a result of lacking quantifier reconstruction. Thus, the linear order for

---

[5]Gloss: 3: third person; ABL: ability; CIR: circumstantial; CL: classifier; COP: copula; DEO: deontic; DUR: durative; EPS: epistemic; EXP: experiential; FUT: future tense; INF: infinitive; IR: irrealis; IMP: imperative; MASC: masculine; PART: particles; PASS: passives; PAST: past tense; PERF: perfective; PL: plural; PRES: present tense; PROG: progressive; POSS: possessive; R: realis; REL: relativizer; SG: singular.

scope interpretation is equivalent to a hierarchical syntactic tree structure, with the left word above the right word, which is illustrated in (1.9).

(1.9) *Linear order - hierarchical structure* correspondence in Mandarin:

$$X \ldots Y \quad \equiv$$
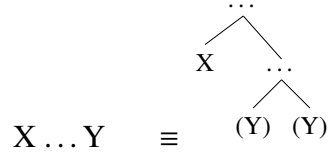
1.5 Chapter overview

Chapter 2 is concerned with temporal interpretation of non-future episodic eventive sentences in Mandarin. I argue against the aspect-as-tense theory formalized in Lin 2006, which claims that the temporal information of a sentence in Mandarin is encoded in the perfective aspect that projects a functional Asp(ect)P and thus there is no need to have T(ense) projection in Mandarin. I show that negative sentences pose a challenge to the aspect-as-tense theory. In Lin 2006, an affirmative sentence with *le*, a perfective aspectual marker that heads AspP, encodes its temporality in *le*. However, its negated counterpart with the negation marker *méiyǒu* does not have *le*, which raises the question of where the temporal interpretation of its negated sentence comes from. I discuss one account that would potentially save the aspect-as-tense theory, which essentially assumes a phonologically null counterpart of *le* in a negative sentence with *méiyǒu*. This account would put *méiyǒu* in the head of NegP. I show that that it cannot be maintained, because *méiyǒu* cannot be under NegP due to constraints on its distribution. Based on temporal constraints on negative sentences with *méiyǒu* and two language-internal diagnostic tests, I argue that *méiyǒu* is located under T. Since negation itself does not contribute temporal information, I propose that what is actually under T is a phonologically null element

$\emptyset_{y\check{o}u}$, which is optionally realized as *yǒu* when the negation marker *méi* moves from Neg to attach to it. At the end, I provide a syntactic account on the non-cooccurrence of *méiyǒu* and *le* via a feature sharing mechanism proposed in Pesetsky & Torrego 2007, coupled with a semantics for non-future episodic eventive sentences. In the Appendix, I put the proposed TP analysis in a larger context and discuss possible future research.

Chapter 3 discusses existential constructions in Mandarin that include *yǒu/méiyǒu*-existential sentences ('there be') and existential quantificational phrases (EQPs) such as *yǒurén* ('someone') or *méiyǒurén* ('nobody'). These existential constructions use the same words *yǒu/méiyǒu* as do episodic eventive sentences, which is considered non-accidental. On the one hand, I argue that *yǒu/méiyǒu*-existential sentences ('there be') and sentences with existential quantificational phrases (EQPs) in Mandarin share the same structure. Specifically, the word *yǒu* in both constructions is base-generated as a verb in V and assigns a patient role to its NP argument. In a negative existential sentence, the negation marker *méi* is merged above VP headed by *yǒu*. One the other hand, I propose that a non-future episodic existential sentence has the same phonologically null element $\emptyset_{y\check{o}u}$ in T as does a non-future episodic eventive sentence. What is different from these two types of non-future episodic sentences is that TP headed by $\emptyset_{y\check{o}u}$ are merged directly above VP in a non-future episodic existential sentence. In other words, unlike the structure of a non-future episodic eventive sentence, the structure of a non-future episodic existential sentence does not have AspP and *v*P between TP and VP. Since quantifiers are interpreted in situ in Mandarin (Section 1.4), the proposed structure for non-future episodic existential sentences requires that existential quantifiers are interpreted below T. I provide evidence to support this proposal. The result is that in non-future episodic sentences, be it eventive or existential, presuppositional quantifiers are interpreted above T and existential quantifiers are interpreted below T, which is consistent with Diesing's (1992) Mapping Hypothesis.

Chapter 4 gives a detailed syntactic and semantic analysis of one type of universal free choice items (U-FCIs), namely, (*wúlùn*) *wh dōu* U-FCIs, which is often translated into English *no matter wh-* phrases. I show that this type of U-FCIs must be interpreted above $\emptyset_{y\check{o}u}$(/*méiyǒu*) in a non-future episodic sentence, regardless its base position. This provides further support for the argument for TP headed by $\emptyset_{y\check{o}u}$(/*méiyǒu*) in Mandarin. I give a semantics for (*wúlùn*) *wh dōu* U-FCIs that adopts the scalar-implicature proposal for FCIs developed in Fox 2007; Chierchia 2006, 2013. The new semantic proposal accounts for both the universal quantification force and the free choice flavor, and it is thus advantageous over several recent accounts on the same topic.

Following Chapter 4, I present another evidence in Chapter 5 that supports the TP proposal for Mandarin. I show that, similar to (*wúlùn*) *wh dōu* U-FCIs, *(lián) ... dōu* ('even') scalar quantifiers in Mandarin must be interpreted above $\emptyset_{y\check{o}u}$(/*méiyǒu*) as well.

Chapter 6 concludes the dissertation.

CHAPTER 2

T(ENSE) IN MANDARIN CHINESE: FROM THE PERSPECTIVE OF

NEGATION

In the Minimalist Program, the temporal interpretation of a sentence is assumed to be localized in the functional projection T(ense), which checks/agrees with the tense morphemes on verbs in languages such as English (Chomsky 1993 *et seq.*). This theoretical assumption raises the issue whether or not T exists in languages, such as Mandarin Chinese (henceforth Mandarin), that do not have tense morphology.

In the literature on Mandarin, two opposite views on this issue have been expressed. On the one hand, some linguists propose a covert (i.e., phonologically null) T mainly based on the assumption that functional categories are universal (e.g., Simpson & Wu 2002; Sybesma 2007; Tsai 2008b; Huang et al. 2009). On this view, if a functional category can be argued for in one language, it should be present in all the other languages. On the other hand, some linguists argue against a functional T in Mandarin; they claim either that temporal interpretation is associated with a functional Asp(ect) projection (e.g. Lin 2006; Bittner 2012) or is achieved via lexical and/or pragmatic mechanisms (e.g. Smith & Erbaugh 2005).

The universality assumption should not be taken for granted, especially in light of recent studies suggesting that functional categories may not be universal (e.g., Despić 2011, 2013 on DP in Serbo-Croatian). The second approach is worth considering since if temporal interpretation is all encoded in Aspect, there is no need to postulate T. This is compatible with the Minimalist Program.

In this chapter, I focus on analyzing the aspect-as-tense theory for Mandarin as formalized in Lin 2006 and its implications for negative sentences. I show that this

theory cannot provide a coherent temporal interpretation for non-future episodic eventive sentences in Mandarin. To solve the problem, I propose a phonologically null element $\emptyset_{y\check{o}u}$ in T in non-future episodic sentences, which is optionally pronounced as *yǒu* when the sentence negation marker *méi* obligatorily moves out of its base position under Neg(ation) to attach to it in non-future negative episodic sentences. This proposal is supported by both cross-linguistic considerations and language-internal diagnostics. Finally, I illustrate a compositional semantics for non-future episodic eventive sentences in Mandarin based on the newly proposed clause structure.

The chapter is organized as follows. Section 2.1 gives a brief overview of the aspect-as-tense theory as formalized in Lin 2006; Section 2.2 evaluates the theory from the perspective of negative sentences. It is shown that the theory cannot provide a coherent temporal interpretation for negative sentences. This leads to the question about the structural position of the sentential negation marker *méiyǒu*, which is addressed in Section 2.3. I consider two structural options for *méiyǒu*, and propose that it heads a TP based on cross-linguistic considerations and language-internal tests. In Section 2.4, I illustrate a feature-based account of episodic affirmative and negative sentences in Mandarin coupled with compositional semantic derivations. Section 2.5 concludes the chapter. In the appendix (Section 2.6), I propose a new classification of negation markers in Mandarin, the purpose of which is to put the TP proposal developed in this chapter in a larger context. I show that it only applies to episodic eventive sentences and episodic sentences that describe Davidsonian states (Maienborn 2005); thus, future work on temporality on other types of sentences is called for (see Sun 2014 for an attempt).

2.1 The aspect-as-tense theory for temporality in Mandarin

2.1.1 Kleinian tense and aspect in formal semantics

In English and many other languages, the temporal information contained in a sentence is encoded in verbal inflection. For example, the sentence in (2.1) minimally differs from the one in (2.2) with respect to verbal inflection. When uttered out of the blue, (2.1) has a habitual present interpretation whereas (2.2) describes either an episodic past event or a past habitual situation with respect to the utterance time. To disambiguate (2.2), temporal adverbials can be added, as shown in (2.3) and (2.4). Thus, interpretational difference with respect to temporal information is encoded in the inflectional morpheme on verbs in English, i.e., *-s* in (2.1) and *-ed* in (2.2). This grammaticalized encoding system of temporal information is called *tense*.

(2.1) John plays basketball.

(2.2) John played basketball.

(2.3) John played basketball yesterday. (*episodic*)

(2.4) John played basketball when he was young. (*habitual*)

Besides temporal information, some languages also have *aspect*, a grammaticalized system to encode aspectual information of a situation. Roughly speaking, aspectual information is concerned with whether a situation has ended or is still going on with respect to a time point or a time interval. Aspect, when used in this way, is variously called *grammatical aspect*, *viewpoint aspect* (Smith 1991) or *outer aspect* (Travis 2010).

13

Accordingly, English progressive belongs to the class of imperfective aspect since a sentence with the progressive suffix *-ing* on verbs denotes an ongoing event with respect to a time. For example, (2.5) describes a past event of John playing basketball which was still going on with respect to a point in time, i.e., '4pm yesterday'.

(2.5) John was playing basketball at 4pm yesterday.

Klein 1994 defines three notions of time that are encoded in a sentence: the utterance time (TU), the situation time (TSit), and the topic time (TT).[1] The utterance time, as its name indicates, is the time when a sentence is uttered. Situations are eventualities that happen or hold in the world (Bach 1986). A sentence describes a situation. The situation time is defined as the time interval during which the situation as described by the sentence obtains. The topic time is the time interval about which an assertion is made.

Tense and aspect are defined as relations between two times. Tense is a linear relation between TU and TT, which encodes the information about whether the event under discussion is before, after or simultaneous with the utterance time. Aspect, on the other hand, is an inclusion relation between TT and TSit, which encodes the information about whether a situation still holds at a topic time, or, a situation is completed within a topic time. There are three tenses (2.6) and two aspects (2.7).

(2.6) Tenses

    i. Present tense: TT overlaps with TU (TT O TU)

    ii. Past tense: TT precedes TU (TT < TU)

    iii. Future tense: TT follows TU (TU < TT)

---

[1]Earlier research on tense and aspect can be found in Kamp & Rohrer 1983.

(2.7) Aspects

    i. Perfective aspect: TT includes TSit (TSit $\subseteq$ TT)

    ii. Imperfective aspect: TSit includes TT (TT $\subset$ TSiT)

Thus, (2.8) is a representation of the temporal and aspectual information that is encoded in (2.5) in the spirit of Klein 1994.

(2.8)   i. TT = $[\![$ [4pm yesterday] $]\!]$; TU = the time when (2.5) is uttered; TSiT = the duration of the event of John's playing basketball;

    ii. Past tense: TT < TU;

    iii. Imperfective aspect: TT $\subset$ TSiT

Kratzer (1998) formalizes Klein's (1994) semantic notion of aspect with compositional semantic representation. (2.9) is modified from Kratzer's (1998) formulation in order to keep consistency of the discussion in this paper. The predicate *P* denotes a property of time of type *i*.

(2.9)   i. Perfective aspect: $\lambda P_{<i,t>} \lambda t_{\text{Top}} \exists t[t \subseteq t_{\text{Top}} \wedge P(t)]$

    ii. Imperfective aspect: $\lambda P_{<i,t>} \lambda t_{\text{Top}} \exists t[t_{\text{Top}} \subseteq t \wedge P(t)]$

2.1.2   Event realization and default aspect

Bohnemeyer & Swift (2004) observe that the aspectual interpretation of a sentence without overt marking of aspect on its event predicate in some languages (e.g., German,

Inuktitut, and Russian) depends on telicity of the event predicate[2]. By default, a sentence with telic predicates is interpreted with perfective aspect, and a sentence with atelic predicates is interpreted with imperfective aspect. For example, the two Inuktitut sentences in (2.10) and (2.11) do not have overt aspectual marking on their predicates.

(2.10) *Anijuq.*
          ani-juq
          go.out-PAR.3.SG
        'He/she went out.' (Bohnemeyer & Swift 2004: ex.4)

(2.11) *Pisuttuq.*
          pisuk-juq
          walk-PAR.3.SG
        'He/she is walking.' (Bohnemeyer & Swift 2004: ex.5)

In (2.10), the predicate 'to go out' is telic, and by default, the sentence is interpreted as asserting that there was a *completed* 'going out' event by the utterance time. By contrast, the predicate 'to walk' in (2.11) is atelic, and by default, the sentence asserts that there is an *on-going* 'walking' event at the utterance time. Bohnemeyer & Swift (2004) argue that this correlation between telicity of a predicate and viewpoint aspect is established via *event realization*, a Gricean implicature[3]. In other words, a sentence without overt aspectual marking on its event predicate *P* implicates that there is an event

---

[2]Bohnemeyer & Swift (2004), following Krifka (1989, 1998), separate an *event* that occurs in our daily life from a *predicate* which is a linguistic expression and assume that *telicity* is a property of a predicate not an event.

[3] Bohnemeyer & Swift (2004) treat *event realization* as an implicature based on the aspectual contrast as illustrated in the following examples which show that default aspect is cancelable.

  i. Als ich Marys Büro betrat, schrieb sie einen Brief. (Bohnemeyer & Swift 2004: ex.9b)
     when I Mary's office entered(PAST), wrote(PAST) she a letter
     'When I entered Mary's office, she wrote a letter.'

  ii. Als ich Marys Büro betrat, schrieb sie einen Brief. Überrascht blickte sie auf, legte den Stift zur Seite, und lächelte mich an. (Bohnemeyer & Swift 2004: ex.9b')
     when I Mary's office entered(PAST), wrote(PAST) she a letter. surprised looked(PAST) she up, laid(PAST) the pen aside and smiled(PAST) me at.
     'When I entered Mary's office, she wrote/was writing a letter. Surprised, she looked up, put the pen away, and smiled at me.'

e that instantiates the predicate *P* under a topic time t_{Top}. In order to fulfill this realization implicature, predicates with different telicity are correlated with different aspect. The *event realization* is defined by Bohnemeyer & Swift (2004) as follows[4]:

(2.12) $\forall P, t_{\text{Top}}, e \subseteq E[\text{REAL}_{\text{E}}(P, t_{\text{Top}}, e) \leftrightarrow \exists e'[P(e') \wedge e' \leq_{\text{E}} e \wedge \tau(e') \leq_{\text{T}} t_{\text{Top}}]]$

Based on the mereological structure of events and telicity as formalized in Krifka 1989, 1998 and topic time in Klein 1994, (2.12) reads as follows: for all event predicates *P*, topic time t_{Top} and event *e*, *e* realizes *P* under t_{Top} if and only if there exists an event *e'* such that *e'* is an instantiation of the predicate *P*, *e'* is a mereological subpart of *e*, and $\tau(e')$, the duration time of *e'*, is included in t_{Top}. The last conjunct in this definition, i.e., $\tau(e') \leq_{\text{T}} t_{\text{Top}}$, encodes aspectual information.

In order to derive the aspect of a sentence without overt aspectual marking, an operator, named *default aspect*, is proposed to combine with the predicate of the sentence, which is defined in (2.13).

(2.13) $\text{DASP} := \lambda P \lambda t_{\text{Top}} \exists e[\text{REAL}_{\text{E}}(P, t_{\text{Top}}, e)]$

In a sentence with overt aspectual marking, either perfective or imperfective, the overt aspect combines with the meaning of *v*P. But, in a sentence without overt aspectual marking, it is the operator DASP that combines with *v*P. This contrast is illustrated in (2.14).

According to Bohnemeyer & Swift 2004, "(i) suggests that the writing event's onset coincided with the entering (at least this reading is more plausible than the overlap reading)". By contrast, aspectual interpretation of 'schrieb sie einen Brief' in (ii) is ambiguous between a perfective and an imperfective aspect.

[4]$\leq_{\text{T}}$ in (2.12) is equivalent to the inclusion relation $\subseteq$ defined in Kleinian/Kratzerian aspect (section 2.1.1).

(2.14)

```
        TP              TP
       /  \            /  \
      T   AspP        T   AspP
          /  \            /  \
    PERF/IMPF  vP      DASP   vP
```
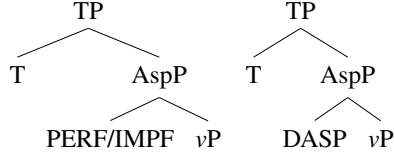
For a sentence with a telic predicate P_t, if there is an event e_1 that realizes P_t under t_{Top}, (i.e., $\text{REAL}_E(P_t, t_{\text{Top}}, e_1)$), then by (2.12), there exists a subevent e'_1 of e_1 such that the run time of e'_1 is included in t_{Top} (i.e., $\tau(e'_1) \leq_T t_{\text{Top}}$) that also realizes P_t (i.e., $\exists e'_1[P_t(e'_1) \wedge e'_1 \leq_E e_1 \wedge \tau(e'_1) \leq_T t_{\text{Top}}]$). Since an event e_1 that realizes a telic predicate P_t has no subevent e'_1 that can also instantiate P_t, unless e'_1 is e_1 itself, e'_1 is necessarily identified with e_1 in order to satisfy *event realization*. Thus, by replacing e'_1 with e_1, we derive that the run time of e_1 is included in t_{Top} (i.e., $\tau(e_1) \leq_T t_{\text{Top}}$), which gives us a perfective aspect.

The situation is more complicated for a sentence with an atelic predicate. When an atelic predicate P_{at} combines with DASP, one derives via (2.13) that there is an event e_2 that realizes P_{at} at a topic time t_{Top}; then by (2.12), there exists a subevent e'_2 of e_2 that also realizes P_{at} (i.e., $P_{at}(e'_2)$), and the run time of e'_2 is included in t_{Top} (i.e., $\tau(e'_2) \leq_T t_{\text{Top}}$). Since an atelic predicate has the property of cumulativity, when an event e instantiates an atelic predicate P, any subevent e' of e would also instantiate P. This provides us with two possible situations, as illustrated in (2.15) and (2.16).

(2.15)

IMPF: $t_{TOP} \subseteq \tau(e)$

$P_{at}(e)$

$P_{at}(e_2)$

$P_{at}(e'_2)$

t

t_{TOP}

(2.16)

PERF: $\tau(e) \subseteq t_{TOP}$

$P_{at}(e)$

$P_{at}(e_2)$

$P_{at}(e'_2)$

t
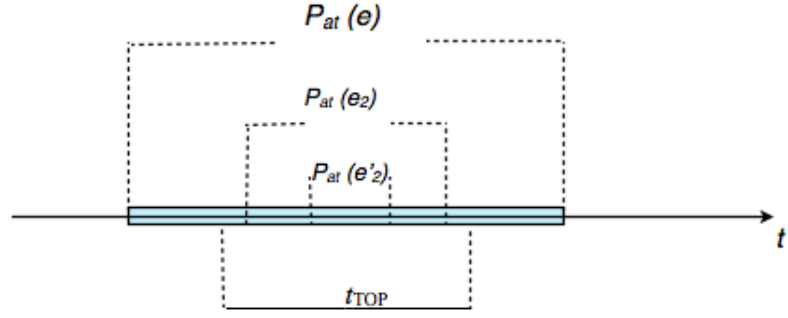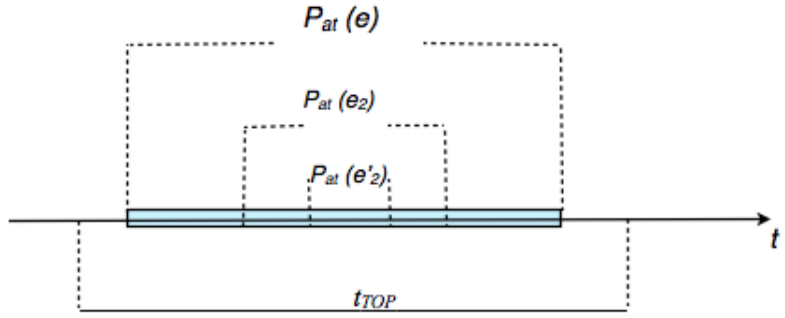
t_{TOP}

Given an event e that instantiates an atelic predicate P_{at}, in both situations, an event e_2 instantiates the predicate P_{at} at t_{Top}, and a subevent e'_2 of e_2 does, too. The difference lies in the relation between t_{Top} and the run time of e that instantiates P_{at} (i.e., $\tau(e)$). In (2.15), t_{Top} is included in $\tau(e)$, which is imperfective; whereas in (2.16), $\tau(e)$ is included in t_{Top}, which is perfective.

However, as observed in telicity-dependent languages, an atelic predicate is interpreted imperfectly by default, not perfectively. Bohnemeyer & Swift (2004) give an argument based on the informativity of a proposition. They observe that, for a sentence with an atelic predicate without any aspectual marking, any subevent that realizes the atelic predicate at a topic time t_{Top} when the sentence is interpreted imperfectively at t_{Top} can also realize the atelic predicate at a topic time t'_{Top} when the sentence is interpreted perfectively at t'_{Top}. For instance, as illustrated in (2.17), when a sentence with an atelic

19

predicate P_{at} and an event e is interpreted imperfectively at a topic time such as $t_{1-\text{Top}}$ (i.e., the upper graph), for any subevent such as e' that instantiates P_{at} at $t_{1-\text{Top}}$, it would also instantiate P_{at} at any topic time such as $t_{2-\text{Top}}$, when the sentence is interpreted perfectively at that topic time (i.e., the lower graph).

(2.17)

IMPF: $t_{1\text{-}TOP} \subseteq \tau(e)$; and $\tau(e') \subseteq t_{1\text{-}TOP}$, where $e' \leq_E e$.
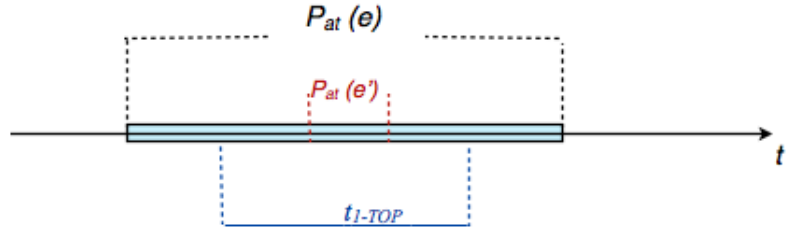
PERF: $\tau(e) \subseteq t_{2\text{-}TOP}$; and $\tau(e') \subseteq t_{1\text{-}TOP}$, where $e' \leq_E e$.
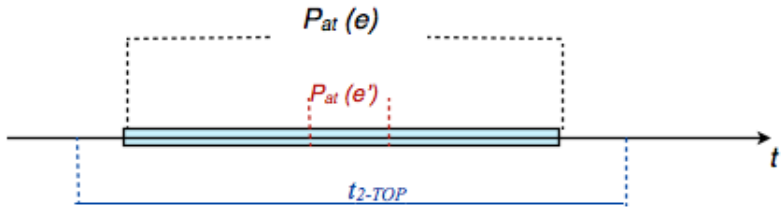
However, the reverse does not hold. As illustrated in (2.18), when the sentence is interpreted perfectively at a topic time such as $t_{2-\text{Top}}$ (i.e., $\tau(e) \leq t_{2-\text{Top}}$) (i.e., the upper graph), it is not the case that, for any subevent e' of e instantiate P_{at} at $t_{2-\text{Top}}$, it could also instantiate P_{at} at any topic time when the sentence would be interpreted imperfectively. In the extreme case shown in the lower graph in (2.18), the sentence is interpreted imperfectively at $t_{1-\text{Top}}$, but the subevent e' bears no inclusion relation to $t_{1-\text{Top}}$. In other words, e' cannot instantiate P_{at} at $t_{1-\text{Top}}$.

(2.18)

PERF: $\tau\,(e) \subseteq t_{2\text{-}TOP}$; and, $\tau\,(e') \subseteq t_{2\text{-}TOP}$, where $e' \leq_E e$.
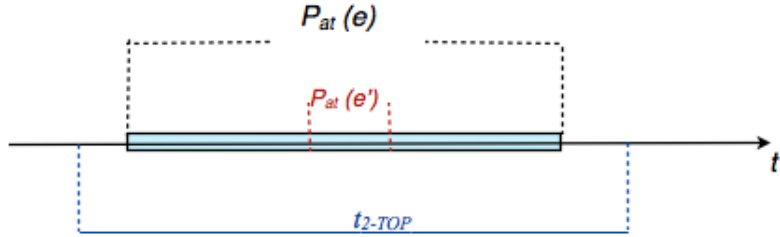
IMPF: $t_{1\text{-}TOP} \subseteq \tau\,(e)$; but, $t_{1\text{-}TOP} \not\subseteq \tau\,(e')$, $\tau\,(e') \not\subseteq t_{1\text{-}TOP}$, where $e' \leq_E e$.
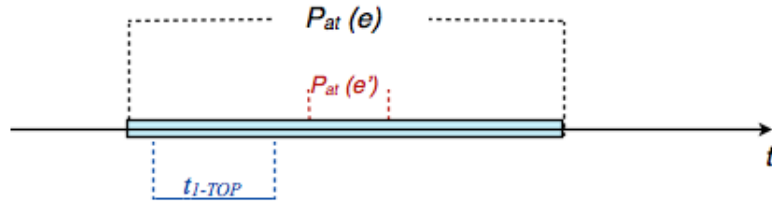
Bohnemeyer & Swift (2004) argue that this asymmetry indicates that, for a sentence with an atelic predicate without overt aspectual marking, a perfective reading of the sentence is stronger than an imperfective reading; thus, the perfective reading needs to be overtly marked. If there is no perfective marking on an atelic predicate, by the Gricean maxim of Quantity, i.e., 'Make your contribution as informative as required', it means that the predicate is not interpreted perfectively, therefore, it has an imperfective aspect.

2.1.3 Lin's (2006) aspect-as-tense theory

Within the framework of the Minimalist Program, the temporal information of a sentence, which is reflected on tense morphemes on verbs in many languages such as English,

21

is assumed to be encoded in a functional Tense projection (TP) in the structure of the sentence. The fact that verbs in Mandarin do not inflect for temporal information raises two major questions with respect to this assumption. First, if there is no tense morphology, how does a sentence get its temporal information? Second, where is the temporal information of a sentence localized in its clause structure? These questions have been addressed to various degrees of detail in the literature (e.g. Simpson & Wu 2002; Sybesma 2007). Most recently, Lin (2006) addresses these questions from the perspective of formal semantics. In essence, he argues that the temporality of a sentence in Mandarin is encoded in aspect; and, structurally, it is localized in a functional Aspect projection (AspP). He thus concludes that there is no need to posit a TP on a par with languages like English for the clause structure of Mandarin. His structural proposal for Mandarin is given in (2.19):

(2.19) [$_{CP}$...[$_{IP}$...[$_{ModalP}$...[$_{AspP}$[$_{Asp}$ *le/guò/zhèngzài/zhe*]...[$_{VP}$...]]]]]

Lin's (2006) argument is based on the observation that bare sentences in Mandarin, i.e., sentences without overt temporal adverbials or aspectual markers, have different temporal interpretations when uttered out of the blue. He gives the sentences in (2.20) and (2.21) as examples.

(2.20) 张三　　很　忙。
　　　 Zhāngsān hěn máng
　　　 Zhangsan very busy
　　 'Zhangsan is very busy.' (Lin 2006: ex.2a)

(2.21) 张三　　打破　一　个　花瓶。
　　　 Zhāngsān dǎpuò yí gè huāpíng
　　　 Zhangsan break one CL vase
　　 'Zhangsan broke a vase.' (Lin 2006: ex.3a)[5]

---

[5]Lin 2006: fn.5 notes that " when a predicate is non-punctual, an aspectual marker is usually needed, ..." This intuition is shared by many native speakers of Mandarin, including the current author. In fact, (2.21) without the particle *le* sounds odd when uttered out of the blue. See Sun 2014 for similar judgement.

When uttered out of the blue, (2.20) has a present interpretation and describes a situation that overlaps with the utterance time. (2.21), however, describes an event that happened before the utterance time, thus, it has a past interpretation.

To account for the temporal distinctions in bare sentences such as (2.20) and (2.21), Lin (2006) adopts the notion of *default aspect* proposed in Bohnemeyer & Swift 2004. As discussed in Section 2.1.2, Bohnemeyer & Swift (2004) argue that default aspectuality in languages without overt aspectual marking can be drived from the telicity of a predicate. Specifically, an atelic predicate selects an imperfective aspect by default, and a telic predicate a perfective aspect. Accordingly, the bare sentence in (2.20) has an imperfective aspect, since '很忙 /hěn máng/ ('very busy')' is an atelic predicate. Similarly, since the predicate '打破一个花瓶/dǎpuò yí gè huāpíng/ ('to break a vase')' is telic, the sentence in (2.21) has a perfective aspect.

However, as it stands in Kratzer's (1998) formalization of the Kleinian aspect in (2.9), repeated here in (2.22), aspectuality itself cannot provide temporal information in a sentence. It only specifies the inclusion relation between event time and topic time. It is tense that relates topic time to the utterance time and spells out the precedence relation between them.

(2.22)   i. Perfective aspect: $\lambda P < i, t > \lambda t_{\text{Top}} \exists t[t \subseteq t_{\text{Top}} \wedge P(t)]$

         ii. Imperfective aspect: $\lambda P < i, t > \lambda t_{\text{Top}} \exists t[t_{\text{Top}} \subseteq t \wedge P(t)]$

Lin (2006) thus assumes two Mandarin-specific rules in (2.23) for the temporal interpretation in a sentence.

(2.23)   i. An expression ϕ of type $< i, t >$ that serves as a translation of a matrix sentence is true iff $[\![\phi]\!](s^*)=1$, where s^* is the speech time.

ii. If ϕ is an expression of type $< i, < i, t >>$, apply the formula

'$\lambda R_{<i,<i,t>>}\lambda t_1 \exists t_2 R(t_2)(t_1)$' to ϕ.

He shows that the semantic denotation of (2.20) can be derived compositionally via (2.23i), as illustrated in (2.24). The last line of the semantic calculation says that there is a time t such that the speech time s^* is included in t and Zhangsan is busy during t, which gives a present interpretation of the sentence.

(2.24) $[\![[_{...}[_{\text{AspP}} Asp_{\text{IMPF}}[_{\text{AdjP}}\text{Zhangsan} [_{\text{Adj}'} \text{very busy}]]]]]\!]^{s^*} =$

$\text{IMPF}(\lambda t\, [busy'(zhangsan')(t)])(s^*) =$ (*by* (2.22ii))

$\lambda P < i, t > \lambda t_{\text{Top}}\exists t[t_{\text{Top}} \subseteq t \wedge P(t)](\lambda t\, [busy'(zhangsan')(t)])(s^*) =$

$\lambda t_{\text{Top}}\exists t[t_{\text{Top}} \subseteq t \wedge busy'(zhangsan')(t)](s^*) =$ (*by* (2.23i))

$\exists t[s^* \subseteq t \wedge [busy'(zhangsan')(t)]$

Note that the rule in (2.23i) is fairly standard for evaluating the truth conditions of an utterance with respect to the utterance time. However, Lin's (2006) implementation in (2.24) is not without problems. After the application of the imperfective aspect defined in (2.22ii), the result $\lambda t_{\text{Top}}\exists t[t_{\text{Top}} \subseteq t \wedge busy'(zhangsan')(t)](s^*)$ is of type $< i, t >$, which appears to be a candidate for the application of the rule in (2.23i). But, by applying (2.23i) in the second to the last step in (2.24), Lin seems to equate the utterance time s^* to the topic time of the sentence under discussion, which is by no means standard.

The reason that the derivation in (2.24) seems to obtain the correct semantics for (2.20) is because the utterance time s^* coincides with the topic time in this specific example. This is not always the case. In fact, later during the discussion on the semantics of the particle *le*, Lin gives the sentence in (2.25) and remarks that " [...], when a temporal adverbial is present as in (18b) [i.e., (2.25) here], the state is only asserted to

be true of an interval overlapping the interval denoted by the temporal adverbial. The state of being depressed might still be true at the speech time ... but this is not part of the assertion made by the speaker."

(2.25) 李四　上　　个　月　　很　　沮丧。
　　　　Lǐsì　shàng　gè　yuè　hěn　jǔsàng.
　　　　Lisi　last　CL　month　very　depressed
　　　'Lisi was depressed last month.' (Lin 2006: ex.18b)

As is clear from Lin's remark, he assumes that the topic time of (2.25) bears a relation with the temporal adverbial '上个月/shàng gè yuè/ ('last month')', but not the utterance time. But he does not seem to notice a problem, which would arise when one tries to derive the semantics of (2.25) the same way as he does to (2.20). To simplify the discussion, let us take the adverbial 'last month' as the topic time in (2.25). A semantic derivation is illustrated in (2.26), which proceeds in a parallel fashion as the one in (2.24) for (2.20).

(2.26) $\llbracket$ [[last month] [...[$_{\text{AspP}}$ Asp_{IMPF}[$_{\text{AdjP}}$Lisi [$_{\text{Adj'}}$ very depressed]]]]] $\rrbracket^{s^*}$ =

$\quad$ IMPF($\lambda t\,[depressed'(lisi')(t)])(last-month')(s^*)$ = (by (2.22ii))

$\quad$ $\lambda P<i,t>\lambda t_{\text{Top}}\exists t[t_{\text{Top}} \subseteq t \wedge P(t)](\lambda t\,[depressed'(lisi')(t)])(last-month')(s^*)$ =

$\quad$ $\lambda t_{\text{Top}}\exists t[t_{\text{Top}} \subseteq t \wedge depressed'(lisi')(t)](last-month')(s^*)$ = (by (2.23i))

$\quad$ $\exists t[last-month' \subseteq t \wedge [depressed'(lisi')(t)](s^*)$

However, the last step in (2.26) has a free variable s^*, which indicates that the derivation is not right. The reason is straightforward. As noted above, the utterance time coincides with the topic time in (2.20); and when the rule in (2.23i) applies, the derivation appears to give us a right semantics for the sentence. However, when the utterance time is different from the topic time, a problem arises. For Lin's rule in (2.23i), when applied as

in (2.24), does not provide enough slots for time arguments, which results in s^* being a free variable in the last step of the derivation. Thus, the rule in (2.23i) does not give the right temporal information of a sentence in Mandarin, contrary to Lin's expectation.

The inadequacy of the rule in (2.23i) also casts doubts on the validity of the rule in (2.23ii), since (2.23ii) is proposed as a remedy for the failed application of (2.23i) to derive a correct temporal information for a sentence with a perfective aspect such as (2.21). This is illustrated in (2.27).

(2.27) $[\![\ [_{...}[_{\text{AspP}}\ Asp_{\text{PERF}}[_{\text{VP}}\text{Zhangsan}\ [_{\text{V}'}\ \text{break a vase}]]]]\ ]\!]^{s^*} =$

$\quad$ PERF($\lambda t\ [break'(vase')(Zhangsan')(t)])(s^*) =$ $\qquad\qquad$ (by (2.22i))

$\quad$ $\lambda t_{\text{Top}}\exists t[t \subseteq t_{\text{Top}} \wedge break'(vase')(Zhangsan')(t)](s^*) =$ $\qquad$ (by (2.23i))

$\quad$ $\exists t[t \subseteq s^* \wedge break'(vase')(Zhangsan')(t)]$

According to Lin 2006, the semantic denotation for (2.21) in (2.27) is not quite right, because the time interval t of Zhangsan's breaking a vase cannot be included in a time point s^*, but rather t should precede s^*. Thus, he proposes a new perfective aspect for Mandarin in order to incorporate the precedence relation (i.e., $\mathbf{t}_{\text{Top}} < \mathbf{t_0}$), as shown in (2.28)

(2.28) Perfective aspect = $\lambda P < i, t > \lambda t_{\text{Top}}\lambda t_0\exists t[t \subseteq t_{\text{Top}} \wedge P(t) \wedge t_{\text{Top}} < t_0]$

The result ψ after applying (2.28) to (2.21) is shown in (2.29), which is of semantic type $< i, < i, t >>$. Due to type mismatch, it is not directly combinable with s^*.

(2.29) PERF($\lambda t\ [break'(vase')(Zhangsan')(t)]) =$ $\qquad\qquad\qquad$ (by (2.28))

$\quad$ $\lambda t_{\text{Top}}\lambda t_0\exists t[t \subseteq t_{\text{Top}} \wedge break'(vase')(Zhangsan')(t) \wedge t_{\text{Top}} < t_0]$ $\qquad$ (ψ)

The rule in (2.23ii) thus comes to rescue and converts a semantic object of type $< i, <$ $i, t >>$ into one of type $< i, t >$, as illustrated in (2.30)[6]. The last line says that there is a topic time t_{Top} which precedes s^* and includes t, the situation time of Zhangsan's breaking a vase.

(2.30) continued from (2.29):

$$[\, \lambda R_{<i,<i,t>>} \lambda t_1 \exists t_2 R(t_2)(t_1)\,](\psi)(s^*) = \qquad\qquad (by\ (2.23ii))$$

$$\lambda t_1 \exists t_2 \exists t[t \subseteq t_2 \wedge break'(vase')(Zhangsan')(t) \wedge t_2 < t_1](s^*) =$$

$$\exists t_2 \exists t[t \subseteq t_2 \wedge break'(vase')(Zhangsan')(t) \wedge t_2 < s^*] = \qquad (modulo\ t_2/t_{\text{Top}})$$

$$\exists t_{\text{Top}} \exists t[t \subseteq t_{\text{Top}} \wedge break'(vase')(Zhangsan')(t) \wedge t_{\text{Top}} < s^*]$$

Lin (2006) considers this new perfective aspect reflecting an asymmetry between perfective and imperfective aspect in Mandarin. He notes that perfective aspect in Mandarin encodes past tense, whereas imperfective aspect does not encode tense at all. However, encoding temporality into a perfective aspect raises the semantic type of the perfective aspect, which is not without cost. The price it has paid is the inclusion of an additional type-lowering rule, i.e., the rule in (2.23ii). This up-and-down derivation significantly complicates the semantic derivation for a sentence in Mandarin, not to mention that its motivation is based on a problematic application of a language-specific rule in the first place.

2.2 Negative sentences: a challenge to the aspect-as-tense theory

In addition to the claim that there is an asymmetry between perfective and imperfective aspect in bare sentences in Mandarin, as discussed in the above section, Lin (2006) argues

---

[6]Structurally, Lin (2006) assumes that the rule in (2.23ii) applies at the IP level. But he does not spell out what is under IP.

that this asymmetry is maintained in sentences with overt aspectual markers. Specifically, the perfective aspectual markers 了/le/ ('LE')[7] and 过/guò/ ('EXP') encode past tense in their denotations, whereas the imperfective aspectual markers (正)在 /(zhèng)zài/ ('PROG') and 着/zhe/ ('DUR') do not[8]. For instance, when uttered out of the blue, the sentences with perfective aspect markers in (2.31) and (2.32) have a past interpretation, whereas those with imperfective aspect markers in (2.33) and (2.34) have a present interpretation.

(2.31) 张三　　批评　　了　李四。
   Zhāngsān　pīpíng　**le**　Lǐsì.
   Zhangsan　criticize　**LE**　Lisi
  'Zhangsan criticized Lisi.'[9]

(2.32) 张三　　买　过　　书。
   Zhāngsān　mǎi　**guò**　shū.
   Zhangsan　buy　**EXP**　book
  'Zhangsan bought books before. '

(2.33) 张三　　正在　　唱歌。
   Zhāngsān　**zhèngzài**　chànggē.
   Zhangsan　**PROG**　 sing
  'Zhangsan is singing.'

(2.34) 墙　　上　　挂　着　　一　张　　照片。
   qiáng　shàng　guà　**zhe**　yì　zhāng　zhàopiān.
   wall　on　 hang　**DUR**　one　CL　 picture
  'There is a picture hanging on the wall.'

---

[7]To avoid confusion that might arise in later discussion, I gloss the word *le* as 'LE' instead of 'PERF'. As will be argued in this chapter, *le* is not a pure perfective aspectual marker.

[8]The progressive marker *zhèngzài* is often abbreviated as *zhèng* or *zài*. I use the full form in the discussion.

[9]In Mandarin, a sentence with an atelic predicate that has no aspectual marking has a dispositional or habitual interpretation. For instance, without the particle *le*, (2.31) would be roughly paraphrased as 'Zhangsan criticizes Lisi'. The same applies to (2.32) and (2.33).

Thus, the temporal difference observed among sentences with different aspectual markers seems to support Lin's (2006) claim that a perfective aspect located under AspP encodes tense and therefore there is no need to have a TP in the clause structure of Mandarin.

One prediction that follows from the aspect-as-tense theory is that the temporal interpretation of a negative sentence in Mandarin should also be localized under AspP on a par with an affirmative sentence. However, the negated counterpart of (2.31), shown in (2.35), raises some questions.

(2.35) 张三　　　没有　　批评　　*(了)* 李四。
　　　　Zhāngsān méiyǒu pīpíng　(*le)　Lǐsì.
　　　　Zhangsan not.R　criticize LE　Lisi
　　　'Zhangsan did not criticize Lisi.'

As shown above, the perfective aspectual marker *le* in the affirmative sentence in (2.31) cannot occur in its negated sentence in (2.35). If *le* encodes past tense in (2.31), its non-occurrence in (2.35) is unexpected. It would leave the negated sentence without temporal information. This would contradict the observed facts, since (2.35) clearly has a temporal interpretation: namely, a past meaning as indicated in the English translation. To derive the temporal interpretation of (2.35), one might argue that *méiyǒu* and *le* are in complementary distribution (cf. Wang 1965, Chao 1968: 439). The word *le* heads an AspP in an affirmative sentence, and the negation marker *méiyǒu* replaces *le* in a

negative sentence[10],[11]. Accordingly, the negation marker *méiyǒu* would occupy the same structural position and have the same semantics as *le*. In other words, *méiyǒu* heads an AspP and has a past denotation. However, this argument cannot be maintained on both semantic and syntactic grounds.

On the semantic side, assuming that *méiyǒu* encodes past tense would lead to false predictions about temporality in negated sentences with other aspectual markers. First, unlike the perfective aspectual marker *le*, the experiential perfective aspectual marker *guò* occurs with the negation marker *méiyǒu*.

(2.36) 李四　洗　　过　　碗。
　　　　Lǐsì　xǐ　　guò　　wǎn.
　　　　Lisi　wash　PERF　bowl

---

[10]The sentential negation marker *méiyǒu* consists of two characters: the character *yǒu* and the character *méi*. *Yǒu* is used either as a possessive verb meaning 'to have' or an existential quantifier, and *méi* is a negation marker that is only used to negate *yǒu*. Thus, *méiyǒu* is often abbreviated as a single *méi*. Its compositional implication for affirmative sentences in Mandarin will be spelled out in Section 2.4.

Besides *méi*, there is another negation marker in Mandarin, namely, the character 不/bù/ ('not.IR'). Working within the framework of transformational grammar, Wang (1965) proposes two morpho-phonological transformational rules to account for the non-cooccurrence between *méiyǒu* and *le*. In essence, Wang proposes that there is an underlying Aspect head *yǒu* which becomes *le* in an affirmative sentence, and the single negation marker *bù* becomes *méi* in front of *yǒu*. Wang's (1965) proposal is criticized in Teng 1973 exactly for the same syntactic reason that will be discussed below, namely, it would predict that for every negative sentence with *méiyǒu*, there must be a corresponding affirmative sentence with *le*. This prediction is not borne out, as illustrated in (2.43) and (2.44).

Studies that treat *bù* and *méiyǒu* as two distinct negation markers have focused on their distributional differences (cf. e.g., Hsieh 2001; Lin 2003a). This issue will be addressed in Section 2.6.

[11]There are two alternatives to the complementarity account. One account assumes that *le* is phonologically null, but syntactically and semantically present in a negative sentence. It is thus 'invisible' in (2.35), but not absent. The problems with this account will be discussed in Section 2.3.1. The other account assumes that the derivation of (2.35) does not even have *le* in its numeration to start with; thus, there is no complementarity problem. However, if we follow Bohnemeyer & Swift's (2004) default aspect, where telic predicates have default perfective aspect and atelic predicates have default imperfective aspect, the sentence in (2.35) should have imperfective aspect, since the predicate 'to criticize' is atelic and there is no overt aspectual marking. In Mandarin, imperfective aspect in an episodic sentence is instantiated overtly and only shows up in two ways: progressive aspect with overt progressive marker *zhèngzài* and durative aspect with overt durative marker *zhe*. Since neither of them is in (2.35), (2.35) does not have an imperfective interpretation. In fact, it has a perfective interpretation which says that there was not a completed event of Zhangsan criticizing Lisi in the past. This qualifies the applicability of default aspect to predicates in Mandarin.

(2.37) 李四　没有　　洗　　*(过)　碗。
　　　　 Lǐsì　méiyǒu　xǐ　　guò　　wǎn.
　　　　 Lisi　not.R　 wash　PERF　bowl

The sentence in (2.36) has the experiential perfective aspectual marker *guò* which is argued to encode past tense under the aspect-as-tense theory. Accordingly, (2.36) is predicted to have the meaning 'Lisi washed dishes before' (cf. Lin 2006: 10). As is shown in (2.37), its negated counterpart still has *guò*. If the negation marker *méiyǒu* encodes past tense, as assumed above, we would predict the temporal interpretation of (2.37) to be past-within-past, similar to experiential past perfect in English; thus, (2.37) would be translated into 'Lisi had not washed dishes before'. For an English sentence with past perfect such as (2.38), a salient past time reference is required for its felicity.

(2.38) *(Before Lisi went to college), he had not washed dishes before.

However, the Mandarin sentence in (2.37) can be evaluated with respect to the utterance time. In other words, when uttered out of the blue, (2.37) means that Lisi has not washed dishes before, which is more like an experiential present perfect in English. This present perfect reading is not predicted if both the negation marker *méiyǒu* and the experiential perfective marker *guò* are assumed to encode past tense, as the aspect-as-tense theory would do.

Additional false predictions are observed in negated sentences that have imperfective aspectual markers *zhèngzài* or *zhe*. As shown above, when uttered out of the blue, sentences with *zhèngzài* ('PROG') or *zhe* ('DUR') in Mandarin have present interpretation. The examples in (2.33) and (2.34) are repeated here as (2.39) and (2.40), respectively.

(2.39) 张三　　　正在　　　唱歌。
　　　　 Zhāngsān　zhèngzài　chànggē.
　　　　 Zhangsan　PROG　　 sing
　　　 'Zhangsan is singing.'

31

(2.40) 墙　　上　挂　着　一　张　　照片。
qiáng shàng guà zhe yì zhāng zhàopiān.
wall on hang DUR one CL picture
'There is a picture hanging on the wall.'

To negate (2.39) and (2.40), the negation marker *méiyǒu* is used, as shown in (2.41) and (2.42).

(2.41) 张三　　没有　　正在　　唱歌。
Zhāngsān méiyǒu zhèngzài chànggē.
Zhangsan not.R PROG sing
'Zhangsan is not singing.'

(2.42) 墙　　上　　没有　挂　着　一　张　　照片。
qiáng shàng méiyǒu guà zhe yì zhāng zhàopiān.
wall on not.R hang DUR one CL picture
'There is not a picture hanging on the wall.'

However, despite the presence of *méiyǒu*, (2.41) and (2.42) do not have past interpretation, they retain present interpretation. This observation directly refutes the claim that *méiyǒu* encodes past tense, which suggests that *méiyǒu* and *le* cannot be in complementary distribution.

On the syntactic side, if *méiyǒu* and *le* are in complementary distribution, it follows that every negated sentence with *méiyǒu* would have an affirmative counterpart in which *le* is present. This prediction is not borne out (see also Teng 1973). For instance, it would falsely predict that the affirmative counterpart of (2.41) is either (2.43) or (2.44), but not (2.39).

(2.43) *张三　　正在　　唱　了　歌。
Zhāngsān zhèngzài chàng le gē.
Zhangsan PROG sing LE song
'Intended: Zhangsan is singing.'

(2.44) *张三　　　正在　　　唱歌　　了。
　　　　Zhāngsān zhèngzài chànggē le.
　　　　Zhangsan PROG　　sing　　LE
　　　'Intended: Zhangsan is singing.'

The sentence in (2.43) is syntactically ill-formed, thus ungrammatical. The sentence in (2.44) does not have the intended simple progressive meaning as (2.39) does. The sentence in (2.44) is itself a grammatical sentence which means that Zhangsan has already been singing. This meaning can be brought out more clearly when the word 已经/yǐjīng/ ('already') is added to the sentence (2.45).

(2.45) 张三　　　已经　　正在　　　唱歌　　了。
　　　　Zhāngsān yǐjīng zhèngzài chànggē le.
　　　　Zhangsan already PROG　　sing　　LE
　　　'Zhangsan has already been singing.'

This usage of the *sentence-le* (a.k.a. sentence-final *le*) has long been noted to be similar to English perfect (Chao 1968; Li & Thompson 1981; Lin 2003b; Soh & Gao 2008). Important for the argument developed here, the negated sentence of (2.45) or the grammatical reading of (2.44) is not (2.41), but the one in (2.46)[12].

(2.46) 张三　　　还　没有　　正在　　　唱歌。
　　　　Zhāngsān hái méiyǒu zhèngzài chànggē.
　　　　Zhangsan still not.R　PROG　　sing
　　　'Zhangsan has not been singing yet.'

In a word, the assumption of a structural alternation between *méiyǒu* and *le* also leads to inconsistencies.

To sum up, the analyses above have shown that assuming a complementarity between *méiyǒu* and *le* based on the contrast between (2.31) and (2.35) leads to false semantic

---

[12]See Löbner 1989 for German *schon* 'already' and *noch nicht* 'not yet'.

and syntactic predictions. This means that if *le* is under AspP (2.47i) as argued in the aspect-as-tense theory, *méiyǒu* cannot be under the same AspP (2.47ii).

(2.47) i. [… [$_{AspP}$ [$_{Asp}$ *le/guò/zhèngzài/zhe*] [$_{vP}$]]]

  ii. *[… [$_{AspP}$ [$_{Asp}$ *méiyǒu/guò/zhèngzài/zhe*] [$_{vP}$ …]]]

The fact that *méiyǒu* can co-occur with the other three aspectual markers suggests that *méiyǒu* is located in a structural position that is higher than AspP, as illustrated in (2.48).

(2.48) [… [$_?$ [$_?$ *méiyǒu*] [$_{AspP}$ [$_{Asp}$ *guò/zhèngzài/zhe*] [$_{vP}$ …]]]]

The next issue is to decide what this question mark '?' in (2.48) is, i.e., the functional category that *méiyǒu* is located at, which is addressed in the following section.

2.3   The structural position of *méiyǒu* in Mandarin

The evaluation of the aspect-as-tense theory shows that any proposal on the functional category of *méiyǒu* needs to be able to explain two issues: the non-cooccurrence of *méiyǒu* and *le*, and, the structural location of temporal interpretation in Mandarin sentences, regardless of its polarity.

2.3.1   *Méiyǒu* is not under NegP

One might argue that *le* has a phonologically null counterpart $\emptyset_{le}$ that only appears in a negative sentence, and it is this 'invisible' *le* that contributes to past interpretation, not

the negation marker *méiyǒu*. The structure of a negative sentence in Mandarin would thus simply add a negation project (NegP) on top of AspP[13], as illustrated in (2.49).

(2.49) [... [$_{\text{NegP}}$ [$_{\text{Neg}}$ *méiyǒu*] [$_{\text{AspP}}$ [$_{\text{Asp}}$ $\emptyset_{le}$/*guò*/*zhèngzài*/*zhe*] [$_{\text{vP}}$ ...]]]]

By preserving Lin's (2006) claim that no T is necessary in Mandarin, this proposal has to explain *why le* becomes 'invisible' in a negative sentence. Note that the explanation has to be morpho-phonological, since nothing syntactic or semantic of *le* has changed in a negative sentence[14]. In other words, an explanation for the 'invisible' *le* would have to spell out conditions that trigger the loss of morpho-phonological properties of *le* in a negative sentence.

In fact, even if one puts aside the 'visibility' issue of *le*, the proposal that *méiyǒu* is under NegP cannot be maintained on independent grounds. It is argued that, cross-linguistically, if a language has a sentential negation marker under a NegP, regardless whether the negation marker is the head or the specifier of the NegP, the NegP is either above TP or below it (Laka 1990; Haegeman 1995 a.o.), as illustrated in (2.50).

---

[13]That sentential negation markers either head, or are specifiers of, a functional negation projection in a clause has been argued extensively in the literature (see Pollock 1989; Laka 1990; Ouhalla 1991; Zanuttini 1991; Haegeman 1995 among others). This view is challenged in Baker 1991 where sentential negation markers are argued to be an adverb not a functional head. Note that my argument against *méiyǒu* under NegP does not hinge upon the exact grammatical category or syntactic position of *méiyǒu*, thus it is compatible with either approach to sentential negation markers.

[14]This is different from another possible explanation brought into my attention by Anastasia Giannakidou (p.c.). As she pointed out, negation markers have been argued to be aspectual markers that change an event into a state (see Mittwoch 1977; de Swart 1996), so if *méiyǒu* has such a function and marks a state, *le* would not occur with it, since *le* marks an event. This explanation clearly assumes that *le* is absent in a negative sentence, which means that we would go back to where we started, namely, if *le* is not present in a negative sentence, where does temporal interpretation of the negative sentence come from, given Lin's (2006) claim?

(2.50)

NegP TP
```
   NegP              TP
   /  \             /  \
 Neg   TP         T    NegP
        |                |
        T               Neg
```
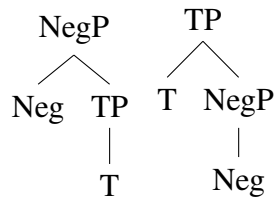
Crucial for our purposes here, the negation marker that is under NegP can also appear in non-finite constructions. This correlation is observed in typologically diverse languages, e.g., Germanic languages such as *not* in English and *nicht* in German; in Romance languages such as *ne...pas* in French and *non* in Italian; in Slavic languages such as *ne* in Serbo-Croatian; and in Basque, an isolated language, as illustrated below.

(2.51) John did **not** have a fever. (English)

(2.52) He tried **not** to laugh. (English)

(2.53) *Es regnet **nicht**. (German)*
   it rains not
   'It is not raining.'

(2.54) *Ich versuche **nicht** zu lachen. (German)*
   I try   not to laugh
   'I'm trying not to laugh.'

(2.55) Jean (**n'**) aime **pas** Marie. (French)

   'John does not like Mary.' (Pollock (1989: ex.2b))

(2.56) **Ne pas** regarder la télévision consolide l'esprit critique. (French)

   'Not to watch television strengthens one's independence.' (Pollock (1989: ex.16e))

(2.57) Maria (**non**) ha telefonato a sua madre. (Italian)

'Maria has (not) called her mother.' (Zanuttini (1991: 3))

(2.58) **Non** leggere articoli di sintassi è un vero peccato. (Italian)

'Not to read syntax articles is a real shame.' (Zanuttini (1991: 15))

(2.59) *Milan **ne** poznaje Mariju. (Serbo-Croatian)*
Milan not knows Mary
'Milan does not know Mary.' (Progovac (1994: 35))

(2.60) ***Ne** jesti provrće nije preporučljivo. (Serbo-Croatian)*
not eat vegetables not-is advisable
'Not to eat vegetables is not advisable.' (Miloje Despić, p.c.)

(2.61) *etxea **ez** da erori. (Basque)*
house-the no has fallen
'The house didn't fall down.' (Laka (1990: 25))

(2.62) *mila bider agindu dizut **ez** ardorik edateko. (Basque)*
thousand times ordered I-have-you no wine-PART drink-to
'I have told you one thousand times not to drink wine.' (Laka (1990: 72))

If *méiyǒu* in Mandarin is under NegP, one would expect it to share this cross-linguistic property. In other words, it should be able to appear in environments that are often translated into non-finite constructions in languages such as English[15]. However, contrary to this expectation, *méiyǒu* is systematically excluded in constructions where the corresponding English sentences would use infinitives. These constructions include complements of verbs such as 准备/zhǔnbèi/ ('to prepare') (2.63) (Huang 1982) or 设法 /shèfǎ/ (''to try)

---

[15]The discussion on (non-)finiteness is directly linked to the absence/presence of T. Since it is under debate whether T exists in Mandarin at this stage, I resort to equivalence-translation between two languages as the method for comparison. I thank Molly Diesing for pointing out a previous argumentation flaw that assumes the existence of non-finite constructions in Mandarin.

(2.64) (Li 1990), subjects of copular constructions with the verb 是/shì/ ('to be') (2.65), purpose constructions such as 为了/wèile/ ('in order to') (2.66), and raising constructions with predicates such as 很 难/hěn nán/ ('to be difficult') (Li 1985; Teng 1975) (2.67). As the examples below show, *bù* is used instead.

(2.63) 张三　　准备　　春节　　　　不/(*没有)　　回家。
　　　　Zhāngsān zhǔnbèi chūnjié　　bù/(*méiyǒu)　　huíjiā.
　　　　Zhangsan prepare　Spring Festival not.IR/(*not.R)　return-home
　　　　'Zhangsan planned not to go home during the Spring Festival'.

(2.64) 我　设法　不/(*没有)　　哭。
　　　　wǒ　shèfǎ　bù/(*méiyǒu)　kū.
　　　　I　　try　　not.IR/(*not.R)　cry
　　　　'I tried not to cry.' (PKU 2009)

(2.65) 不/(*没有)　　忘　　历史，　是　为了　　　维护　　和平。
　　　　bú/(*méiyǒu)　wàng　lìshǐ,　shì　wèile　　wéihù　hépíng.
　　　　not.IR/(*not.R)　forget　history,　be　in order to　protect　peace
　　　　'Not to forget history is to protect peace.' (Internet Entry[16])

(2.66) 为了　　　不/(*没有)　　伤　　父亲　的　　心，　她　反而　　去
　　　　wèile　　bù/(*méiyǒu)　shāng　fùqīn　de　　xīn,　tā　fǎnér　　qù
　　　　in order to　not.IR/(*not.R)　hurt　　father　POSS　heart,　she　in-turn　go
　　　　安慰　　父亲。
　　　　ānwèi　fùqīn.
　　　　comfort　father
　　　　'In order not to hurt her father, she in turn went to comfort her father. ' (Tao & Xiao 2012)

(2.67) 韩国　　　　当时　　很　难　　不/(*没有)　　做出　　派兵
　　　　Hánguó　　dāngshí　hěn　nán　　bú/(*méiyǒu)　zuòchū　paìbīng
　　　　South Korea　then　　very　difficult　not.IR/(*not.R)　do　　send-troops
　　　　决定。
　　　　juédìng.
　　　　decision
　　　　'It was very difficult for South Korea not to make the decision of sending troops at the time. ' (PKU 2009)

---

[16]http://history.sina.com.cn/lszx/szzz/2014-12-09/0951111214.shtml; accessed on Dec., 2015.

Examples such as (2.63) and (2.64) have been used to argue for a finite/non-finite distinction in Mandarin (Huang 1998/1982; Li 1990). But, these examples are disputed in Xu 1985-1986 whose arguments are expanded by Hu et al. 2001, a major reference that is often cited as showing that there is no finite vs. non-finite distinction in Mandarin. For Xu 1985-1986, the ungrammaticality of *méiyǒu* in (2.63) is lexical-semantic, not syntactic. Xu argues that the verb 准备/zhǔnbèi/ ('to prepare') selects "a planned event" as its complement, but the word *méiyǒu* is used to "negate a previous action or state", which is semantically incompatible with "a planned event".

However, semantic incompatibility cannot be used to explain all ungrammatical cases. For example, the grammaticality contrast in (2.65) seems to be syntactic, because the copula 是/shì/ ('to be') can take a clausal subject, as shown in (2.68).

(2.68) 他   没有   放弃   学业， 在   今天   看   来   是   正确   的。
        tā   méiyǒu fàngqì xuéyè, zài jīntiān kàn lái   shì zhèngquè de
        he   not.R   give up study, at   today   look from be   correct   PART
        'It is right from today's viewpoint that he didn't give up his study.'

Given that (2.65) and (2.68) have the same subject-predicate structure, the ungrammatical-ity of *méiyǒu* in (2.65) can only be due to a structural difference between the subjects in the two sentences. Thus, the fact that *méiyǒu* is ruled out in constructions that correspond to infinitives in other languages suggests that *méiyǒu* is not under NegP[17].

---

[17]Given that Mandarin has two negation markers *méiyǒu* and *bù*, one might argue that it might well be the case that they occur in different linguistic contexts in the first place; therefore, the fact that *méiyǒu* cannot occur in some *bù*-contexts does not automatically mean that *méiyǒu* is not under NegP in its own contexts. For example, modern Greek has two negation markers that occur in different clause types. (I thank the audiences at the Cornell Workshop on Aspect for raising this point.)

As far as I can tell, this argument needs to answer two major questions for it to be valid. First, it needs to specify the nature of the linguistic contexts for the two negation markers. Note that the nature cannot be semantic, and it must be syntactic. Second, it still needs to explain why *méiyǒu* cannot co-occur with *le*. If this argument assumes that *méiyǒu* is under NegP, then it would face the same question as the 'invisible' *le* argument discussed at the beginning of the section.

2.3.2 *Méiyǒu* is under TP

As I have shown above, the sentential negation marker *méiyǒu* cannot be under NegP. Given that *méiyǒu* seems to have a temporal restriction, I propose that it is under T[18,19], which simultaneously explains why *méiyǒu* cannot be under NegP. Cross-linguistically, negation markers that are under NegP do not encode temporality in their denotation[20].

I present three pieces of evidence for the T proposal for *méiyǒu*. First, as mentioned above, a sentence with *méiyǒu* has a non-future interpretation. This is further supported by its incompatibility with contexts that have future orientation. As shown in (2.69), the negative sentence cannot combine with *míngtiān* ('tomorrow'), which suggests an encoding of temporality.

(2.69) 张三　　　*(*明天)/(今天)/(昨天)*　　　没有　喝酒。
　　　 Zhāngsān (*míngtiān)/(jīntiān)/(zuótiān)　méiyǒu hējiǔ.
　　　 Zhangsan (*tomorrow)/(today)/(yesterday) not.R　drink
　　　 '*Zhangsan will not drink tomorrow.' compared with 'Zhangsan did not drink today/yesterday.'

The second piece of evidence comes from a language-internal phenomenon of the

---

[18] See Huang 1990 for a similar proposal from a different research perspective.

[19] Since sentences with *méiyǒu* have non-future temporal interpretations, one hypothesis would be that it marks realis mood, meaning non-existence. In this case, *méiyǒu* would be under a Mood head instead of a T head. This would weaken the proposal that Mandarin has T. I do not have a good way to distinguish TP from MoodP at the moment, so I have to leave this issue for further investigation. However, I want to call attention to some recent research on sentential negation markers in Dravidian languages by Amritavalli & Jayaseelan (2005); Amritavalli (2014). It is proposed by these authors that in Kannada and Malayalam, the sentential negation marker *illa* in matrix negated sentences is under MoodP, which marks the indicative mood; and temporal interpretation is on AspP selected by *illa*, which is either past or non-past, depending on (im)perfectivity. Thus, temporal interpretation, or tense, is separated from temporal anchoring, i.e., the finiteness on the indicative mood. I would like to point out that this analysis cannot be applied to Mandarin. First, as shown above, sentences with *méiyǒu* in Mandarin can only be interpreted as non-future. Second, while negated sentences with *illa* can have a habitual reading in Dravidian languages, negated sentences with *méiyǒu* in Mandarin only describe episodic events. Thus, if *méiyǒu* in Mandarin is under MoodP, this MoodP in Mandarin have to be differentiated from the MoodP in Dravidian languages.

[20] In languages that have tensed negation markers such as Standard Arabic, it is often proposed that all negation markers are generated under NegP, but the tensed negation markers move to T obligatorily (see Aoun et al. 2010 a.o.). Similar to *méiyǒu* in Mandarin, these tensed negation markers cannot occur in non-finite constructions in their languages.

structural positions of two adverbs 又/yòu/ ('again.R') and 再/zài/('again.IR'), both of which mean 'again' in Mandarin[21]. Functional grammar has it that sentences with *yòu* denote a realized repetition, whereas sentences with *zài* denote an unrealized repetition (Lü 1980).

For instance, the sentence in (2.70) with *yòu* presupposes that Zhangsan had criticized Lisi before and asserts that an event of the same type occurred by the utterance time. Thus, (2.70) entails the proposition that Zhangsan criticized Lisi, which is attested by the infelicitous continuation that means the opposite.

(2.70) 张三$_i$　　　又/(*再)　　　　　批评　　了　李四$_j$。*(其实　他$_i$　没有
　　　Zhāngsān$_i$　yòu/(*zài)　　pīpíng　le　Lǐsì$_j$.　　(*Qíshí　tā$_i$　méiyǒu
　　　Zhangsan　again.R/(*again.IR)　criticize　LE　Lisi　　in fact　he　not.R
　　　批评　　他$_j$。*)
　　　pīpíng　tā$_j$.)
　　　criticize　he
　　　'Zhangsan$_i$ criticized Lisi$_j$ again. (* In fact, he$_i$ did not criticize him$_j$.) '

The interpretation of (2.71) is different. (2.71) can presuppose either that Zhangsan criticized Lisi before the utterance time or that Zhangsan will criticize Lisi tomorrow. Regardless of which presupposition it chooses, it asserts that there is a future time at which an event of the same type happens. In this sense, the intended repetition has not realized.

---

[21]Unlike *again* in English, both *yòu* and *zài* in Mandarin have several other uses in addition to repetition. The following examples are taken from Lü 1980.

i. 他 是 个 聪明 人， 又 肯 努力。
tā shì gè cōngmíng rén, yòu kěn nǔlì.
he be CL clever people again.R willing-to work-hard
'He is a clever person, and (he is) also willing to work hard.' (Lü 1980: 561)

ii. 这 件 事 再 一 次 说明 了 一 个 真理。
zhèi jiàn shì zài yí cì shuōmíng le yí gè zhēnlǐ.
this CL issue again.IR one time explain LE one CL truth
'This issue explained one truth once again.' (Lü 1980: 571)

It remains to be investigated whether the basic use of *yòu* and *zài* as repetition and the other uses share a core meaning.

(2.71) (张三ᵢ   今天   批评   了 李四ⱼ。/ 张三ᵢ   明天   会
(Zhāngsānᵢ jīntiān pīpíng le Lǐsìⱼ./ Zhāngsānᵢ míngtiān huì
Zhangsan   today criticize LE Lisi/   Zhangsan tomorrow FUT
批评   李四ⱼ。) 他ᵢ 后天   会   再/(*又)
pīpíng Lǐsìⱼ.) Tāᵢ hòutiān   huì   zài/(*yòu)
criticize Lisi   he the day after tomorrow FUT again.IR/(*again.R)
批评   他ⱼ。
pīpíng tāⱼ.
criticize he

'(Zhangsanᵢ criticized Lisiⱼ today. / Zhangsanᵢ will criticize Lisiⱼ tomorrow.) Heᵢ
will criticize himⱼ again the day after tomorrow.'

Assuming with Enç (1987) that T in a matrix clause relates the reference time
to the utterance time and thus anchors an event, we can explain the semantic/usage
distinction between *yòu* and *zài* by proposing that *yòu* is merged above T, whereas *zài*
is merged below T. Therefore, by the time when *yòu* is merged during the derivation
of (2.70), the event described in the sentence is already anchored by T. This accounts
for the intuition described in traditional grammar that sentences with *yòu* assert realized
repetition. Similarly, when *zài* enters into the derivation of (2.71), the event has not be
anchored yet, thus it is 'unrealized.'

If the sentential negation marker *méiyǒu* is under T, one would predict that the adverbs
yòu and *zài* merge in different positions with respect to *méiyǒu*. Specifically, *yòu* would
merge above *méiyǒu*, whereas *zài* would merge below it. Given that a derivational
hierarchical order of a Mandarin sentence is reflected in its left-to-right linear order, as
discussed in Section 1.4, we would predict that *yòu* appears to the left of *méiyǒu*, and *zài*
to the right. This prediction is borne out, as illustrated in (2.72) and (2.73).

(2.72) 张三   又   没有   (*又)   批评   李四。
Zhāngsān yòu   méiyǒu (*yòu)   pīpíng Lǐsì.
Zhangsan again.R not.R   (*again.R) criticize Lisi
'Once again, Zhangsan did not criticize Lisi.'

42

(2.73) 张三　　　(*再)　　　没有　再　　　批评　　李四。
　　　 Zhāngsān (*zài)　　 méiyǒu zài　　 pīpīng　 Lǐsì.
　　　 Zhangsan (*again.IR) not.R　 again.IR criticize Lisi
　　　 'Zhangsan did not criticize Lisi again.'

As shown above, the adverb *yòu* cannot appear after the negation marker *méiyǒu*; and, the adverb *zài* is banned from being in front of *méiyǒu*. This structural difference leads to semantic distinctions as well. Semantically, both (2.72) and (2.73) entail the proposition that Zhangsan did not criticize Lisi. However, they differ in presupposition. (2.72) presupposes a non-occurrence of an event of Zhangsan criticizing Lisi before; (2.73), on the other hand, presupposes an occurrence of an event of Zhangsan criticizing Lisi before.

In addition, the adverb *zái* is located above AspP, which can be illustrated in (2.74).

(2.74) (昨天　　　我　看见　 张三　　　的　时候，他　正在　　　跑步。)
　　　 (zuótiān　 wǒ kànjiàn Zhāngsān de　 shíhòu, tā zhèngzài pǎobù.)
　　　 (yesterday I　see　 Zhangsan REL time,　 he PROG　　 run.)
　　　 今天　我　看见　　他　的　时候，他　没有　再　　　正在
　　　 jīntiān wǒ kànjiàn tā　 de　 shíhòu, tā méiyǒu zài　　 zhèngzài
　　　 today　 I　 see　　 he REL time,　 he not.R　 again.IR PROG
　　　 跑步。
　　　 pǎobù.
　　　 run
　　　 '(When I saw Zhangsan yesterday, he was running.) When I saw him today, he was not running again.'

Another evidence that supports the structure where *méiyǒu* merges under T comes from the two readings of 怎么/zěnme/ ('how') in Mandarin. Tsai (2008a) observes that the interrogative manner adverb 怎么/zěnme/ ('how') in Mandarin can also be used as an interrogative reason adverb meaning 'why'. Four minimal pairs are given below.

(2.75) 他 (是)　　 怎么(样)　 擦　 干净　　 这　 辆　　 车　 的？
　　　 tā (**shì**)　 **zěnme(yàng)** cā　 gānjìng zhè liàng chē **de**?
　　　 he (**COP**)　 **how**　　　 wipe clean　 this CL　 car DE
　　　 'How did he clean the car?'

43

(2.76) 他　要　　怎么*(样)*　　擦　　干净　　这　辆　　车*?*
       tā　**yào**　**zěnme(yàng)**　cā　gānjìng　zhè　liàng　chē?
       he　**FUT**　**how**　　　　wipe　clean　　this　CL　　car
       'How will he clean the car?'

(2.77) 他　怎么　　擦　　干净　　了　这　辆　　车*?*
       tā　**zěnme**　cā　　gānjìng　**le**　zhè　liàng　chē?
       he　**how**　　wipe　clean　　**LE**　this　CL　　car
       'Why did he clean the car?'

(2.78) 他　怎么　要　　擦　　干净　　这　辆　　车*?*
       tā　**zěnme**　**yào**　cā　　gānjìng　zhè　liàng　chē?
       he　**how**　　**FUT**　wipe　clean　　this　CL　　car
       'Why will he clean the car?'

As the English translations show, *zěnme* in (2.75) and (2.76) is used as an interrogative manner adverb asking for the means that he used or will use to clean the car. A proper answer would be, for example, 'using a special chemical liquid'. When it is used this way, *zěnme* alternates with *zěnmeyàng*. By contrast, *zěnme* in (2.77) and (2.78) is interpreted as an interrogative reason adverb, thus both sentences are asking why he did or will do that. A proper answer in this case would be something like 'because he does not want to be scolded by his father'. In this use of *zěnme*, it is interchangeable with 为什么/wèishénme/ ('why') in Mandarin. In addition, when *zěnme* is used as a reason adverb, it can appear at the initial position of a sentence. For example, (2.79) means the same as (2.77).

(2.79) 怎么　　他　擦　　干净　　了　这　辆　　车*?*
       zěnme　tā　cā　　gānjìng　**le**　zhè　liàng　chē?
       how　　he　wipe　clean　　**LE**　this　CL　　car
       'Why did he clean the car?'

Tsai (2008a) associates the two readings of *zěnme* with two different structural positions within a cartographical framework, namely, manner-*zěnme* occupies Spec

Mod(ifier) P below T, reason-*zěnme* occupies Spec Int(errogative)P above T, as shown in (2.80).

(2.80) $[\ldots[_{\text{IntP}}$ reason-*zěnme* $[\ldots[_{\text{TP}}[_{\text{T}'}$ T $[_{\text{ModP}}$ manner-*zěnme* $[_{\text{vP}}\ldots]\,]\,]\,]\,]\,]\,]\,]$

If *méiyǒu* is in T as proposed above, one would expect that when *zěnme* precedes *méiyǒu*, it is interpreted as a reason adverb; and, when it follows *méiyǒu*, it is interpreted as a manner adverb. The prediction is borne out, which lends more support to the TP proposal.

(2.81) 比尔　没有　怎么*(样)*　回答　这　个　问题*?*
　　　　Bǐěr　**méiyǒu** **zěnme(yàng)** huídá　zhèi gè wèntí?
　　　　Bill　**not.R** **how**　answer this CL question
　　'Which is the way that Bill didn't use to answer the question?'[22]

(2.82) 比尔　怎么　没有　回答　这　个　问题*?*
　　　　Bǐěr　**zěnme** **méiyǒu** huídá　zhèi gè wèntí?
　　　　Bill　**how** **not.R**　answer this CL question
　　'Why didn't Bill answer the question?'

More generally in Mandarin, sentential adverbs such as 显然/ xiǎnrán/ ('obviously') precede *méiyǒu*, whereas adverbs modifying VPs such as 迅速地/xùnsù de/ ('rapidly') follow it, as illustrated in (2.83)-(2.86).

---

[22]The negation marker in (2.81) creates a Neg-island (Ross 1967; Rizzi 1990), which is why *zěnme(yàng)* needs to be emphasized in order to get the intended question. Otherwise, *zěnme(yàng)* gets an indefinite reading with the sentence meaning that Bill didn't/won't answer the question in a special way. This behavior of *zěnme(yàng)* within the scope of negation is on a par with indefinite use of 什么/shénme/ ('what') or 谁/shéi/ ('who') in Mandarin. With emphasis on *zěnme(yàng)*, the intended question only makes sense when uttered in a context where the answer options are contextually given. In that case, *zěnme(yàng)* is interpreted out of the scope of negation, and the sentence in (2.81) can be paraphrased as: in which of the contextually given ways that did Bill not answer the question?

(2.83) 张三　　　显然　　　没有　说谎。
Zhāngsān xiǎnrán   méiyǒu shuōhuǎng.
Zhangsan obviously not.R   lie

'Zhangsan obviously did not lie.'

(2.84) *张三　　　没有　　显然　　　说谎。
*Zhāngsān méiyǒu xiǎnrán   shuōhuǎng.
Zhangsan   not.R   obviously lie

(2.85) 他　没有　　迅速　　地　　吃完　　　饭。
tā   méiyǒu xùnsù   de   chīwán   fàn.
he   not.R   fast   REL eat-finish dish

'He didn't finish eating rapidly.'

(2.86) *他　迅速　　地　　没有　　吃完　　　饭。
*tā   xùnsù   de   méiyǒu chīwán   fàn.
he   fast   REL not.R   eat-finish dish

2.4 Non-future episodic sentences in Mandarin: structure and meaning

2.4.1 Syntax for non-future episodic sentences in Mandarin

If the above analysis of *méiyǒu* is on the right track, the next question is what is under T in an affirmative sentence. To answer this question, let's look at the composition of the negation marker *méiyǒu*. As mentioned briefly in section 2.2, the negation marker *méiyǒu* consists of two characters: *méi* and *yǒu*. *Yǒu* is used either as a possessive verb meaning 'to have' (2.87) or as an existential quantifier (2.88).

46

(2.87) 他 有 三 个 孩子。
　　　 tā yǒu sān gè háizi.
　　　 he have three CL child

　　　 'He has three children.'

(2.88) *(有) 一 本 书 在 桌子 上。
　　　 yǒu yì běn shū zài zhuōzì shàng.
　　　 there is one CL book at desk on

　　　 'There is a book on the desk.'

The word *méi* is a negation marker that is *only* used to negate *yǒu*. Thus, we can understand the negation marker *méiyǒu* as a compound word made of a negation marker and non-negative element. I propose that what is in T in an affirmative sentence in Mandarin is just a phonologically null form of the non-negative element *yǒu*, which is represented as $\emptyset_{y\check{o}u}$ here[23]. The clause structure of a Mandarin sentence that denotes a non-future episodic eventuality is given in (2.89).

(2.89) The structure of a non-future episodic sentence: (preliminary)
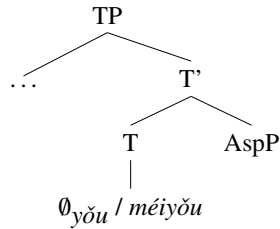
Since the negation marker *méi* does not contribute to temporality, I propose that *méi* is the head of a NegP that sits between TP headed by $\emptyset_{y\check{o}u}$ and AspP. It undergoes obligatory head movement from Neg to T, which results in the sentential negation marker *méiyǒu*, as illustrated in (2.90)[24].

---

[23]Some Chinese dialects use an overt *yǒu* instead of *le* (Tsai 2002; Tan 2012). According to Tsai 2002, in Taiwanese Chinese, the overt *yǒu* is observed to have an emphatic function similar to *do* in English.

[24]The proposal of *méi* as a Neg head would not raise the question why it cannot occur in certain contexts discussed in Section 2.3.1, since if it occurred in those contexts, it would not be able to fulfill its syntactic requirement for movement. This is consistent with the cross-linguistic observation that Neg heads that move obligatorily to T can never appear in non-finite contexts (see Aoun et al. 2010 a.o.)

(2.90) The structure of a non-future episodic negative sentence:

```
                    TP
          ╱          ╲
        …             T’
                ╱         ╲
              T             NegP
              │           ╱    ╲
    Ø_{yǒu}/méi_i+yǒu    Neg    AspP
              ╲           │      │
               ⌢…         t_i    …
```
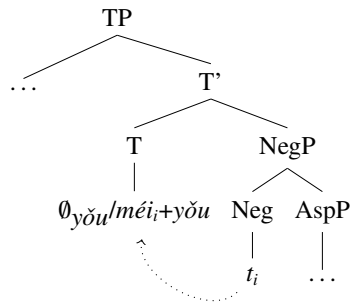
I speculate that the reason that $\emptyset_{yǒu}$ is pronounced when *méi* attaches to it is to 'support' *méi*. However, this phonological support should not be necessary. As mentioned above, *méi* is only used to negate the word *yǒu*; thus the presence of *méi* implies the presence of *yǒu*. In fact, *méiyǒu* is often reduced to just *méi* in conversation.

Thus, the actual constituent in T is $\emptyset_{yǒu}$, which denotes non-future tenses. The structural difference between an affirmative sentence and a negative sentence is that the latter has an additional NegP headed by *méi*. The structure for a non-future episodic sentence is represented in (2.91).

(2.91) The structure of a non-future episodic sentence: (final)

```
            TP
       ╱        ╲
     …           T’
            ╱        ╲
          T           (NegP)
          │         ╱      ╲
     Ø_{yǒu}     (Neg)     AspP
                   │         │
                 (méi)       …
```
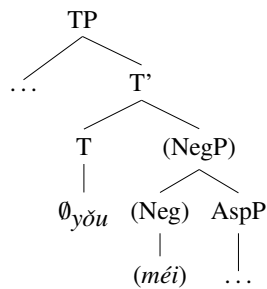
In Section 2.2, I have discussed the inadequacies of the aspect-as-tense theory as a theory for temporal interpretation in Mandarin. One major issue there is that the aspect-as-tense theory cannot give a coherent account of temporality of a negative sentence. The

core problem to be solved is how to account for the non-cooccurrence of the negation marker *méiyǒu* and the particle *le*. As I have shown, *méiyǒu* and *le* can neither share a single structural position (Section 2.2) nor can they be located in different structural positions at the same time (Section 2.3.1). However, the intuition that *yǒu* and *le* are closely related to each other is shared by many native speakers of Mandarin since Wang 1965. Data from several Chinese dialects where *yǒu* appears overtly in an affirmative sentence also seem to support the intuition that *yǒu* and *le* are just two variants of the same thing. An example in Southern Min, a Chinese dialect spoken mainly in several southeastern provinces in China, is given in (2.92).

(2.92) 伊 有　　来。
　　　 yī　yǒu　lái.
　　　 he　YOU　come.
　　'He came.' (Tsai 2002: ex. 8a)

Meanwhile, many linguists have claimed that *le/yǒu* represents the realization or existence of an event (see Sybesma 1997, a.o.), whereas *méiyǒu* negates the realization of an event. To articulate this intuition and avoid the problems noted in the previous discussion, I propose to adopt the feature sharing mechanism proposed in Pesetsky & Torrego 2007 to account for the non-cooccurrence of *méiyǒu* and *le*.

I assume that the suffixes *le*, *guò* and *zhe* in Mandarin enter into a derivation with the verb that they attach to, and the progressive marker *zhèngzài* is base-generated under the Asp head, which has an **[iAsp, +val]** aspectual feature. *Guò* and *zhe* have **[uAsp, +val]** aspectual features that need to agree with phonologically null aspectual operators with **[iAsp, -val]** under the Asp head.

In addition, I propose a phonologically null perfective aspect operator $\emptyset_{PERF}$ that has an **[iAsp, +val]** feature, which is selected by an episodic sentence that does not have

overt aspectual markings. This proposal accounts for the observation that an episodic
sentence with no overt aspectual marking has a perfective interpretation. For example,
the sentence in (2.93) has a future perfective reading[25].

(2.93) 张三　　会　打破　一　个　花瓶。
　　　 Zhāngsān huì dǎpuò yí gè huāpíng.
　　　 Zhangsan will break one CL vase
　　 'Zhangsan will break a vase.'

Thus, there are four Aspect heads with different feature values in the inventory: overt
progressive aspect *zhèngzài* and covert perfective aspect $\emptyset_{PERF}$ are base-generated under
Aspect Head with **[*i*Asp, +val]** features (2.94), whereas covert experiential aspect $\emptyset_{EXP}$
and covert durative aspect $\emptyset_{DUR}$ that are under Aspect have **[*i*Asp, -val]** features and thus
need to Agree with *guò* and *zhe*, respectively (2.95).

(2.94)

---
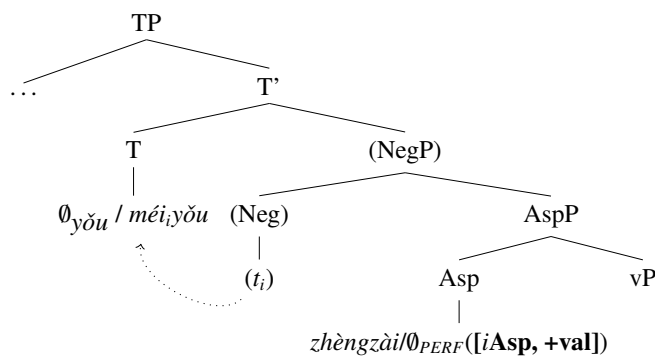
[25]In Lin's (2006) account, a future *huì*-sentence such as (2.93) selects a neutral aspect in the spirit of
Smith 1997. However, as Verkuyl (2008: 170) correctly points out, sentences such as (2.93) with a telic
predicate are not ambiguous with respect to aspectual interpretation. They are interpreted perfectively,
despite being set in the future. The sentence in (2.93) denotes that there is a future topic time within which
the event of Zhangsan breaking a vase is completed.

(2.95)
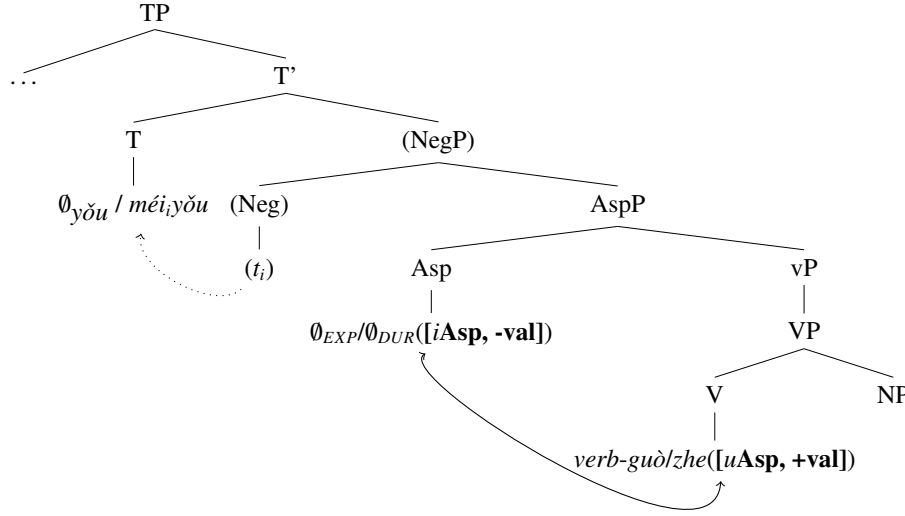
$\emptyset_{y\check{o}u}$ in T has **[*i*T, +val]** features. The tense values that $\emptyset_{y\check{o}u}$ has are non-future[26]. Its denotation is given in (2.96).

(2.96) $[\![\ [\ \emptyset_{\mathbf{y\check{o}u}}\ ]\ ]\!] = \lambda P_{<i,t>}.\,\lambda t''.\,\exists t'\ (t' \leq\ t'' \wedge P(t')).$

Depending on the selectional properties of aspectual markers or the temporal restrictions posed by temporal adverbials, either present tense or past tense appears in an episodic sentence, but they never occur at the same time. In other words, tense in Mandarin is never vague. This point will be further spelled out below.

I propose that the particle *le* has an **[*u*T, past]** tense feature and an **[*u*Asp, PERF]** aspect feature. To get rid of its *u*T in order for the sentence to be interpretable, it must enter into a feature sharing relation with $\emptyset_{y\check{o}u}$. Similarly, to delete its *u*Asp, it must enter into a feature sharing relation with $\emptyset_{PERF}$ that has an **[*i*Asp, PERF]** aspect feature. This is illustrated in (2.97).

---

[26]Note that a non-future tense is typical for South East Asian languages such as Thai. I thank John Whitman for pointing this out to me.

(2.97)

TP
… T'
T AspP
$\emptyset_{y\check{o}u}([i\textbf{T, +val}])$ Asp vP
$\emptyset_{PERF}([i\textbf{Asp, PERF}})$ VP
V NP
verb-le([u**T, past**], [u**Asp, PERF**])
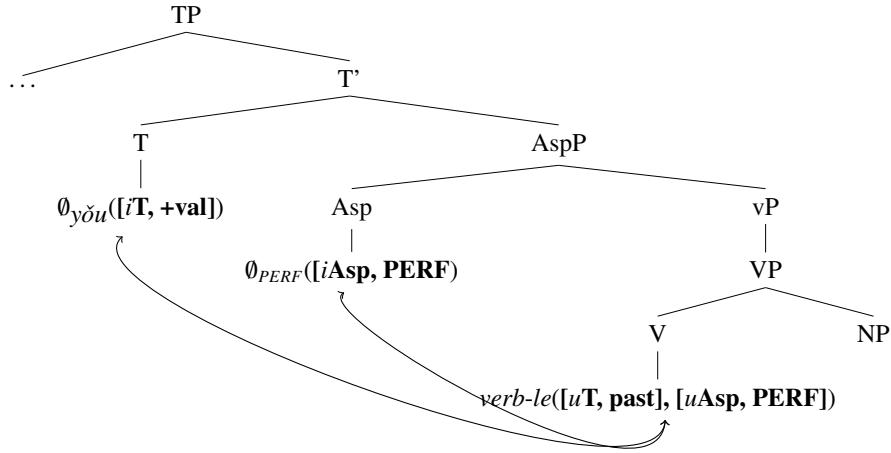
This account has several virtues. First, on this account, the temporal interpretation of an episodic affirmative sentence with *le* is not encoded in *le* itself, rather it is encoded in the phonologically null $\emptyset_{y\check{o}u}$ under T. This is consistent with the location of temporal interpretation for sentences with aspectual markers *zhèngzài*, *guò* and *zhe*. Secondly, on this account, when *le* appears, $\emptyset_{y\check{o}u}$ must appear in order to delete the uninterpretable tense feature of *le*; but, since $\emptyset_{y\check{o}u}$ has [*i***T, +val**] features, its appearance in a sentence does not require the presence of *le*. In other words, the presence of *le* implies the presence of $\emptyset_{y\check{o}u}$, but it does not hold the other way around. Thus, this account captures the intuition about the affinity between *le* and $\emptyset_{y\check{o}u}$, but it avoids the problems discussed in Section 2.2 that the complementary distribution account has. Finally, the non-cooccurrence between *le* and *méiyǒu* can be accounted for if a Neg head would block the Agreeing between *le* and $\emptyset_{y\check{o}u}$. Thus, if *le* appeared in a negative sentence with *méiyǒu*, its uninterpretable tense feature could not be deleted, which would cause the derivation to crash. This derivation is illustrated in (2.98).

(2.98)

```
                    TP
              ╱          ╲
            …              T'
                      ╱         ╲
                    T            NegP
                    |        ╱         ╲
        ∅_yǒu([iT, +val])  Neg        AspP
                            |      ╱        ╲
                           méi   Asp         vP
                                              |
                                             VP
                                          ╱      ╲
                                        V          NP
                                        |
                              verb-le([uT, +past])
```
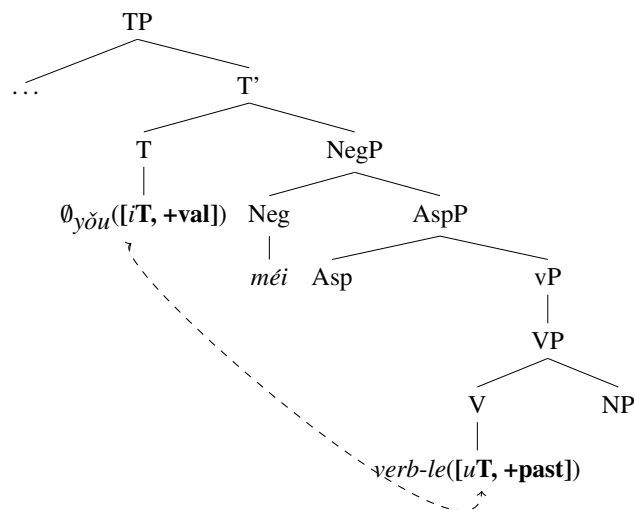
2.4.2   Semantics for non-future episodic sentences in Mandarin

Based on the discussion for the syntactic properties of non-future episodic sentences in Mandarin, one can give a semantics for them by adopting the Kleinian tense and aspect. I illustrate two examples below.

A syntactic derivation for the sentence in (2.99), modified from (2.21), is given in (2.100). Following Chomsky 1995, the NP in [Spec vP] moves to [Spec TP] to check its structural Case; the verb under V moves to v to check accusative Case on the object NP.

(2.99) 张三　　打破　了　一　个　花瓶。
       Zhāngsān dǎpuò le yí gè huāpíng
       Zhangsan break LE one CL vase
    'Zhangsan broke a vase.'

(2.100)
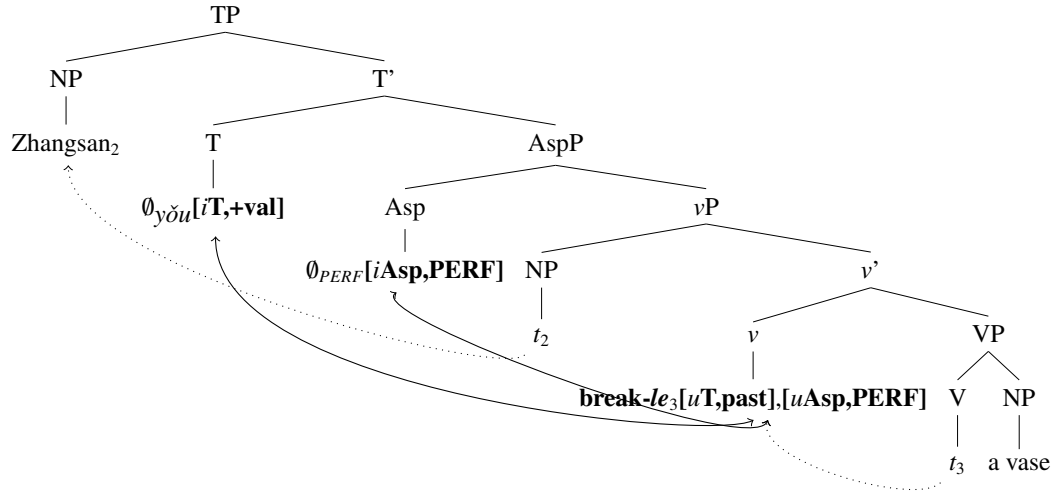
As shown in (2.100), $\emptyset_{y\breve{o}u}$ as the head of TP enters into an Agree relation with *le* to check off its uninterpretable tense feature uT, and $\emptyset_{PERF}$ as the head of AspP deletes the uninterpretable aspect feature of *le* via feature sharing.

The feature sharing mechanism adopted here allows a simplified semantic composition in that elements that Agree with each other only get interpreted once in the semantic derivation. For example, in an episodic affirmative sentence with *le* such as (2.99), $\emptyset_{y\breve{o}u}$ and *le* Agree with each other (2.100), but only the former gets interpreted in the semantic derivation of the sentence. The tree in (2.101) illustrates the LF of (2.99)[27].

---

[27]The parentheses notation for semantic types in LF trees is equivalent to notations in angle brackets. For example, the semantic type (it) is equivalent to <i,t>.

(2.101)

TP
NP — T'$_{(it)}$
T$_{((it)(it))}$ — AspP$_{(it)}$
$\emptyset_{\textbf{\textit{yǒu}}}$[$i$T,past]   Asp$_{((it)(it))}$ vP$_{(it)}$
PERF   NP$_e$ v'$_{(e(it))}$
Zhangsan v VP$_{(e(it))}$
V$_{(e(e(it)))}$ NP$_e$
break   a vase
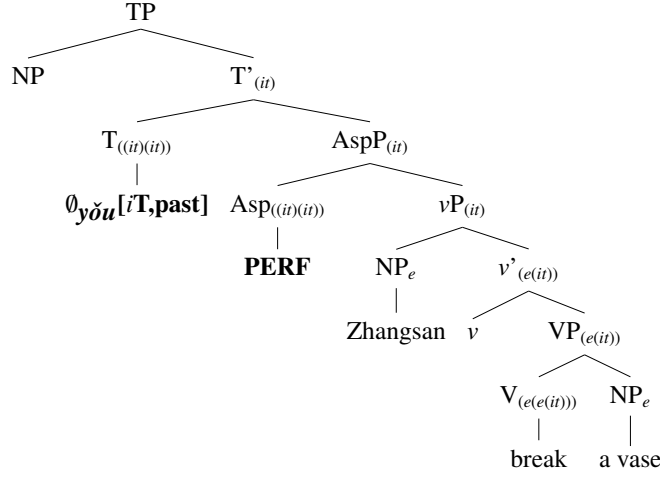
Denotations of main terminal nodes in (2.101) are given in (2.102), and the semantic derivation for (2.99) is illustrated in (2.103).

(2.102) $[\![$ [break] $]\!]$ = $\lambda x.\, \lambda y.\, \lambda t.\, \textbf{\textit{break}}(x)(y)(t)$.

$[\![$ [a vase] $]\!]$ = $\textbf{\textit{vase}}$.

$[\![$ [Zhangsan] $]\!]$ = $\textbf{\textit{zs}}$.

$[\![$ [**PERF**] $]\!]$ = $\lambda P_{<i,t>}.\, \lambda t_{\text{Top}}.\, \exists t\, (t \subseteq t_{\text{Top}} \wedge P(t))$.

$[\![$ [$\emptyset_{\textbf{\textit{yǒu}}}$] $]\!]$ = $\lambda P_{<i,t>}.\, \lambda t''.\, \exists t'\, (t' < t'' \wedge P(t'))$.[28]

(2.103) $[\![$ [$_{\text{T'}}$ [$_{\text{T}}$ $\emptyset_{\textbf{\textit{yǒu}}}$ [$_{\text{Asp}}$ **PERF** [$_{v\text{P}}$ Zhangsan [$_{\text{VP}}$ break a vase]]]] $]\!]^{s^*}$ =

$(\emptyset_{\textbf{\textit{yǒu}}}(\textbf{PERF}(\lambda t.\, \textbf{\textit{break}(vase)(zs)}(t))))\, (s^*)$ =

$(\emptyset_{\textbf{\textit{yǒu}}}(\lambda t_{\text{Top}}.\, \exists t\, (t \subseteq t_{\text{Top}} \wedge \textbf{\textit{break}(vase)(zs)}(\textbf{t})))\, (s^*)$ =

$\exists t'\, (t' < s^* \wedge \exists t\, (t \subseteq t' \wedge \textbf{\textit{break}(vase)(zs)}(t))$

The last line in (2.103) says that there is a time t' such that it precedes the utterance time s^* and it includes another time t at which Zhangsan broke a vase. This gives us the right

---

[28] The tense value in this specific example is past, therefore $t' < t''$.

interpretation of (2.99), i.e., the event of Zhangsan breaking a vase happened before the utterance time s^*.

A semantic derivation for a negated sentence proceeds in a similar fashion. The sentence in (2.104) is the negation of (2.99), and (2.105) illustrates a syntactic structure for it. As discussed in Section 2.4.1, an episodic sentence without overt aspectual marking on its verbal predicate is interpreted perfectively. Accordingly, the aspect in (2.104) is perfective.

(2.104) 张三　　没有　打破　一　个　花瓶。
　　　　Zhāngsān méiyǒu dǎpuò yí gè huāpíng
　　　　Zhangsan not.R break one CL vase
　　　'Zhangsan did not break a vase.'

(2.105)
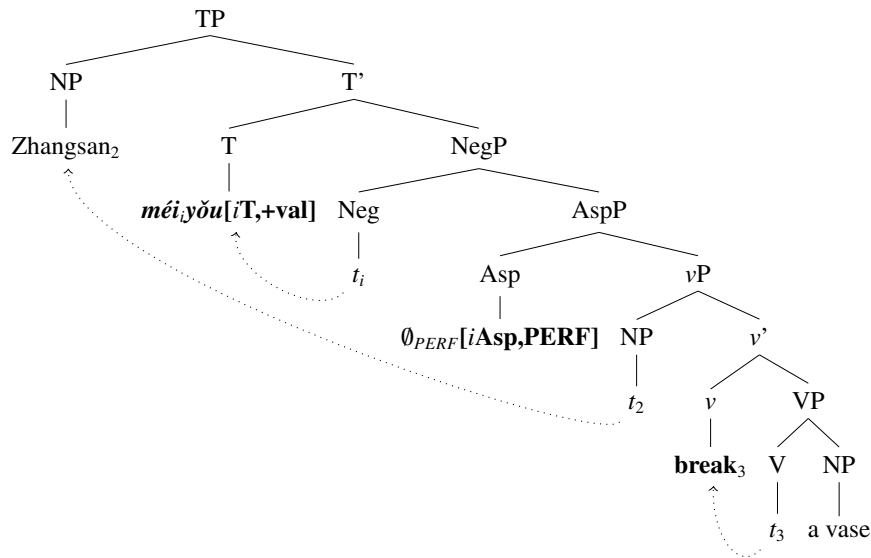
The LF for (2.104) is illustrated in (2.106), and the semantic derivation is in (2.108).

(2.106)
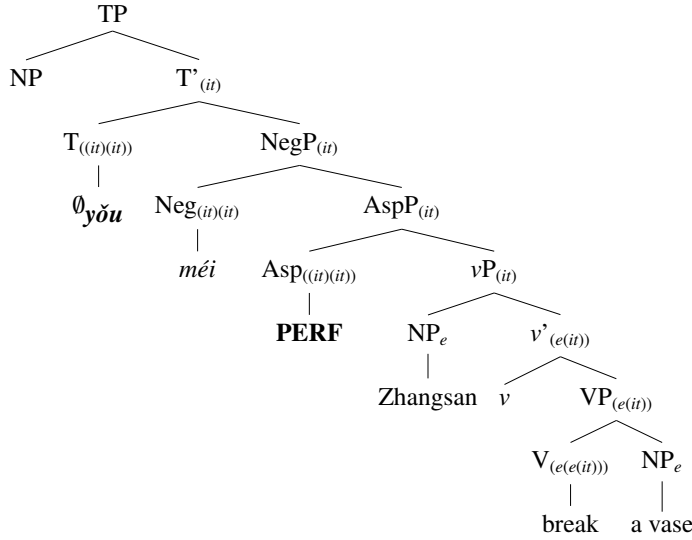
(2.107) $[\![\ [\ \text{break}\ ]\ ]\!] = \lambda x.\ \lambda y.\ \lambda t.\ \boldsymbol{break}(x)(y)(t).$

$[\![\ [\ \text{a vase}\ ]\ ]\!] = \boldsymbol{vase}.$

$[\![\ [\ \text{Zhangsan}\ ]\ ]\!] = \boldsymbol{zs}.$

$[\![\ [\ \textbf{PERF}\ ]\ ]\!] = \lambda P_{<i,t>}.\ \lambda t_{\text{Top}}.\ \exists t\,(t\ \subseteq\ t_{\text{Top}} \wedge P(t)).$

$[\![\ [\ \boldsymbol{m\acute{e}i}\ ]\ ]\!] = \lambda P<i,t>.\ \lambda t'.\neg P(t').$

$[\![\ [\ \emptyset_{\boldsymbol{y\check{o}u}}\ ]\ ]\!] = \lambda P_{<i,t>}.\ \lambda t''.\ \exists t'\,(t'\ \leq\ t'' \wedge P(t')).$

(2.108) $[\![\ [_{\text{T}'}\ [_{\text{T}}\ \emptyset_{\boldsymbol{y\check{o}u}}\ [_{\text{Neg}}\ \boldsymbol{m\acute{e}i}\ [_{\text{Asp}}\ \textbf{PERF}\ [_{v\text{P}}\ \text{Zhangsan}\ [_{\text{VP}}\ \text{break} - le\ \text{a vase}\ ]]]]]]\ ]\!]^{s^*} =$

$(\emptyset_{\boldsymbol{y\check{o}u}}(\boldsymbol{m\acute{e}i}(\textbf{PERF}(\lambda t.\ \boldsymbol{break(vase)(zs)}(t)))))) \ (s^*) =$

$(\emptyset_{\boldsymbol{y\check{o}u}}(\lambda t_{\text{Top}}.\ \neg\exists t\,(t\ \subseteq\ t_{\text{Top}} \wedge \boldsymbol{break(vase)(zs)}(t)))\ (s^*) =$

$\exists t'\,(t'\ \leq\ s^* \wedge \neg\exists t\,(t\ \subseteq\ t' \wedge \boldsymbol{break(vase)(zs)}(t)))$

The last line in the semantic calculation above says that at some time t' either before or at the utterance time s^*, there was no t that is included in t', during which an event of breaking a vase by Zhangsan happened.

57

2.5 Conclusion

In this chapter, I discussed the predictions that the aspect-as-tense theory (Lin 2006) has with respect to negative sentences. The negation marker *méiyǒu* ('not.R') in a negative sentence cannot occur with the so-called perfective aspectual marker *le*, but it can do so with the other aspectual markers *guò*, *zhe* and *zhèngzài*. This poses important questions to the aspect-as-tense theory because *le* is assumed to encode temporal information. If *le* is not present, where would the temporal interpretation of a negative sentence come from? I gave arguments against treating the negation marker *méiyǒu* as heading a NegP based on a cross-linguistic generalization on distribution of sentential negation markers and proposed that *méiyǒu* is under TP based on some language-internal diagnostic tests. At the end, I presented a syntactic and a semantic structure for non-future episodic sentences in Mandarin that utilizes the feature-sharing mechanism proposed in Pesetsky & Torrego 2007 and the standard Kleinian/Kratzerian tense and aspect. The new proposal, which is shown to have several advantages over previous proposals, can give a principled account on the properties of non-future episodic sentences in Mandarin.

2.6 Appendix: The distribution of negation markers in Mandarin: a new proposal

The purpose of this appendix is to put the proposal for TP in Mandarin developed in this chapter in a larger context. I show that the proposal that $\emptyset_{y\check{o}u}$/*méiyǒu* are under T applies only to a subset of sentence types, namely, an episodic eventive or Davidsonian state sentence (Maienborn 2005). It does not apply to sentences describing a Kimian state (Maienborn 2005), because *méiyǒu* cannot negate this type of sentence, which suggests

that $\emptyset_{y\check{o}u}$ does not occur in this type of sentence either. The negation marker that may appear in a sentence of Kimian states is *bù* ('not.IR'). The temporal structure of this type of sentences needs further investigation (See Sun 2014 for a proposal on this topic).

2.6.1 Where do *méiyǒu* ('not.R') and *bù* ('not.IR') appear?

As discussed in this chapter, the negation marker *méiyǒu* ('not.R') is used in an episodic sentence[29]. The sentences in (2.35), (2.37), (2.41), and (2.42) are repeated in (2.109)-(2.112) respectively for illustration purposes.

(2.109) 张三　　　没有　　批评　　*(*了)* 李四。
       Zhāngsān méiyǒu pīpíng (*le) Lǐsì.
       Zhangsan not.R criticize LE Lisi
    'Zhangsan did not criticize Lisi.'

(2.110) 李四 没有　　洗　　过　碗。
       Lǐsì méiyǒu xǐ guò wǎn.
       Lisi not.R wash EXP bowl
    'Lisi has not washed bowls before.'

(2.111) 张三　　　没有　　正在　　唱歌。
       Zhāngsān méiyǒu zhèngzài chànggē.
       Zhangsan not.R PROG sing
    'Zhangsan is not singing.'

---

[29]The negation markers *méiyǒu* ('not.R') and *bù* ('not.IR') appear in a declarative or an interrogative sentence. The negation marker 别 /bié/ ('not.IMP') is used in imperative sentences, as illustrated below.

    i. 别 喝酒。
      Bié hējiǔ.
      not.IMP drink
      'Don't drink!'

I will leave out the discussion on *bié* here.

(2.112) 墙　　上　　没有　　挂　　着　　一　　张　　照片。
　　　　qiáng shàng méiyǒu guà zhe yì zhāng zhàopiān.
　　　　wall　on　not.R　hang DUR one CL　picture
　　　　'There is not a picture hanging on the wall.'

The negation marker *bù* occurs with stative verbal predicates, the copular verb *shì*, adjectival predicates, and modals, as illustrated in (2.113)[30,31].

(2.113)　　i. stative verbs: 喜欢/xǐhuān/ ('to like'), 知道/zhīdào/ ('to know') ,

　　　　像/xiàng/ ('to resemble'), . . .

　　ii. the copula verb: 是/shì/ ('to be')

　　iii. adjectivals: 高兴/gāoxìng/ ('happy'), 聪明/cōngmíng/ ('intelligent'), . . .

　　iv. modals: 可以/kěyǐ/ ('can.DEO'), 可能/kěnéng/ ('can.EPS') , . . .

Some illustrative examples are given in (2.114)-(2.117).

---

[30]The possessive verb 有/yǒu/ ('to have') is an exception in this respect. It cannot be negated by *bù*, as shown below.

　i. *张三 不 有 朋友。
　　Zhāngsān bù yǒu péngyǒu.
　　Zhangsan not.IR have friend
　　'Intended: Zhangsan does not have friends.'

It can only be negated by *méi*, as shown in the example below. As mentioned in footnote 9 in section 2.2, Wang (1965) considers this as a morpho-phonological transformation from *bù* to *méi* in front of the verb *yǒu*. I do not share Wang's (1965) view, and I consider it as an exception in the lexicon.

[31]The deontic necessity modal 必须/bìxū/ ('must') does not have a negative form. Unlike other modals, the circumstantial possibility modal 能/néng/ ('can.CIR') can also be negated by *méi*, as shown below. In this case, the sentence describes an episodic event. This is contrasted with negation by *bù* as shown in (ii) which has a modal meaning.

　i. 可是 爸爸 却 没 能 走出 梅里雪山。 (Xiao & Jin 2013)
　　kěshì bàbà què méi néng zǒuchū MéiLǐXuěShān
　　but father but not.R can walk-out Maini Snow Mountains
　　'However, (his) father could not walk out of the Maini Snow Mountains. '

　ii. 动物 没 有 语言，所以 不/*没有 能 思维。 (Xiao & Jin 2013)
　　dòngwù méi yǒu yǔyán, suǒyǐ bú/*méiyǒu néng sīwéi
　　animal not.R have language, therefore not.IR/*not.R can.CIR think
　　'Animals do not have language, therefore (they) cannot think.'

(2.114) 张三　　　不/*没有　　　知道　这　件　事。
　　　　Zhāngsān bù/*méiyǒu　　zhīdào zhè jiàn shì.
　　　　Zhangsan not.IR/*not.R know　this CL issue

'Zhangsan does not know this issue.'

(2.115) 张三　　　不/*没有　　　是　一　名　　学生。
　　　　Zhāngsān bú/*méiyǒu　　shì yì míng xuéshēng.
　　　　Zhangsan not.IR/*not.R be one CL　student

'Zhangsan is not a student. '

(2.116) 张三　　　不/*没有　　　高兴。
　　　　Zhāngsān bù/*méiyǒu　　gāoxìng.
　　　　Zhangsan not.IR/*not.R happy

'Zhangsan is not happy.'[32]

(2.117) 除　　依照　　　　法律　所　规定　　的　情况　　　和　执行
　　　　chú　yīzhào　　　fǎlü　suǒ　guīdìng de　qíngkuàng hé　zhíxíng
　　　　except according-to law　SUO require REL situation　and execution
　　　　方式　外,　　不/*没有　　　可以　　监视　　住宅。*(Xiao & Jin 2013)*
　　　　fāngshì wài,　bù/*méiyǒu　　kěyǐ　　jiānshì zhùzhái.
　　　　means　outside, not.IR/*not.R can.DEO monitor residence

'Except for situations and means of execution that are required by the law, one cannot monitor residence.'

2.6.2　Previous proposals for the distribution of *méiyǒu* and *bù*

That there are temporal/modal differences between *méiyǒu* and *bù* have been noted for a long time in functional grammar (Chao 1968, Li & Thompson 1981, Lü 1980). Roughly, it is said that sentences with *méiyǒu* describe an event that happened, whereas sentences with *bù* describe a modal context. However, neither temporality nor modality is sufficient to describe their distribution. For example, the example in (2.114) as discussed above is an episodic sentence but *bù* is used.

---

[32]Mandarin adjectives can function as predicates directly. They do not combine with the copular verb *shì*.

Several recent studies focus on the selectional differences between *méiyǒu* and *bù* (Ernst 1995; Hsieh 2001; Lin 2003a, etc.). For example, Hsieh (2001: 52) argues that *méiyǒu* selects dynamic situations, whereas *bù* selects non-dynamic situations. The definition of a dynamic situation is taken from Comrie 1976: 49 as a situation that "will only continue if it is continually subject to a new input of energy." A similar proposal comes from Lin 2003a where it is argued that *méiyǒu* selects an event as its complement, whereas *bù* selects "a stative situation that requires no input of energy in order to obtain that situation." According to Lin 2003a, a sentence with the durative marker *zhe* such as (2.34), repeated here as (2.118), describes a stative situation that is a result of an action which needs input of energy in the first place. For example, in (2.118), the stative situation of a picture hanging on the wall is considered not to be able to obtain without the action of someone hanging the picture on the wall in the first place; and since the action of someone hanging a picture on the wall needs energy to achieve, the sentence in (2.118) cannot be negated by *bù* (2.119).

(2.118) 墙　　上　　挂　　着　　一　　张　　照片。
　　　　qiáng　shàng　guà　zhe　yì　zhāng　zhàopiān.
　　　　wall　　on　　hang　DUR　one　CL　　picture
　　'There is a picture hanging on the wall.'

(2.119) *墙　　上　　不　　挂　　着　　一　　张　　照片。
　　　　qiáng　shàng　bù　　guà　zhe　yì　zhāng　zhàopiān.
　　　　wall　　on　　not.IR　hang　DUR　one　CL　　picture
　　'Intended: There is not a picture hanging on the wall.'

This kind of stative situation is to be contrasted with stative situation as described by sentences with an adjectival predicate. Lin (2003a) argues that a sentence such as 'He is clever' "needs no initial conscious effort and energy in order to obtain the state." Thus, *bù* is used to negate the sentence 'He is clever'. Since *bù* is used to negate a variety of

stative predicates as listed in (2.113), Lin would be forced to explain the use of *bù* in stative predicates other than adjectives in a similar way.

The use of 'an input of energy' as a criterion to classify situations as described in linguistic expressions raises some questions. It is not clear what 'an input of energy' really means. Is the term 'energy' to be understood as a physics term? If so, in what sense does the state as described by a sentence such as 'He is clever' *not* need energy to obtain? Wouldn't the person need energy to sustain his life in the first place for the state of 'being clever' to obtain? Wouldn't the person need to do something, e.g., studying, in order to be clever? I do not see how the 'input of energy' criterion could give a coherent explanation. Moreover, because of the vague use of a non-linguistic term, one still does not know what is at stake that separates a stative sentence with durative marker *zhe* from a stative sentence with an adjectival predicate or, broadly speaking, any other stative predicate, if one takes the different negation markings seriously.

2.6.3   A new proposal

Maienborn 2005 argues that, contrary to Neo-Davidsonian view that all verbal predicates may denote properties of eventualities (Bach 1986), copula sentences do not introduce an eventuality argument in that they systematically fail linguistic diagnostics for eventualities. In this respect, copula sentences pattern with stative verbs such as *know* and *hate*, which is to be contrasted with state verbs like *stand* and *sit* that pass all the eventuality tests. She proposes to enrich our linguistic ontology with two different types of states: *Kimian states* (K-states) for the former and *Davidsonian states* (D-states) for the latter.

Davidsonian states, just like Davidsonian events, are directly observable, can be located in space and time, and can vary in the way that they are realized; whereas Kimian

states are not directly observable and cannot be located in space, but they can be located in time. Several linguistic diagnostics are proposed to show their properties. For example, in English and German, a linguistic expression describing a Davidsonian state can be an infinitival complement of a perception verb, which is not possible for an expression describing a Kimian state, as illustrated in (2.120).

(2.120) I saw John stand under the tree. *vs.* * I saw John be happy. / * I saw John know the answer.

In addition, a linguistic expression describing a Davidsonian state can be modified by a locative expression, whereas a linguistic expression describing a Kimian state cannot, which is shown in (2.121).

(2.121) A statue stands under the tree. *vs.* * John knows the answer at home.

However, the sentence in (2.122) appears to be a counter-example since a locative expression is in a sentence with an adjective predicate.

(2.122) Mary is happy at school.

Assuming that an eventuality is encoded as VP in a syntactic structure, Maienborn (2005), following her previous work in Maienborn 2001, distinguishes three types of locative modifiers: "frame-setting" modifiers, "external" modifiers, and "internal" modifiers. She argues that only the last two types of modifiers are part of VP, i.e., related to the eventuality; and, the first type of modifiers is outside VP and serves to set a frame for the proposition. She gives several syntactic tests to show that a locative phrase such as 'at school' in (2.122) does not modify the state as described by the predicate, but it is

rather a "frame-setting" modifier. Accordingly, the interpretation of (2.122) is more like 'when she is at school, Mary is happy' [33]. Maienborn's (2005) ontological proposal is summarized in (2.123)[34].

(2.123)

	action verbs	state verbs	stative verbs	to be + SLP/ILP
e(*vent*)	✓	✓	×	×
	Davidsonian events	D-states	K-states	K-states

The distribution of *méiyǒu* and *bù* in Mandarin reflects this finer linguistic ontology proposed in Maienborn 2005. In particular, as shown in (2.113), *bù* negates adjectival predicates regardless whether they are individual-level predicates or stage-level predicates; *bù* also negates stative verbs such as *zhīdào* ('to know'). In addition, *bù* negates modal verbs. However, *bù* does not negate state verbs such as *guà* ('to hang') in (2.118), as shown in (2.119), in which case *méiyǒu* is used instead, as illustrated in (2.112). This is illustrated in (2.124).

(2.124)

	action verbs	state verbs	stative verbs	copula	adj. pred.	modals
méiyǒu	✓	✓	×	×	×	×
bù	×	×	✓	✓	✓	✓
	D-events	D-states	K-states	K-states	K-states	K-states

---

[33] Since the syntactic tests that Maienborn (2005) adopts are mostly specific to German and are not directly transferable to Mandarin, I refer readers to her original papers for details.

[34] SLP is short for stage-level predicates; ILP is short for individual-level predicates. (Carlson 1980)

CHAPTER 3

EXISTENTIAL CONSTRUCTIONS IN MANDARIN

This chapter is concerned with existential constructions in Mandarin, whose relevance to the TP proposal in Chapter 2 lies in the fact that they use the same words *yǒu* and *méiyǒu* as episodic eventive sentences do. I entertain the hypothesis that these phenomena are non-accidental. Specifically, I propose that a non-future episodic existential sentence has a TP projection headed by a phonologically null $\emptyset_{y\check{o}u}$, the same way as a non-future episodic eventive sentence does. Unlike an episodic eventive sentence, an episodic existential sentence does not have *v*P and AspP in its clause structure. The verb *yǒu* in an existential sentence is argued to be in V and assign a patient role to its NP argument[1].

The proposed structure for a non-future episodic existential sentence dictates that existential constructions are interpreted below T in Mandarin, which is contrary to Huang's (2003) suggestion that at least some existential quantifiers in Mandarin can be interpreted in Spec TP above T. I provide evidence showing that an existential quantifier such as *yǒurén*, which is often translated into *someone* in English, can never be in Spec TP in a clause, and thus is never interpreted above T. By contrast, a proper name or a presuppositional quantifier may occur and get interpreted in Spec TP. Thus, the proposed structure provides us with a coherent picture of quantifier interpretation in Mandarin, which is consistent with Diesing's (1992) Mapping Hypothesis[2].

This chapter is organized in the following way. The first three sections give a brief description of three existential constructions that involve the use of *yǒu/méiyǒu*: existential sentences (Section 3.1), sentences that have indefinite subjects (Section 3.2), and

---

[1]My proposal for existential constructions is different from Huang's (1990). In Huang 1990, the word *yǒu* in an existential sentence is argued to be in I(nfl). I will show that this is not right.

[2]While the idea that Diesing's (1992) Mapping Hypothesis is valid for Mandarin has been expressed in the literature (Cheng 1991; Hole 2006), there has been no detailed analysis to spell it out. This chapter is meant to fill this gap.

existential quantificational phrases (Section 3.3). Section 3.4 points out the similarities among existential constructions in Mandarin and proposes a unified structure for them. In Section 3.5, I argue that existential quantificational phrases can never appear at the canonical subject position (i.e., Spec TP), contrary to some suggestion that they can (e.g. Huang 2003). Section 3.6 shows that EQPs are base-generated and interpreted below T. Section 3.7 concludes the chapter.

3.1 Existential sentences in Mandarin

I use the term *existential sentence* to refer to a type of sentences in the form of (NP) *yǒu/méiyǒu* NP (XP) in Mandarin, as illustrated in (3.1) and (3.2)[3,4].

(3.1) *(今天/昨天/*明天)* 有 一 本 书 *(在 桌子 上)*。
(jīntiān/zuótiān/*míngtiān) yǒu yì běn shū (zài zhuōzì shàng).
(today/yesterday/*tomorrow) there be one CL book at desk on
'There is/was a book (on the desk) (today/yesterday/*tomorrow).'

(3.2) *(今天/昨天/*明天)* 没有 一 本 书 *(在 桌子*
(jīntiān/zuótiān/*míngtiān) méiyǒu yì běn shū (zài zhuōzì
(today/yesterday/*tomorrow) not.R-there be one CL book at desk
上)。
shàng).
on
'There is/was not a book (on the desk) (today/yesterday/*tomorrow).'

As the translations show, when uttered out of the blue, (3.1) and (3.2) have non-future interpretations that are compatible with non-future temporal modifiers.

---

[3]The word 有/yǒu/ is also used in possessive constructions meaning 'to have', as shown in (i).

i. 他 有 三 个 孩子。
tā yǒu sān gè háizi
he have three CL child
'He has three children.'

While I think this use of *yǒu* is a special case of existential constructions, I will leave out the discussion on this use for future research.

[4]In the literature, the term *existential sentence* has also been used semantically. For example, besides the *yǒu/méiyǒu* existential sentence type, Huang (1987) lists three more types of sentences that express existence. They are: (1.) sentences with unaccusatives such as 发生/fāshēng/ ('to happen'); (2.) sentences with locative verbs such as 坐/zuò/ ('to sit'); and (3.) sentences with verbs suffixed with the experiential aspectual marker *guò* or the perfective marker *le*. See also Teng 1977.

3.2 Ban on indefinite subjects in Mandarin

Mandarin does not allow indefinite subjects (Li & Thompson 1981; Duanmu 1988; Cheng 1991; Tsai 2001). For example, a verbatim translation of the English sentence in (3.3) into Mandarin is ungrammatical, as shown in (3.4).

(3.3) Two boys laughed.

(3.4) *两　　个　　男孩　　笑　　了。
　　　liǎng　gè　nánhái　xiào　le.
　　　two　　CL　boy　　laugh　LE
　　　'Intended: Two boys laughed.'

To save (3.4), the word *yǒu* needs to be added in front of the indefinite phrase; thus, we have (3.5) as the counterpart of (3.3) in Mandarin.

(3.5) *(有)　　两　　个　　男孩　　笑　　了。
　　　*(yǒu)　liǎng　gè　nánhái　xiào　le.
　　　YOU　　two　　CL　boy　　laugh　LE
　　　'Two boys laughed.'

The obligatory use of *yǒu* makes a sentence with an indefinite subject such as (3.5) have the same form and meaning as an existential sentence. This is different from English where existential meaning can be expressed in two linguistic forms: one with indefinite subjects like (3.3) and the other with the *there be*-existential construction. In Mandarin, these two forms collapse into one form; therefore, I will use the term *existential sentences* to cover both cases in the discussion to follow.

3.3 EQPs in Mandarin

The existential quantificational phrases (EQPs) *someone*/*somebody* or *no one*/*nobody* in English are often translated into 有人/yǒurén/ (lit. *yǒu*-people, i.e., 'someone/somebody') or 没有人/méiyǒurén/ (lit. *méiyǒu*-people, i.e., 'no one/nobody') in Mandarin. For example, (3.7) and (3.9) are the Mandarin counterparts of (3.6) and (3.8), respectively. Here, again, we have a construction with *yǒu/méiyǒu* followed by an indefinite bare noun 人/rén/ ('people').

(3.6) Someone handed in homework.

(3.7) 有人　　　交　　　了　作业。
　　　 yǒurén　　jiāo　　　le　　zuòyè.
　　　 someone　hand-in　LE　homework
　　　 'Someone handed in homework.'

(3.8) No one handed in homework.

(3.9) 没有人　　　交　　　　*(*了)*　作业。
　　　 méiyǒurén　jiāo　　　　(*le)　　zuòyè.
　　　 no one　　　hand-in　LE　　　　homework
　　　 'No one handed in homework.'

3.4 The structure of existential constructions

The surface similarities between existential sentences and sentences with existential quantificational phrases are hard to miss. The question is whether their surface similarities reflect structural similarities. In other words, do they share the same syntactic structure? I propose that they do, and the common structure for them is illustrated in (3.10), where

70

yǒu heads a VP and assigns a patient role to its NP argument (cf. Teng 1977). In negative sentences and negative EQPs, a NegP headed by *méi* is merged between TP and AspP.

(3.10)

```
        TP                      TP
      /    \                  /    \
   …        T'             …         T'
          /    \                   /    \
        T       VP               T        NegP
              /    \                     /    \
            V       NP                 Neg      VP
            |        |                  |      /    \
          yǒu       …                 méi    V      NP
                                             |        |
                                            yǒu       …
```
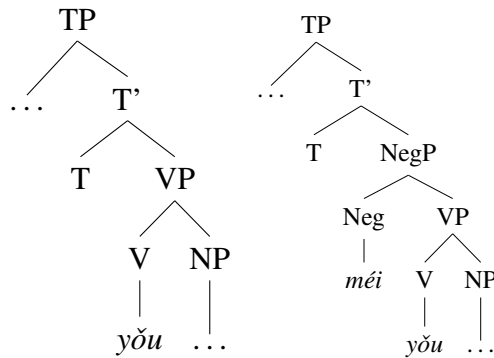
In the structures in (3.10), there is no *v*P since *yǒu* does not assign accusative case. There is also no AspP between TP and VP because aspectual markers do not occur in existential constructions. For example, the sentence in (3.11) is ungrammatical, where the progressive aspectual marker *zhèngzài* ('PROG') is before the EQP *yǒurén* ('someone').

(3.11) *现在　　正在　　有人　　唱歌。
　　　　*xiànzài zhèngzài yǒurén　chànggē.
　　　　now　　　PROG　　someone sing
　　‘*Now there is being someone who is singing.’

Aspectual markers can only occur after existentials. For example, the sentence in (3.12) is grammatical, in contrast to (3.11).

(3.12) 现在　　有人　　正在　　唱歌。
　　　　xiànzài yǒurén　zhèngzài chànggē.
　　　　now　　　someone PROG　　sing
　　‘Someone is singing now. ’

Accordingly, the structure of a minimal *yǒu NP* sentence such as (3.13), adapted from (3.1), where there is only a simple NP after *yǒu/méiyǒu*, is (3.14).

(3.13) 有　　　一　本　书。
　　　　yǒu　　　yì　běn　shū.
　　　　there be　one　CL　book
　　　'There is/was a book.'

(3.14)

```
              TP
            /    \
          …       T'
                /    \
               T      VP
                    /    \
                   V      NP
                   |     /    \
                 yǒu   Num     N'
                        |     /   \
                       one   Cl    N
                             |     |
                            běn   book
```
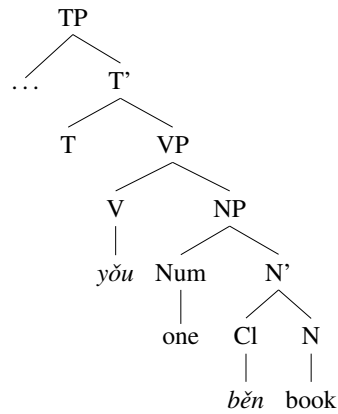
A more complicated existential sentence such as (3.4) or a sentence with an existential quantifier such as (3.7) involves a CP that modifies the noun in its front, as illustrated in (3.15).

(3.15)

```
              TP
            /    \
          …       T'
                /    \
               T      VP
                    /    \
                   V      NP
                   |     /   \
                 yǒu    N    CP
                        |    |
                        …    …
```

72
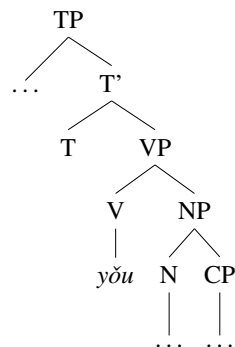
(3.16) illustrates the structures of (3.4) and (3.7) in detail[5].

(3.16)

```
              TP                                    TP
             /  \                                  /  \
          ...    T'                             ...    T'
                /  \                                   /  \
               T    VP                               T    VP
                   /  \                                   /  \
                  V    NP                                V    NP
                  │   /  \                               │    │
                 yǒu Num   N'                           yǒu   N'
                      │   /  \                               /  \
                    two  Cl   N'                            N    CP
                         │   /  \                           │   /  \
                        gè  N    CP                       person λx  TP
                            │   /  \                               /  \
                           boy λx   TP                            x    T'
                                   /  \                               /  \
                                  x    T'                            T    AspP
                                      /  \                           │   /  \
                                     T    AspP                     Ø_yǒu Asp  vP
                                     │   /  \                               /  \
                                   Ø_yǒu Asp  vP                           v    VP
                                            /  \                               /  \
                                           v    VP                            V    NP
                                                │                             │    │
                                             laugh-LE                    hand-in-LE homework
```
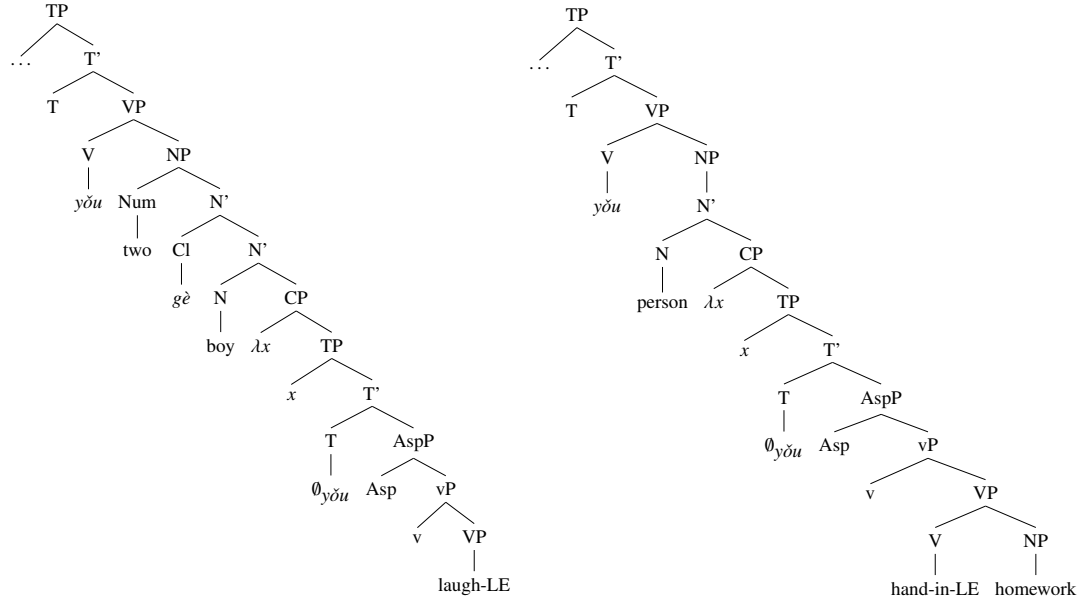
I propose that a phonologically null $\emptyset_{y\check{o}u}$ merges in T in a non-future episodic existential sentence the same way as it does in a non-future episodic eventive sentence discussed in Chapter 2. When the existential sentence is negative, a NegP headed by *méi* is merged above VP. This is illustrated in (3.17).

(3.17)

```
              TP
             /  \
          ...    T'
                /  \
               T    (NegP)
               │    /  \
            Ø_yǒu (Neg)  VP
                  │     /  \
                (méi)  V    NP
                       │    │
                      yǒu  ...
```
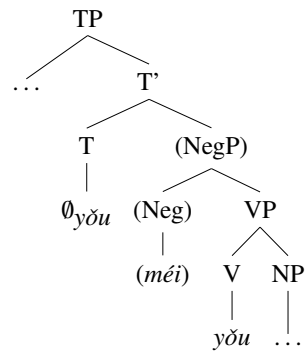
---
[5]In order to save space, I will omit the functional projections AspP and/or *v*P in places where confusion would not arise in the following discussion.

Unlike *méi* in a negative episodic eventive sentence, the one in a negative episodic existential sentence does not need to undergo Neg to T movement to merge with $\emptyset_{y\check{o}u}$. This is because the verb *yǒu* only takes *méi* as its negation marker, and *méi* only negates *yǒu*. This one-to-one relation is reflected in the structure proposal in (3.10).

In a future episodic existential sentence, 会/huì/ is merged in T; similarly, *méi* is merged in Neg when the sentence is negative, as shown in (3.18).

(3.18)

```
                TP
              /    \
           ...      T'
                  /    \
                 T     (NegP)
                 |     /    \
               huì  (Neg)    VP
                      |      /  \
                   (méi)    V   NP
                            |    |
                           yǒu  ...
```
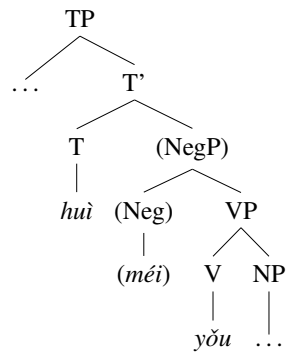
This structure is supported by sentences such as (3.19) or (3.20), where the future marker *huì* is obligatory.

(3.19) 明天,　　*(会)　有　　一　本　书　在　桌子　上。
　　　 míngtiān, *(huì) yǒu yì běn shū zài zhuōzì shàng.
　　　 tomorrow, *(will) there be one CL book at desk on
　　　 'There will be a book on the desk.'

(3.20)　明天　　　我　回　　家,　　会　没有人　　接　　我。
　　　　míngtiān　wǒ　huí　　jiā,　　huì　méiyǒurén　jiē　　wǒ.
　　　　tomorrow　I　　go back　home,　will　no one　　　pick up　I

'I am going home tomorrow, and no one will pick me up.' [6,7]

The fact that the word *yǒu* in an existential sentence stays in a future context lends support to the structural proposal that it is a lexical verb in V (3.10), since a functional T-head $\emptyset_{y\check{o}u}$/*méiyǒu* cannot occur in a future context.

3.5　Against EQPs in subject position

In the structural proposal for a sentence with an existential quantifier in Mandarin in (3.10), the elements in an existential quantifier such as *yǒurén* ('someone') occupy different positions. Take (3.7), repeated in (3.21), as an example. As illustrated in (3.16), repeated in (3.22), the word *yǒu* is originated under V, whereas the *rén* is a noun. Thus, an existential quantifier in Mandarin is formed in the syntactic derivation, rather than appearing as a single lexical item that enters into the syntactic derivation.

---

[6]Another way to say (3.20), which might be more common, is to negate the future marker, not *yǒu*, as illustrated below.

i. 明天 我 回家, 不 会 有人 接 我。
　 míngtiān wǒ huí jiā, bú huì yǒurén jiē wǒ.
　 tomorrow I go back home, not.R will someone pick up I

This seems to be a Neg-raising. If it really is, it would suggest that the Neg head above *yǒu*-VP might just be a Neg feature whose phonological realization depends on where it ends up in the syntactic derivation. If it remains in situ, it becomes *yǒu*; if it moves up, it becomes *bù*. I am not going to make a choice here and will leave it for future research.

[7]The example in (3.20) is modified from the alternative question in (i), which is found online. Similar examples can be found online in abundance.

i. 明天 回家, 会 不 会 没有人 接?
　 míngtiān [e] huí jiā, huì bú huì méiyǒurén jiē [e]?
　 tomorrow [I] go back home, will not.R will no one pick up [I]
　 'I'm going home tomorrow, and [I am wondering] whether there will be no one who will pick me up.'
　 (source: http://tieba.baidu.com/p/1357573451; accessed on Dec. 10, 2015.)

(3.21) 有人　　交　　了　作业。
　　　　yǒurén　jiāo　le　zuòyè.
　　　　someone　hand-in　LE　homework
　　　　'Someone handed in homework.'

(3.22)

```
                    TP
                   /  \
                 …     T'
                      /  \
                    T      VP
                    |     /  \
                  ∅_yǒu  V    NP
                         |     |
                       yǒu     N'
                              /  \
                            N      CP
                            |     /  \
                         person  λx   TP
                                     /  \
                                   x      T'
                                        /  \
                                      T      …
                                      |      |
                                    ∅_yǒu    VP
                                            /  \
                                          V      NP
                                          |       |
                                   hand-in-LE  homework
```
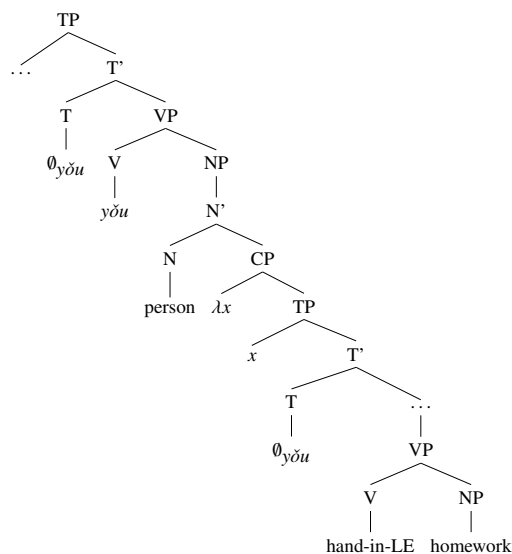
Existential quantifiers in English, by contrast, are lexical nouns. For example, 'some-one' in (3.6), repeated in (3.23), is a lexical NP in Spec TP position at the surface structure, as illustrated in (3.24).

(3.23) Someone handed in homework.

(3.24)

```
              TP
             /  \
           NP     T'
           |     /  \
       someone  T      …
                |      |
             [+past]   VP
                      /  \
                    V      NP
                    |       |
                 bought  three books
```

76
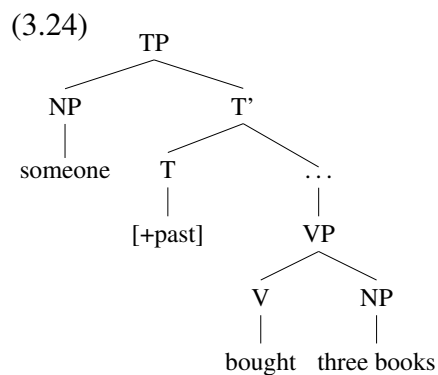
Being a lexical NP, an EQP in English can also be the direct object of a verb (3.25), the indirect object of a ditransitive verb (3.26), or the object of a preposition (3.27).

(3.25) Mary met someone/no one on her way home.

(3.26) Mary gave someone/no one a book.

(3.27) Mary was cheated by someone/no one.

By contrast, as predicted by the structural proposal in (3.10),, Mandarin EQPs can be none of them, as illustrated in (3.28) - (3.30) (cf. Huang 2003). This is because Mandarin EQPs are not NPs.

(3.28) *玛丽 在 回 家 的 路 上 遇见 了 *(没)*有人。
  *Mǎlì zài huí jiā de lù shàng yùjiàn le (méi)yǒurén.
  Mary at return home REL road on meet LE someone/no one
  'Intended: Mary met someone/no one on her way home.'

(3.29) *玛丽 给 了 *(没)*有人 一 本 书。
  *Mǎlì gěi le (méi)yǒurén yì běn shū.
  Mary give LE someone/no one one CL book
  'Intended: Mary gave someone/no one a book.'

(3.30) *玛丽 被 *(没)*有人 骗 了。
  *Mǎlì bèi (méi)yǒurén piàn le.
  Mary PASS someone/no one cheat LE
  'Intended: Mary was cheated by someone/no one.'

In fact, the proposal in (3.10) makes a even stronger prediction, i.e., EQPs in Mandarin can *never* be in Spec TP, the canonical subject postion. However, sentences like (3.7) (a.k.a. (3.21)) and (3.9), as well as those in (3.31)-(3.34), seem to suggest some structural parallelism between the Mandarin sentences and their English translations.

(3.31) 有人　　　明天　　　*(不)*　　会　　喝酒。
    yǒurén míngtiān (bú) huì hējiǔ.
    someone tomorrow (not.IR) will drink
    'Someone will (not) drink tomorrow.'

(3.32) 没有人　　　交　　　*(*了)*　作业。
    méiyǒurén jiāo (*le) zuòyè.
    nobody hand-in LE homework
    'Nobody handed in homework.'

(3.33) 没有人　　　没有　　交　　　作业。
    méiyǒurén méiyǒu jiāo zuòyè.
    nobody not.R hand-in homework
    'Nobody didn't hand in homework.'

(3.34) 没有人　　　明天　　　*(不)*　　会　　喝酒。
    méiyǒurén míngtiān (bú) huì hējiǔ.
    nobody tomorrow (not.IR) will drink
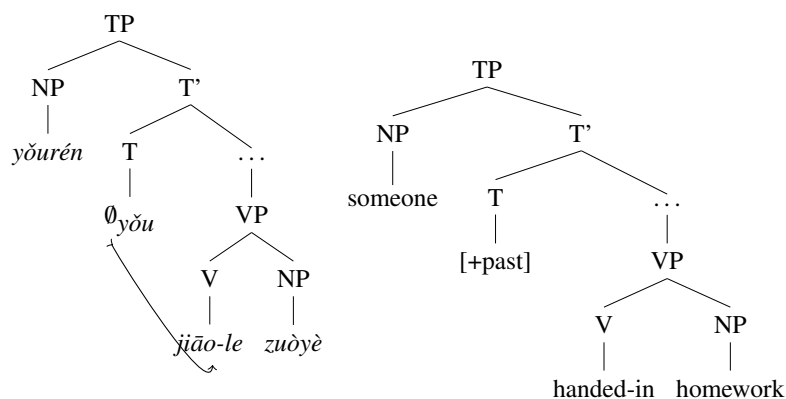   'Nobody will (not) drink tomorrow.'

On the one hand, the Mandarin sentences can be translated into English ones word by word without word order alternation, which could suggest some structural parallelism; on the other hand, if *le* agrees with a phonologically null element $\emptyset_{y\check{o}u}$ in T as argued in Chapter 2, the sentence in (3.21) seems to have a structure where *yǒurén* being in Spec TP position and $\emptyset_{y\check{o}u}$ in T Agrees with *le* that is attached to the verb, as illustrated in (3.35). This would give us a structure that is the same as its English translation 'someone handed in homework', again in (3.35). The same argument applies to the other examples in (3.9) as well as (3.31)-(3.34)[8].

---

[8] Huang (2003) assumes that *méiyǒu rén* in examples such as (3.32)-(3.34) is in subject position. As for the structure of *méiyǒu rén*, he says:

"Concerning Mandarin, one might reasonably suggest that the language (like Japanese) does not have a negative NP. All the putative negative NPs are simply a sequence of *méiyǒu* 'not have' followed by a polarity NP that does not reanalyze into a negative NP constituent. My assumption is that it should be possibile to optionally regard such a sequence as having reanalyzed into an NP, based on two considerations. First, native speakers tend to equate *nobody* with *méiyǒu rén* (say, in word-for-word translation), even without realizing that *méiyǒu rén* does not occur post-verbally. Second, it was pointed out to me (by a member of the audience when I presented this material at Havorford College) that postverbal *méiyǒu rén* is used by some young speakers, and also in pop song lyrics."

Thus, it is clear that the structural parallelism in (3.35) is in the spirit of Huang's (2003) claim.

(3.35)

```
            TP                                    TP
          /    \                               /     \
        NP      T'                           NP       T'
        |      /  \                          |       /  \
      yǒurén  T    …                       someone  T    …
             |      \                              |      \
            Ø_yǒu   VP                          [+past]   VP
                   /  \                                  /  \
                  V    NP                               V    NP
                  |    |                                |     |
              jiāo-le zuòyè                        handed-in homework
```
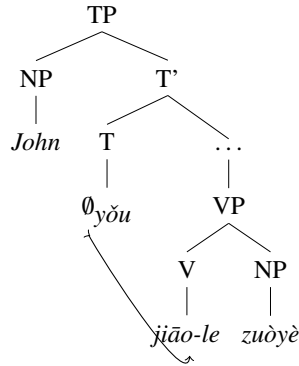
In the following, I am going to show that the structure for (3.21) in (3.35) is wrong, and *yǒurén* may not be in Spec TP position. I make two assumptions for the argument below. First, every proposition *p* has a negative counterpart ¬*p* which is contradictory to it (Law of Excluded Middle)[9]; second, two clauses that have the same structure have the same structural properties, and crucial for our purposes here, they will have the sentential negation marker at the same structural position.

One piece of evidence against the structure in (3.35) comes from the observation that negating the sentence in (3.7) (a.k.a (3.21) and (3.56)), given its structure in (3.35), would lead to a different logical relation from negating a sentence with the same structure but having a proper name as subject. For example, if (3.35) is a correct structure for (3.21), (3.21) would have the same structure as (3.36) does, which is illustrated in (3.37).

(3.36) 约翰　　交　　　了　作业。
　　　　Yuēhàn jiāo　　 le　 zuòyè.
　　　　John　 hand-in LE homework
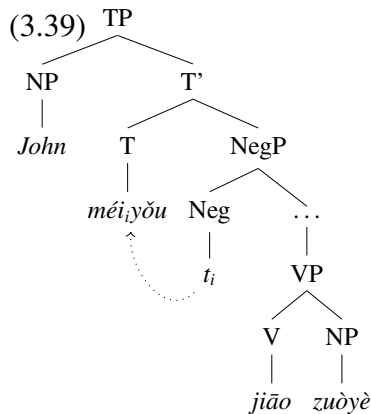　　　'John handed in homework.'

---

[9]I put aside situations when a proposition with a presupposition quantifier or a definite phrase such as 'the French king' has an empty quantificational domain.

(3.37)

```
                    TP
            ┌───────┴───────┐
           NP              T'
           │         ┌──────┴──────┐
          John      T             . . .
                    │              │
                  ∅_yǒu           VP
                              ┌────┴────┐
                              V        NP
                              │         │
                          jiāo-le    zuòyè
```

This means that they would have the same structural properties. One property is the structural position of sentential negation. For example, the sentence in (3.36) makes the assertion that at some time before the utterance time, there was an event of John handing in homework at that time; the negation of this sentence, which is illustrated in (3.38), asserts the opposite, i.e., at some time before the utterance time, there was not an event of John handing in homework at that time. In structure, the element in T in (3.37) has changed to *méiyǒu* in (3.39), after the negation marker *méi* raises to merge with $\emptyset_{yǒu}$.

(3.38) 约翰　　没有　　交　　　作业。
　　　　Yuēhàn méiyǒu jiāo 　 zuòyè.
　　　　John 　 not.R 　 hand-in homework
　　　　'John did not hand in homework.'

(3.39)
```
                    TP
            ┌───────┴───────┐
           NP              T'
           │         ┌──────┴──────┐
          John      T            NegP
                    │        ┌─────┴─────┐
                 méi_i yǒu   Neg        . . .
                             │           │
                            t_i         VP
                                    ┌────┴────┐
                                    V        NP
                                    │         │
                                  jiāo      zuòyè
```

If (3.21) has the same structure as (3.36), as illustrated in (3.35), one would expect the negation of (3.21) to have the same structure as (3.38), which is illustrated in (3.40).

(3.40)
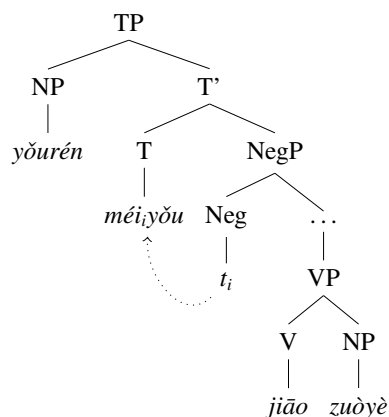
This would give us the sentence in (3.41) as the negated sentence of (3.21).

(3.41) 有人　　没有　　交　　作业。　　*(∃ ≫ ¬,*¬ ≫ ∃)*
　　　　yǒurén　méiyǒu jiāo　　zuòyè.
　　　　someone not.R　　hand-in　homework

　　'Someone didn't hand in homework. I.e., There was someone who didn't hand in homework. NOT: There was not anyone who handed in homework.'

Although (3.41) is grammatical, it is not the real negated sentence of (3.21). By definition, an affirmative sentence and its negated one stand in contradiction. When (3.36) and (3.38) are asserted at the same time, the whole utterance results in contradiction, as illustrated in (3.42).

(3.42) 约翰　　交　　了 作业,　　约翰　　没有　　交　　作业。　　*(⊥)*
　　　　Yuēhàn jiāo　　le　zuòyè,　　Yuēhàn méiyǒu jiāo　　zuòyè.
　　　　John　　hand-in LE homework John　　not.R　　hand-in　homework

　　'John handed in homework, and John did not hand in homework.'
　　(CONTRADICTION)

81

However, there is no contradiction when (3.21) and (3.41) are asserted at the same time, as illustrated in (3.43).

(3.43) 有人　　交　　了　作业,　　有人　　没有　　交　　　作业。*(⊥)*
      yǒurén　jiāo　le　zuòyè,　yǒurén　méiyǒu　jiāo　zuòyè.
      someone　hand-in　LE　homework　someone　not.R　hand-in　homework
    'Idiomatic: There are people who handed in homework, and there are people who didn't hand in homework.' (NO CONTRADICTION)

This logical contrast is unexpected if (3.21) has the same structure as (3.36).

Another piece of evidence is the differences observed between (3.21) and (3.36) with respect to the formation of polar questions[10] and the interpretation of their answers.

In Mandarin, there are three kinds of polar questions: (i) questions with a sentence-final question marker 吗/ma/ ('Q$_{ma}$') (henceforth *ma*-questions); (ii) questions with a sentence-final negation word, which are dubbed as *negative particle questions* (NPQs) in Cheng et al. 1996; (iii) A-not-A questions, a special kind of disjunctive polar question (Huang 1990; McCawley 1994)[11]. If one assumes that polar questions are formed by attaching a question operator in the CP domain (Cheng 1991), one should be able to derive three polar questions by attaching the question operators to the CP domain of the clause[12].

The sentence in (3.36) with a proper name as subject can form the three types of polar questions, as illustrated in (3.44)-(3.46). Moreover, the three questions share a common

---

[10]I use *polar questions* here as a cover term for a question that has as its denotation a set of two contradictory propositions (Hamblin 1973). In notation: $Q_{Polar}(p) = \{p, \neg p\}$. Thus, this term not only includes Mandarin *ma*-questions and *negative particle questions* (Cheng et al. 1996), but also A-not-A questions in Mandarin, which is a special disjunctive question.

[11]I use the term 'A-not-A questions' as a cover term for a type of questions where there is a common part, represented by 'A', before and after the negation, represented by 'not'. See Huang 1990; McCawley 1994 for discussions on variants of A-not-A questions.

[12]In this case, one could think A-not-A questions as being formed by attaching a question operator to a disjunctive proposition. The exact syntactic generation of A-not-A questions are under debate (see Gasde 2004; Law 2006; Simpson 2015 a.o.). But, the argument below does not hinge on it.

answer in (3.47). The affirmative answer in (3.47) is an elliptical form for (3.36) and the negative one for (3.38).

(3.44) 约翰   交   了   作业   吗?
       Yuēhàn jiāo   le   zuòyè   ma?
       John   hand-in LE   homework Q_{ma}
    'Did John hand in homework?'

(3.45) 约翰   交   了   作业   没?
       Yuēhàn jiāo   le   zuòyè   méi?
       John   hand-in LE   homework not.R
    'Did John hand in homework?'

(3.46) 约翰   交   没   交   作业?
       Yuēhàn jiāo   méi   jiāo   zuòyè?
       John   hand-in not.R   hand-in homework
    'Did John hand in homework or not?'

(3.47) 交   了。/没   有。
       jiāo   le./méi   yǒu.
       hand-in LE./not.R.
    '(Lit.) (e) handed in (e)./(e) did not (e). i.e., Yes, he did. / No, he didn't.'[13]

If the existential sentence in (3.21) has the same structure as the sentence in (3.36), one would expect it to form the same types of polar questions. However, as shown below, the *ma*-question in (3.48) and the NPQ in (3.49) are grammatical, but the A-not-A question in (3.50) is not.

(3.48) 有人   交   了   作业   吗?
       yǒurén   jiāo   le   zuòyè   ma?
       someone hand-in LE   homework Q_{ma}
   'Did anyone hand in homework?'

---

[13]Mandarin is a discourse *pro*-drop language (see Huang 1984 a.o.).

(3.49) 有人　　交　　了　作业　　　没?
　　　　yǒurén　jiāo　le　zuòyè　　m'ei?
　　　　someone　hand-in　LE　homework　not.R
　　'Did anyone hand in homework?'

(3.50) *有人　　交　　没　交　　作业?
　　　　*yǒurén　jiāo　méi　jiāo　zuòyè?
　　　　someone　hand-in　not.R　hand-in　homework?
　　'Intended: Did anyone hand in homework?'

One might argue that A-not-A questions are established via Agree between the question operator in CP and the disjunctive phrase under T (Huang 1991), but there is no such Agree operation in sentence-final particle questions. One could then argue that the Agree operation between Q_{disj} and the A-not-A constituent is blocked by the EQP *yǒurén* (3.51); therefore, (3.50) is ungrammatical.

(3.51)
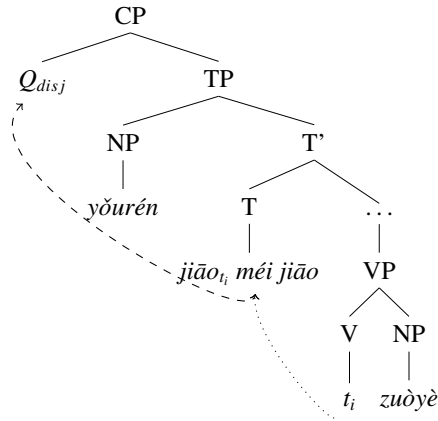
By contrast, the EQP *yǒurén* in (3.48) and (3.49) does not cause intervention because there is no Agree operation in sentence-final particle questions. Thus, the fact that (3.50) is ungrammatical would not necessarily falsify the structure for (3.21) in (3.35), since the ungrammaticality might be due to an idiosyncratic property of A-not-A questions.

However, when turning to the answers to the two grammatical polar questions (3.48) and (3.49), one finds another serious problem. These answers are illustrated in (3.52).

(3.52) 有。　／没有。　　／ *交　　　了。/*没　交。
     yǒu.　/méiyǒu.　/ *jiāo　　le./*méi　　jiāo.
     YOU　/not.R　　/ *hand-in　LE./*not.R　hand-in.

    'Lit. there was. / there wasn't.' i.e., 'Yes, someone did. / No, no one did.'
    But, 'Lit. *hand-in LE./*not.R hand-in.', i.e., * 'Yes, someone did. / No, no one did.'

Between the two grammatical answers, the affirmative one can be considered as an elliptical form of (3.21), but, the negative one *méiyǒu* cannot be interpreted as an elliptical form of (3.41), the negative sentence of (3.21) when it is assumed to have the structure in (3.35). It can *only* be interpreted as an elliptical form of (3.53).

(3.53) 没有人　　交　　　*(*了)* 作业。
     méiyǒurén　jiāo　　(*le)　zuòyè.
     no one　　　hand-in　(*LE)　homework

    'No one handed in homework?'

In other words, one cannot form a polar question with (3.21) and its alleged negative sentence (3.41) as possible answers, which indicates that (3.41) is not the negation of (3.21).

Notice that (3.53), unlike (3.41), is a contradictory sentence to (3.21), as illustrated in (3.54), which indicates that (3.53) is the negated sentence on (3.21).

(3.54) 有人　　交　　了 作业,　　没有人　　交　　　*(*了)* 作业。*(⊥)*
     yǒurén　jiāo　　le zuòyè,　méiyǒurén jiāo　　(*le)　zuòyè.
     someone　hand-in　LE homework no one　　hand-in　(*LE)　homework

    'Idiomatic: Someone handed in homework, and no one handed in homework.'
    (CONTRADICTION)

Notice further that (3.48) and (3.49) with *yǒurén* as subject also have different answers from the polar questions in (3.44)-(3.46) with *John* as subject. While the answers to the polar questions with *John* as subject either affirm or negate the element in T, those with *yǒurén* as subject seem to either affirm or negate the element in Spec TP, which cannot be right for independent reasons. Again, this difference is unexpected if *yǒurén* and *John* have the same syntactic status in the same syntactic tree, as claimed in (3.35) and (3.37).

To summarize so far, if one assumes that *yǒurén* in (3.7) (a.k.a. 3.21), repeated in (3.55), and *John* in (3.36), repeated in (3.56), occupy the same structural position, as illustrated in (3.35) and (3.37), repeated in (3.57), one would not expect the differences observed in (3.58).

(3.55) 有人　　交　　了　作业。
      yǒurén　jiāo　　le　zuòyè.
      someone　hand-in　LE　homework
    'Someone handed in homework.'

(3.56) 约翰　　交　　了　作业。
      Yuēhàn　jiāo　　le　zuòyè.
      John　　hand-in　LE　homework
    'John handed in homework.'

(3.57)
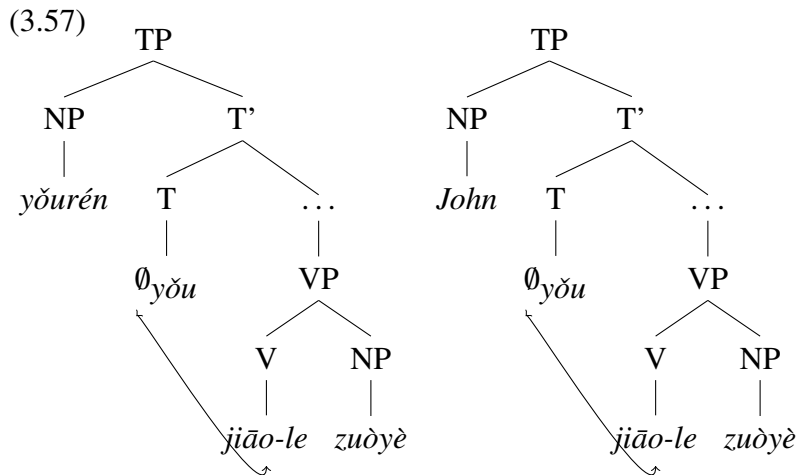
(3.58) Differences based on different types of elements at Spec TP (i.e., different subjects), given the structural proposals in (3.57):

|		*yǒurén* (SUBJ)	*John* (SUBJ)
(a)	Possibility to negate T	✓	✓
(b)	An affirmative sent. and its negation stand in contradiction	✗	✓
(c)	Form A-not-A questions	✗	✓
(d)	Form *ma*-questions	✓	✓
(e)	Form NPQs	✓	✓
(f)	Answers to polar questions include the result of (a)	✗	✓

Since *yǒurén* and *John* are assumed to be in the same structural position, the differences could only be explained as due to some semantic differences between the two types of subjects. In fact, one might argue that unlike proper names, the subject *yǒurén* as a quantificational phrase prevents the sentential negation operator from targeting T, which explains why (3.41) cannot be the negative form of (3.21). However, this argument would have to explain two things. First, as shown in (3.54), the sentence in (3.53) is the negated sentence of (3.21). Assuming that *yǒurén* is the subject would amount to suggesting that the sentential negation operator could negate the subject NP. This does not make sense; since by definition, a sentential negation operator takes a sentence as its argument, not an NP.

Second, strong quantifiers (SQs) such as 每-个-人/měi-gè-rén/ (Lit. every-CL-people, i.e., 'everyone') or 大-部分-(的)-人/dà-bùfèn-(de)-rén/ (Lit. big-part-(POSS)-people, i.e., 'most people') do not block sentential negation, when they are in subject position. In

fact, they pattern with proper names in all the aspects discussed in (3.58). For example, the sentence in (3.59), if given a structure in (3.60), can have a negative counterpart where the element under T is negated. When asserted at the same time, they result in contradiction, as shown in (3.61).

(3.59) 每　　个　人　　*(都)　交　　了　作业。
　　　　měi　gè　rén　dōu　jiāo　le　zuòyè.
　　　　every　CL　people　DOU　hand-in　LE　homework.
　　　　'Everyone handed in homework.'

(3.60)
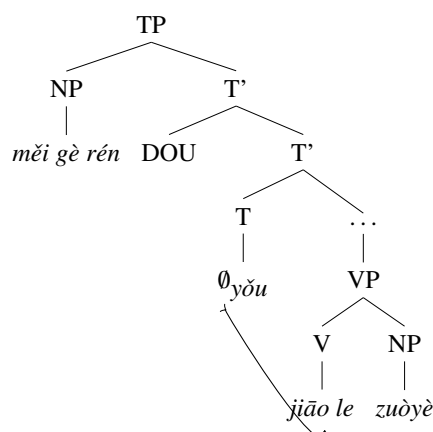
(3.61) *每　个　人　　都　　交　　了　作业。　　每　　个　人
　　　　měi　gè　rén　dōu　jiāo　le　zuòyè.　　měi　gè　rén
　　　　every　CL　people　DOU　hand-in　LE　homework.　every　CL　people
　　　　都　　没有　　交　　作业。(⊥)
　　　　dōu　méiyǒu　jiāo　zuòyè.
　　　　DOU　not.R　hand-in　homework

　　　　'*Everyone handed in homework, and, everyone did not hand in homework[14].'
　　　　(CONTRADICTION)'

---

[14]Since quantifiers in Mandarin do not reconstruct, the English translation 'everyone did not hand in homework' has to be interpreted as the universal quantifier scoping over the negation operator in order to get the right meaning of its counterpart in Mandarin (in notation: ∀ ≫ ¬, *¬ ≫ ∀)

Moreover, as illustrated in (3.62)-(3.64), one can also form the three types of polar questions with *měi-gè-rén* in subject position and have (3.59) and its negated counterpart as possible answers, as shown in (3.65) (see also McCawley 1994).
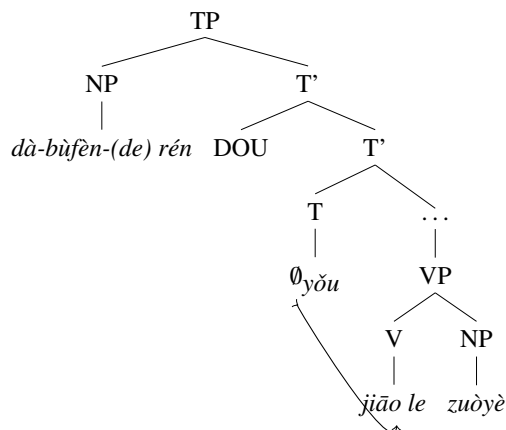
(3.62) 每　　个　人　　都　　交　　　了　作业　　　吗*?*
　　　　měi　gè　rén　dōu　jiāo　le　zuòyè　　ma?
　　　　every　CL　people　DOU　hand-in　LE　homework　Q*ma*
　　　　'Did everyone hand in homework?'

(3.63) 每　　个　人　　都　　交　　　了　作业　　　没*?*
　　　　měi　gè　rén　dōu　jiāo　le　zuòyè　　méi?
　　　　every　CL　people　DOU　hand-in　LE　homework　not.R
　　　　'Did everyone hand in homework?'

(3.64) 每　　个　人　　都　　交　　没　交　　作业*?*
　　　　měi　gè　rén　dōu　jiāo　méi　jiāo　zuòyè?
　　　　every　CL　people　DOU　hand-in　not.R　hand-in　homework?
　　　　'Did everyone hand in homework?'

(3.65) 都　　交　　　了。　/都　　没有。
　　　　dōu　jiāo　le.　/dōu　méiyǒu.
　　　　DOU　hand-in　LE.　/DOU　not.R.
　　　　'(Lit.) (e) DOU handed in (e)./(e) DOU did not (e). i.e., Yes, everyone did. / No, everyone didn't.'[15]

The examples in (3.66) and (3.72) show the parallel behavior when the quantifier 大-部分-(的)-人/dà-bùfèn-(de)-rén/ (Lit. big-part-(POSS)-people, i.e., 'most people') is in subject position.

(3.66) 大-部分-*(的)*　人　　*(都)*　交　　　了　作业。
　　　　dà-bùfèn-(de)　rén　*(dōu)*　jiāo　le　zuòyè.
　　　　most　　　　　people　DOU　hand-in　LE　homework.
　　　　'Most people handed in homework.'

---

[15]The scope interpretation for the negative answer in Mandarin is ∀ ≫ ¬, but not ¬ ≫ ∀.

(3.67)

```
                    TP
              /            \
            NP              T'
            |          /         \
  dà-bùfèn-(de) rén   DOU         T'
                             /          \
                            T           ...
                            |          /    \
                          ∅_yǒu       VP
                                     /    \
                                    V      NP
                                    |       |
                                jiāo le   zuòyè
```

(3.68) *大-部分-*(*的*)* 人   都   交   了 作业,   大-部分-*(*的*)*
     dà-bùfèn-(de)   rén   dōu   jiāo le zuòyè,   dà-bùfèn-(de)
     most   people DOU hand-in LE homework, most
     人   都   没有   交   作业。
     rén   dōu   méiyǒu   jiāo   zuòyè.
     people DOU not.R   hand-in homework,

'Most people handed in homework, and most people did not hand in homework.'[16]

(3.69) 大-部分-*(*的*)* 人   都   交   了 作业   吗*?*
     dà-bùfèn-(de)   rén   dōu   jiāo le zuòyè   ma?
     most   people DOU hand-in LE homework Q_{ma}

'Did most people hand in homework?'

(3.70) 大-部分-*(*的*)* 人   都   交   了 作业   没*?*
     dà-bùfèn-(de)   rén   dōu   jiāo le zuòyè   méi?
     most   people DOU hand-in LE homework not.R

'Did most people hand in homework?'

(3.71) 大-部分-*(*的*)* 人   都   交   没   交   作业*?*
     dà-bùfèn-(de)   rén   dōu   jiāo méi   jiāo   zuòyè?
     most   people DOU hand-in not.R hand-in homework?

'Did most people hand in homework?'

---

[16]Similarly, the English translation 'most people did not hand in homework' has to be interpreted as the quantifier scoping over the negation operator in order to get the right meaning of its counterpart in Mandarin (in notation: **MOST ≫ ¬, *¬ ≫ MOST**).

(3.72) 都　　交　　了。　/都　　没有。
　　　　dōu　jiāo　le.　/dōu　méiyǒu.
　　　　DOU　hand-in　LE.　/DOU　not.R.

'(Lit.) (e) DOU handed in (e)./(e) DOU did not (e). i.e., Yes, most people did. / No, most people didn't.'[17]

Thus, strong quantifiers can be added to (3.58), as illustrated in (3.73).

(3.73) Differences based on different types of elements at Spec TP, given the structural proposals in (3.57):

		yǒurén (SUBJ)	*John* (SUBJ)	SQs (SUBJ)
(a)	Possibility to negate T	✓	✓	✓
(b)	An affirmative sent. and its negation stand in contradiction	✗	✓	✓
(c)	Form A-not-A questions	✗	✓	✓
(d)	Form *ma*-questions	✓	✓	✓
(e)	Form NPQs	✓	✓	✓
(f)	Answers to polar questions include the result of (a)	✗	✓	✓

To sum up, positing that an existential quantifier such as *yǒurén* in a sentence such as (3.7) (a.k.a. 3.21) is at Spec TP, the canonical subject position in a sentence, fails to arrive at predictions that come from a sentence with the same structure but has either a proper name or a strong quantifier as subject. This indicates that an existential quantifier cannot be in Spec TP position in a sentence.

---

[17]The scope interpretation for the negative answer in Mandarin is **MOST** ≫ ¬, but not ¬ ≫ **MOST**.

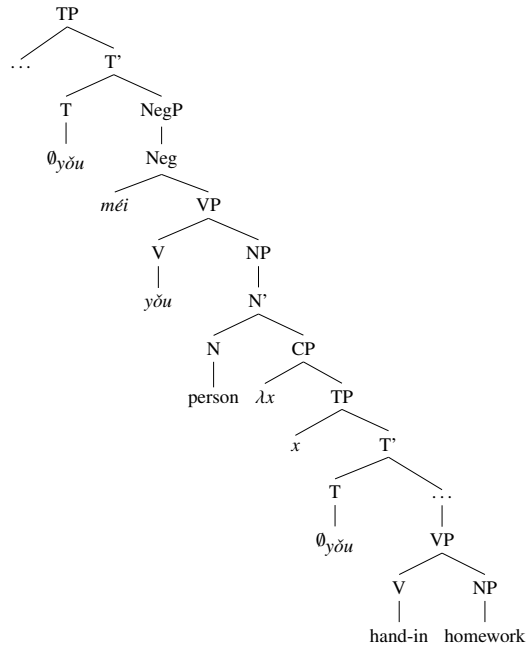## 3.6 EQPs are generated below T

The problems identified above for positing an existential quantifier such as *yǒurén* in the subject position of a sentence such as (3.7) (a.k.a. 3.21 or 3.55) can be avoided by the structural proposal in (3.22) (a.k.a 3.16), repeated here in (3.74).

(3.74)
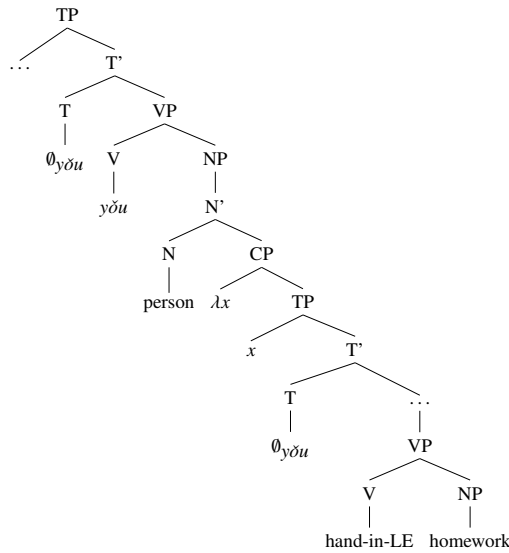
In (3.74), *yǒurén* is analyzed as consisting of two parts that are located in different positions. The word *yǒu* is considered a verb and takes an NP phrase headed by *rén* ('person'). The negated sentence of (3.7) has an additional NegP between TP and VP, as proposed in (3.10). Its structure is illustrated in (3.75).

(3.75)

```
                    TP
                 ┌───┴────┐
                ...        T'
                      ┌────┴────┐
                      T        NegP
                      │          │
                    ∅_yǒu       Neg
                           ┌─────┴─────┐
                          méi          VP
                                   ┌────┴────┐
                                   V         NP
                                   │         │
                                  yǒu        N'
                                        ┌────┴────┐
                                        N         CP
                                        │    ┌────┴────┐
                                     person  λx       TP
                                              ┌────────┴────┐
                                              x            T'
                                                      ┌─────┴─────┐
                                                      T          ...
                                                      │           │
                                                    ∅_yǒu         VP
                                                              ┌────┴────┐
                                                              V        NP
                                                              │         │
                                                          hand-in   homework
```

This gives us (3.76) as the negated sentence of (3.7).

(3.76) 没有人　　　交　　　　*(*了)*　作业。
　　　　méiyǒurén　jiāo　　　(*le)　　zuòyè.
　　　　no one　　　hand-in　(*LE)　homework
　　　'No one handed in homework?'

It follows that asserting (3.7) and (3.76) would lead to contradiction. The prediction is borne out, as illustrated in (3.77).

(3.77) *有人　　交　　了　作业。　　没有人　　交　　　作业。　　*(⊥)*
　　　　yǒurén　　jiāo　le　zuòyè.　　méiyǒurén　jiāo　　zuòyè.
　　　　someone　hand-in　LE　homework　no one　　　hand-in　homework
　　　'*Someone handed in homework, and no one handed in homework.'
　　　(CONTRADICTION)

Moreover, given the structure in (3.74), the A-not-A type of questions for (3.55) is predicted to be the one in (3.78), which is grammatical.

93

(3.78) 有　　没有　　人　　交　　　作业*?*
　　　 yǒu　 méiyǒu rén　 jiāo　 zuòyè?
　　　 YOU　 not.R　 people hand-in homework
　　　 'Did anyone hand in homework?'

(3.78) has the same answer as the other two types of polar questions in (3.48) and (3.49); and, the negative answer to (3.78) is just (3.76) which is identical with (3.53).

Thus, the structure in (3.74) for an EQP such as *yǒurén* in (3.74), where the EQP is base-generated in VP below TP, gives us a consistent picture with respect to the formation and properties of negative sentences and polar questions in Mandarin. An existential sentence with an EQP shows the same properties as a non-existential sentence with proper names (PNs) or strong quantifiers (SQs) in subject position, as summarized in (3.79).

(3.79) No differences when EQPs are in VP:

		EQPs (VP)	PNs (SBUJ)	SQs (SUBJ)
(a)	Possibility to negate T	✓	✓	✓
(b)	An affirmative sent. and its negation stand in contradiction	✓	✓	✓
(c)	Form A-not-A questions	✓	✓	✓
(d)	Form *ma*-questions	✓	✓	✓
(e)	Form NPQs	✓	✓	✓
(f)	Answers to polar questions including the result of (a)	✓	✓	✓

The arguments developed above to argue against EQPs in subject position also apply to other types of existential sentences, which is suggested by the data in Section 3.1-3.3

94

and predicted by the structural proposal in (3.10). For instance, a sentence such as (3.1), repeated here in (3.80), cannot have a structure where *yǒu yì běn shū* is in Spec TP position, as illustrated in (3.81).

(3.80) *(今天/昨天/*明天)*   有   一   本   书   *(在   桌子   上)*。
       (jīntiān/zuótiān/*míngtiān)   yǒu   yì   běn   shū   (zài   zhuōzì   shàng).
       (today/yesterday/*tomorrow)   there be   one   CL   book   at   desk   on
      'There is/was a book (on the desk) (today/yesterday/*tomorrow).'

(3.81) An incorrect structure for (3.80):
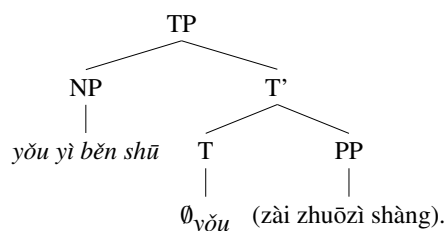
Thus, one can generalize (3.79) into (3.82) by substituting 'existential sentences in VP (ESes (VP))' with 'EQPs (VP)'.

(3.82) A generalization:

		ESes (VP)	EQPs (VP)	PNs (SUBJ)	SQs (SUBJ)
(a)	Possibility to negate T	✓	✓	✓	✓
(b)	An affirmative sent. and its negation stand in contradiction	✓	✓	✓	✓
(c)	Form A-not-A questions	✓	✓	✓	✓
(d)	Form *ma*-questions	✓	✓	✓	✓
(e)	Form NPQs	✓	✓	✓	✓
(f)	Answers to polar questions including the result of (a)	✓	✓	✓	✓

One can summarize the table in (3.82) into two structures for a non-future episodic sentence in Mandarin. The one in (3.83) illustrates the structure of a non-future episodic eventive sentence proposed in Chapter 2, and the one (3.84) illustrates the structure of a non-future episodic existential sentence.

(3.83)

```
                        TP
            ┌───────────┴───────────┐
         PNs/SQs                     T'
                           ┌─────────┴─────────┐
                           T                 (NegP)
                           │            ┌───────┴───────┐
                   Ø_yǒu/méi_i yǒu    (Neg)           AspP
                                        │          ┌────┴────┐
                                      (t_i)       Asp       vP
                                                        ┌────┴────┐
                                                        v        VP
                                                                 │
                                                                ...
```

(3.84)

```
              TP
        ┌──────┴──────┐
       ...            T'
                ┌──────┴──────┐
                T           (NegP)
                │       ┌──────┴──────┐
              Ø_yǒu   (Neg)          VP
                        │         ┌────┴────┐
                     (méi_i)      V        NP
                                  │         │
                                 yǒu       ...
```
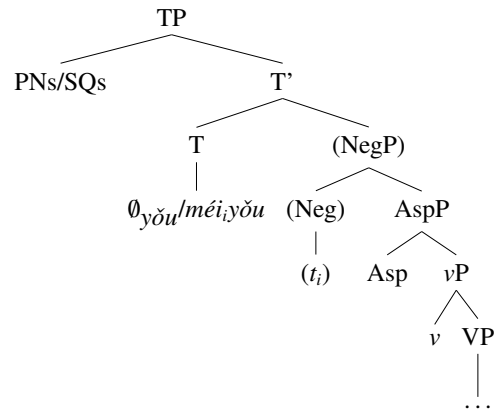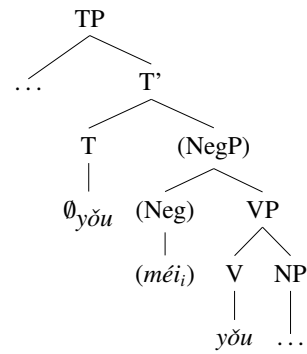
3.7 Conclusion

In this chapter, I took as non-accidental the fact that several types of existential constructions in Mandarin utilize an obligatory *yǒu/méiyǒu*, the same word as used in an episodic eventive sentence discussed in Chapter 2. Specifically, I proposed that existential sentences share one single structure, regardless of their surface differences, as illustrated in (3.10), repeated in (3.85).

(3.85)

```
        TP                          TP
       /  \                        /  \
    . . .  T'                   . . .  T'
          /  \                        /  \
         T    VP                     T    NegP
             /  \                         /   \
            V    NP                     Neg    VP
            |    |                       |    /  \
          yǒu  . . .                    méi  V    NP
                                             |    |
                                           yǒu   . . .
```
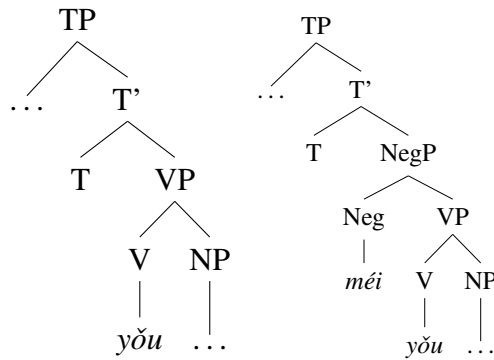
In (3.85), an existential sentence is proposed to be base-generated and get interpreted below T. I presented two pieces of evidence to argue against an EQP in Mandarin being in Spec TP, and showed that the proposed structure in (3.85) shares crucial properties with a sentence with proper names or strong quantifiers as subject, regarding the formation and properties of negative sentences and polar questions.

As shown in (3.83) and (3.84), in an episodic sentence in Mandarin, proper names and strong quantifiers are interpreted above T, and existential quantifiers are base-generated and interpreted below T. This is consistent with Diesing's (1992) Mapping Hypothesis. In essence, Diesing shows that presuppositional or strong quantifiers in English are interpreted at Spec TP and existential/weak quantifiers are interpreted under VP at LF.

97

What one sees in (3.83) and (3.84) is that her Mapping Hypothesis is instantiated at the surface structure in Mandarin.

CHAPTER 4

FREE CHOICE EXPRESSIONS IN MANDARIN

Mandarin Chinese has several linguistic forms to express free choice meaning. Depending on their quantificational force, these forms are further divided into *universal* free choice items (U-FCIs) and *existential* free choice items (E-FCIs). Each group consists of a couple of different expressions. This chapter is concerned with the syntax and semantics of one type of U-FCIs in Mandarin, namely, the type of (*wúlùn/búlùn/bùguǎn*) *wh dōu* ('(no matter) wh-') U-FCIs, which is also referred to as *wh*-DOU U-FCIs in the literature, as illustrated in (4.1)-(4.5)[1,2,3].

(4.1) *(无论)*　　谁　都　　可以　来。
　　　(wúlùn)　shuí　dōu　kěyǐ　lái.
　　　(no-matter)　who　DOU　may　come
　　　'Whoever can come.'

(4.2) 大家　　谁　都　没有　　想出　　一　个　可行　　　的　办法。
　　　dàjiā　shuí　dōu　méiyǒu　xiǎngchū　yí　gè　kěxíng　de　bànfǎ.
　　　everyone　who　DOU　not.R　think-out　one　CL　feasibleness　DE　solution
　　　'Idiomatic: No one thought out a feasible solution.' (Tao & Xiao 2012)

(4.3) 他　谁　都　不　　理，　　　　就　只　跟　你　搭话。
　　　tā　shuí　dōu　bù　lǐ,　　　jiù　zhǐ　gēn　nǐ　dāhuà.
　　　he　who　DOU　not.IR　pay attention,　JIU　only　with　you　get in a word

---

[1]Since the three words 无论 (*wúlùn*), 不论 (*búlùn*), and 不管 (*bùguǎn*) are equivalent syntactically as well as semantically, I only use *wúlùn* in the following discussion.

[2](*Wúlùn*) *wh dōu* U-FCIs have a variant where *dōu* is replaced by 也/yě/ ('also'). Since (*wúlùn*) *wh yě* U-FCIs means the same as (*wúlùn*) *wh dōu* U-FCIs, I will only focus on the latter in this thesis. However, this does not mean that these two variants share the same syntactic and semantic analyses. One notable difference between them is the meaning difference between *dōu* and *yě*. While *dōu* is analyzed as a distributor by many linguists including the current author, *yě* is a presuppositional additive particle. Thus, the syntactic and semantic analyses on (*wúlùn*) *wh dōu* U-FCIs developed in this chapter cannot be applied to (*wúlùn*) *wh yě* U-FCIs without necessary modifications.

[3]Lin (1996) distinguishes two types of (*wúlùn*) *wh dōu* constructions: sentential and nominal. The sentential type has a sentence with a *wh* word that comes after *wúlùn* and before *dōu*, whereas the nominal type only has a nominal *wh*-phrase in that position. Despite their constituency differences, I think these two types share the same semantic analysis; therefore, I will only concentrate on the nominal type in this thesis.

'He does not pay attention to anyone, except only getting in a word with you.'
(Xiao & Jin 2013)

(4.4) *2015* 年 过去 一 半 了, 什么 都 没有 改变。
2015 nián guòqù yí bán le, shénme dōu méiyǒu gǎibiàn.
2015 year pass-go one half LE, what DOU not.R change

'Half of the year 2015 has gone, but nothing changed.' (Internet Entry)[4]

(4.5) 她 什么 都 没 说。
tā shénme dōu méi shuō.
she what DOU not.R say

'She did not say anything.'

I show that the phrase (*wúlùn*) *wh* is always interpreted above the negation marker *méiyǒu*, no matter it is a thematic subject or object. This lends further support to the argument developed in Chapter 2 that the negation marker *méiyǒu* is in T, since it is consistent with the property of T proposed in Diesing's (1992) Mapping Hypothesis, which says that presuppositional quantifiers are interpreted above T. I propose a semantic analysis to derive the free choice meaning in the spirit of the scalar implicature approach to free choice items developed in Fox 2007; Chierchia 2006, 2013 a.o..

This chapter is organized as follows. Section 4.1 briefly introduces FCIs in Mandarin and points out their major differences from FCIs in other languages. Section 4.2 is concerned with the structure of (*wúlùn*) *wh dōu* U-FCIs and its syntactic position in a clause. After discussing some basic properties of *dōu* (Section 4.97), I will show in Section 4.2.2 that *wúlùn*, despite its phonological optionality, is always present in the semantic derivation; moreover, it has to take *wh* components as its argument. Section 4.2.3 shows that the phrase (*wúlùn*) *wh* is always interpreted above the negation marker *méiyǒu*, no matter it is a thematic subject or object. Section 4.3 is concerned with the

---

[4]Accessed on Oct. 21st, 2015. http://j.news.163.com/docs/8/2015070316/ATK3HE050525831P.html

semantic composition of (*wúlùn*) *wh dōu* U-FCIs. After reviewing two previous analyses (Sections 4.3.1 and 4.3.2), I put forward a new semantic proposal in the spirit of the scalar implicature approach to free choice items developed in Fox 2007; Chierchia 2006, 2013 a. o. (Sections 4.3.3, 4.3.4, and 4.3.5). Section 4.4 concludes this chapter.

4.1 Two types of free choice items in Mandarin

Free choice items in Mandarin can be divided into two groups with respect to quantificational force: Universal FCIs (U-FCIs) and Existential FCIs (E-FCIs). In this thesis, I will only give a syntactic and semantic analysis for one type of U-FCIs, namely, (*wúlùn*) *wh dōu* U-FCIs, and leave the other types of FCIs for future research.

4.1.1 Universal FCIs

There are two forms of Universal FCIs in Mandarin. One is (无论/不论/不管) 谁/什么/哪-个 都 ((*wúlùn/búlùn/bùguǎn*) *shuí/shénme/nǎ-gè dōu*), which is often translated into '(no matter) *wh-*' in English, and the other is 任何(*rènhé*) + Noun, which is often translated into 'any + N' in English. They are summarized in (4.6).[5],[6]

(4.6) Universal FCIs in Mandarin:[7]

---

[5]Unlike Giannakidou & Cheng 2006; Cheng & Giannakidou 2013, I do not make a semantic distinction between (*wúlùn*) *wh dōu* and (*wúlùn*) *nǎ*-CL N *dōu*. I will come back to their proposals regarding Mandarin U-FCIs in Section 4.3.2.

[6]The word *rènhé* is glosses as 'any' for the convenience of presentation here. In fact, it consists of two independent morphemes: *rèn* ('depend on') and *hé* ('what'). The morpheme *rèn* ('depend on') also occurs in Existential FCIs as shown in Section 4.1.2. The fact that one single morpheme can appear in both Universal and Existential FCIs is reminiscent of *any* in English; however, as is shown in Section 4.1.2, one major difference between *any* and *rèn* ('depend on') is that *any* by itself can appear in both universal and existential free choice environments, whereas *rèn* has to combine with different words in order to appear in the right context.

[7]To facilitate readability, only the component(s) that varies and corresponds to the items in boldface is shown in Table 4.6.

(wúlùn) wh dōu			
(wúlùn) **wh** dōu	(wúlùn) nǎ-gè-**N** ('which CL N') dōu	rènhé ('any') + **N**	**Glosses**
shuí ('who')	rén ('people')	rén	'anyone'
shénme ('what')	dōngxi ('thing')	dōngxi	'anything'
shénme dìfāng	dìfāng ('place')	dìfāng	'anywhere'
shénme shíjiān	shíjiān ('time')	shíjiān	'any time'
shénme dòngwù	dòngwù ('animal')	dòngwù	'any animal'
shénme N ('what N')	N(ouns)	N	'any N'

Some examples are given in (4.7)-(4.13).

(4.7) 他 *(无论)*　　谁　*(都)*　不　　理。
　　　tā　(wúlùn)　　shuí *(dōu)* bù　　lǐ.
　　　he (no-matter) who　DOU　not.IR　pay attention
　　　'He does not pay attention to anyone.' (Adapted from (4.3))

(4.8) *(无论)*　　谁　他　*(都)*　不　　理。
　　　(wúlùn)　　shuí tā　*(dōu)* bù　　lǐ.
　　　(no-matter)　who　he　DOU　not.IR　pay attention
　　　'He does not pay attention to anyone.'

(4.9) 他 *(无论)*　　哪　　个　人　　*(都)*　　不　　　理。
　　　tā　(wúlùn)　　nǎ　　gè　rén　　*(dōu)* bù lǐ.
　　　he (no-matter) which　CL　people　DOU　　not.IR　pay attention
　　　'He does not pay attention to anyone.'

(4.10) *(无论)*　　哪　　个　人　　他　*(都)*　不　　　理。
　　　(wúlùn)　　nǎ　　gè　rén　　tā　*(dōu)*　bù　　lǐ.
　　　(no-matter)　which　CL　people　he　DOU　not.IR　pay attention
　　　'He does not pay attention to anyone.'

(4.11) 他   任何   人   *(都)   不   理。
       tā   rènhé   rén   *(dōu)   bù   lǐ.
       he   any   people   DOU   not.IR pay attention

       'He does not pay attention to anyone.'

(4.12) 任何   人   他   *(都)   不   理。
       rènhé   rén   tā   *(dōu)   bù   lǐ.
       any   people   he   DOU   not.IR pay attention

       'He does not pay attention to anyone.'

(4.13) 他   (*都)   不   理   任何   人。
       tā   (*dōu)   bù   lǐ   rènhé rén.
       he   (*DOU)   not.IR pay attention any   people

       'He does not pay attention to anyone.'

Suppose that our domain of individuals is D = {Ann, Bob, Chris}. The sentences in (4.7)-(4.13) all entail that he does not pay attention to Ann, he does not pay attention to Bob, and he does not pay attention to Chris, which gives the sentences the flavor of universal quantification[8,9].

---

[8] Sentences with (*wúlùn*) *wh dōu* U-FCIs are argued to be ambiguous between a simple universal quantification reading on a par with sentences with *měi-gè-rén* ('everyone') and a universal free choice reading in Dong 2009; Giannakidou & Cheng 2006. This is not correct. I will take up this issue in Section 4.3.2.

[9] Lin (1996: 107-109) also claims that (*wúlùn*) *wh dōu* constructions are ambiguous. For example, he argues that the sentence in (i) can be paraphrased as the one in (ii), where one reading means that I buy all the things for you and the other reading can have what he calls 'a free choice reading' where "one [. . .] you like will be bought although it does not matter which one". To support the existence of this 'free choice' reading, he argues that (i) can be felicitously followed by (iii) without causing contradiction. He further points out the ambiguity in (i) is similar to the following English sentence in (iv), as discussed by Haspelmath (1995: 374), which is argued to be able to "be felicitously used in a situation when there are hundreds of guests, but only one of them is actually allowed inside because of a specific restriction."

  i. 无论 你 要 什么，我 都 可以 买 给 你。
     wúlùn nǐ yào shénme, wǒ dōu kěyǐ mǎi gěi nǐ.
     no-matter you want what, I can buy to you
     'No matter what you want, I can buy it for you.'

  ii. I can buy all/any thing(s) you want for you.

  iii. 可是，我 不 能 把 每 一 个 都 给 你。
     kěshì, wǒ bù néng bǎ měi yí gè dōu gěi nǐ.
     but, I not can BA every one CL all give you
     'But I cannot give every one of them to you.'

Both (*wúlùn*) *wh* phrases and *rènhé* phrases can appear either after or before the subject without changing the meaning of a sentence, as shown in (4.7)-(4.12). However, (*wúlùn*) *wh dōu* FCIs also have some superficial differences from *rènhé*-FCIs. As indicated in (4.7) and (4.9), *wúlùn* in (*wúlùn*) *wh dōu* FCIs is optional (Chao 1968; Li & Thompson 1981; Lin 1996). Thus, the example sentences in (4.2)-(4.5) at the beginning of this chapter all elide the word *wúlùn* in front of the *wh*-word. For instance, the sentence in (4.5), repeated here in (4.14), is in fact short for the sentence in (4.15).

(4.14) 她　什么　都　没　说。
　　　 tā　shénme　dōu　mèi　shuō.
　　　 she　what　DOU　not.R　say
　　　 'She did not say anything.'

(4.15) 她　*(无论)*　什么　都　没　说。
　　　 tā　(wúlùn)　shénme　dōu　mèi　shuō.
　　　 she　(no-matter)　what　DOU　not.R　say
　　　 'Lit. No matter what it was, she did not say it. Idiomatic: She did not say anything.'

The word *rènhé* in *rènhé*-FCIs can occur before or after the main predicate, as shown in (4.11) and (4.13). When it occurs before the main predicate, *dōu* is obligatory (4.11); when it occurs after the main predicate as object, *dōu* is disallowed (4.13). Despite the

---

　　iv. Any guest can come in.

　　v. Every guest can come in.

The comparison between (i) and (iv) that Lin attempts to draw is not valid. The reason that (iv) can be used in the above mentioned scenario is because it can be paraphrased as it is possible that any guest can come in. In other words, the subject *any guest* in (iv) is interpreted below the modal verb *can* in this case. This is not possible for the Mandarin sentence in (i). As Lin's translation for it shows, the *wúlùn* ('no matter') phrase must scope over the modal *kěyǐ* ('can'); and (i) cannot be interpreted as it is possible that no matter what you want, I buy it for you. The fact that (i) is not contradictory to (iii) is also due to the different scope relation between quantifiers and modal verbs. With quantifiers scoping above modals, (i) can be paraphrased as 'for every x that you want, no matter what x is, there exists a possible world w accessible from the real world $w*$, where I buy x for you'. Thus, (i) is true as long as for every x there is a possible world w for x; and it does not require that this possible world w to be same for all $x$es, which is exactly what the Mandarin sentence in (iii) means. With modals scoping above quantifiers, (iii) means that there does not exist a possible world w accessible from the real world $w*$ where for every x that you want, I buy x for you. Thus, (*wúlùn*) *wh dōu* constructions are not ambiguous.

positional difference of *rènhé*, the two sentences in (4.11) and (4.13) have the same interpretation. By contrast, (*wúlùn*) *wh dōu* FCIs always occur with *dōu* in front of the main predicate, as illustrated in (4.7) and (4.9). In particular, unlike *rènhé*, (*wúlùn*) *wh*, the part that is in front of *dōu*, cannot occur to the right of the main predicate of a sentence. The sentence in (4.16) is ungrammatical.

(4.16) *他 不   理   *(无论)*   谁。
        *tā bù   lǐ   (wúlùn)   shuí.
        he   not.IR pay attention (no-matter)   who

4.1.2 Existential FCIs

Many languages have a noun phrase that gives rise to an *existential* free choice interpretation under certain linguistic contexts such as English *any* (4.17) (Giannakidou 2001), German *irgendein* (4.18) (Kratzer & Shimoyama 2002)[10], and Italian *un N qualunque/qualsiasi* (4.19) (Chierchia 2006). For example, the sentence in (4.17) can be paraphrased as 'press a key to continue, and it does not matter which one', and it does not mean that you are required to press every key to continue, no matter what it is.

(4.17) Press any key to continue. (Giannakidou (2001: ex.2))

(4.18) *Mary musste irgendeinen Mann   heiraten.*
        Mary   had to irgend-one   man   marry

'Mary had to marry a man, [and] any man was a permitted marriage option for her.' (original translation from Kratzer & Shimoyama (2002: ex.8))

---

[10]Kratzer & Shimoyama (2002) notes an epistemic reading of (4.18), which is "there was some man Mary had to marry, [and] the speaker doesn't know or care who it was."

(4.19) *Domani interrogherò uno studente qualsiasi.*
tomorrow (I) will interrogate a student whatever
(Chierchia (2006: ex.10b))

Generally speaking, Mandarin has two ways to express an existential FC meaning in an imperative sentence. They are 任意*rènyì* + NP or 任意+Verb+NP. For instance, the Mandarin counterpart of (4.17) can be expressed in (4.20) or (4.21).

(4.20) 按　　任-意　　　键　　继续。
àn　　rèn-yì　　jiàn jìxù.
press REN-will key continue
'Press any key to continue.'

(4.21) 任-意　　　按　　一　　个　　键　　继续。
rèn-yì　　àn　　yí　　gè　　jiàn jìxù.
REN-will press one CL key continue
'Press any key to continue.'

Important for our purposes here is that neither *wúlùn wh*-words nor *rènhé* can appear in similar contexts (4.23). English *any*, however, can appear in a sentence with a universal free choice interpretation as well as in a sentence with an existential free choice interpretation.

(4.22) *按　无论　　什么　　健　　继续。
àn　　*wúlùn　　shénme* jiàn jìxù.
press no matter what key continue
'Intended: Press any key to continue.'

(4.23) *按　任何　　　键　　继续。
àn　　*rènhé*　　jiàn jìxù.
press REN-what key continue
'Intended: Press any key to continue.'

4.2 The syntax of (*wúlùn*) *wh dōu* universal FCIs

This section has two parts. The first part provides evidence for a syntactic structure of the (*wúlùn*) *wh dōu* phrase where *wúlùn* is always present syntactically and semantically despite its phonological optionality and combines first with *wh* then with *dōu*. The second part shows that the phrase (*wúlùn*) *wh* is always interpreted above the negation marker *méiyǒu*, no matter it is a thematic subject or object. This lends further support to the argument developed in Chapter 2 that the negation marker *méiyǒu* is in T, since it is consistent with the property of T proposed in Diesing's (1992) Mapping Hypothesis, which says that presuppositional quantifiers are interpreted above T.

4.2.1 The syntactic and semantic constraints of *dōu*

The word *dōu* has two basic syntactic and semantic properties (Cheng 1995)[11,12]. Syntactically, *dōu* must be left-adjacent to the main predicate in a clause; thus, (4.24) is ill-formed because *dōu* is placed to the right of the main predicate 'to lift up'.

(4.24) *约翰 和　比尔 抬-起　了　都　那　张　桌子。
　　　　John　hé　Bill　tái-qǐ　le　dōu　nà　zhāng　zhuōzi.
　　　　John　and　Bill　lift-up　LE　DOU　that　CL　table
　　'Intended: John and Bill each can lift the table.'

---

[11]For a historical overview on studies on *dōu*, one is referred to Lin 1996; Huang 1996.

[12]The word *dōu* also occurs in some sentences that do not show an obvious distributive reading such as (12) (see Xiang 2008 a.o.).

　i. 张三 (都) 已经 十 岁 了。
　　Zhāngsān (dōu) yǐjīng shí suì le.
　　Zhangsan (DOU) already ten age LE
　　'Zhangsan has already been ten years old.'

I have nothing deep to say about this use of *dōu* except that I would like to point out a couple of observations about these cases. First, deletion of *dōu* does not seem to alter the truth condition of the sentence. Second, *dōu* cannot be accented. Third, according to my intuition, with the presence of *dōu*, the sentence seems to emphasize the unexpectedness of the assertion from the speaker's point of view (cf. Xiang 2008). Similar phenomena are found in Mandarin with some usage of *yòu* ('again.R') or *zài* ('again.IR') such as the one in the following sentence.

　i. 张三 本来 要 来，结果 (又) 没 来。
　　Zhāngsān běnlái yào lái, jiéguǒ (yòu) méi lái.
　　Zhangsan originally want-to come, result (YOU) not.R come
　　'Zhangsan originally planned to come; eventually, he did not.'

In this sentence, *yòu* ('again.R') is optional and cannot bear accent. When it is present in the sentence, it does not seem to mean repetition of a similar event, at least not on the surface. However, there seems to be some sort of emphasis on disappointment/dissatisfaction from the speaker.

My hunch is that this 'special' use of *dōu* or *yòu* ('again.R') or *zài* might fall into the domain of discourse particles (Zimmerman 2011; Potts 2003) which needs an analysis that might be fundamentally different from its basic or more common usage.

Semantically, *dōu* requires a plural subject or a mass noun to precede it[13]. A singular term with normal intonation would lead to ungrammaticality, as illustrated in (4.25)[14].

(4.25)   *约翰   都   能   抬-起   那   张   桌子。
          *John   dōu   néng   tái-qǐ   nà   zhāng   zhuōzi.
          John   DOU   can   lift-up   that   CL   table

A well-formed sentence with *dōu* gives rise to a distributive reading (Lee 1986; Cheng 1991; Lin 1996, 1998). For instance, the sentence in (4.26) can only be interpreted as saying that John can lift the table by himself, and so can Bill. This is contrasted with (4.27) in which both the Mandarin sentence and its English counterpart have two possible readings: a distributive reading which is the same as (4.26), and a collective reading that John and Bill can lift the table together.

(4.26)   约翰   和   比尔   都   能   抬-起   那   张   桌子。
          John   hé   Bill   dōu   néng   tái-qǐ   nà   zhāng   zhuōzi.
          John   and   Bill   DOU   can   lift-up   that   CL   table
          'John and Bill each can lift the table.' Not: '*John and Bill together can lift the table.'

---

[13]The following example of *dōu* occurring with a mass noun is given in Lin (1996: 20).

   i. 那 盆 水 都 流-光 了。
     nà pén shuǐ dōu liú-guāng le.
     that container water all run-out PAR
     'That container ran out of water.' (original glosses and translation)

This thesis focuses on analyses with plural terms and simply says in the following that *dōu* requires a plural subject, a drastic simplification that readers should bear in mind.

[14]When 'John' in (4.25) is emphasized, the sentence has a scalar meaning, in which case it is a reduced form of (i).

   i. (连) 约翰 都 能 抬-起 那 张 桌子。
     liān John dōu néng tái-qǐ nà zhāng zhuōzi.
     and John DOU can lift-up that CL table
     'Even John can lift that table.'

(4.27) 约翰 和　比尔　能　抬-起 那　张　　桌子。
　　　　John hé　Bill　néng tái-qǐ nà　zhāng zhuōzi.
　　　　John and Bill　can　lift-up that CL　　table
　　　'John and Bill can lift the table.'

However, a disjunctive phrase is disallowed before *dōu* (4.28). As shown in the next section, this property will play a decisive role in giving a correct structure to U-FCIs in Mandarin.

(4.28) *约翰 或　比尔 都　　能　　抬－起 那　张　　桌子。
　　　　*John huò Bill　dōu　néng tái-qǐ　nà　zhāng zhuōzi.
　　　　John or　Bill DOU　can　lift-up that CL　　table
　　　'*John or Bill each can lift the table.' Also not: '*Either John or Bill can lift the table.'

4.2.2 The syntax of (*wúlùn*) *wh dōu* U-FCIs in Mandarin

Given the optionality of *wúlùn* in (*wúlùn*) *wh dōu* U-FCIs, it is worth asking whether the word *wúlùn* is in fact also semantically vacuous. If so, the meaning of *wúlùn wh dōu* U-FCIs would be the same as *wh dōu* U-FCIs. In fact, some recent analyses on this topic are based exactly on *wh dōu* without *wúlùn* (Dong 2009; Liao 2011; Tsai 2014; Xiang 2015). If it is not, one needs to present evidence showing that *wúlùn* is still needed for semantic interpretation despite its phonological absence. In this respect, Lin (1996) does not show evidence of this sort. Based on his data, Lin (1996: 75) claims that the word *wúlùn* only combines with"question-like" constituents; thus, he considers *wh dōu* U-FCIs short for *wúlùn wh dōu* U-FCIs. He subsequently gives a semantic proposal where *wúlùn* contributes to the semantics of the whole construction. Thus, it seems that for Lin, the semantic presence of *wúlùn* is guaranteed by its selectional property. However, this does not rule out the possibility that *wúlùn*, in spite of its syntactic selection, may well be semantically vacuous in the first place.

The evidence against the semantic vacuity of *wúlùn* comes from a fact that is over-looked in Lin 1996, namely, the word *wúlùn*, in addition to preceding *wh* words, can also precede a disjunctive phrase with the disjunctive word 或(者) /huò(zhě)/ ('or'), in which case *dōu* is also obligatory, as illustrated in (4.29). In this case, the sentence also has a universal free choice interpretation, the same as the sentence with (*wúlùn*) *wh dōu* U-FCIs. I thus dub this case as *wúlùn Disjunctive-phrases dōu* U-FCIs.

(4.29) 无论　　　约翰　或　比尔　*(都)　能　　抬一起　那　　张　　　桌子。
　　　　wúlùn　　John huò Bill dōu　néng tái-qǐ　nà　zhāng zhuōzi.
　　　　no matter John or　Bill DOU can　lift-up that CL　　table
　　　'No matter John or Bill, they can lift the table.'

As I have noted at the end of the last section, a disjunctive phrase is disallowed before *dōu*, as illustrated in (4.28), repeated here in (4.30).

(4.30) *约翰　或　比尔　都　　能　　抬一起　那　张　　桌子。
　　　　*John huò Bill dōu　néng tái-qǐ　nà zhāng zhuōzi.
　　　　John　or　Bill DOU can　lift-up that CL　　table
　　　'*John or Bill each can lift the table.' Also not: '*Either John or Bill can lift the table.'

Thus, the grammaticality of (4.29) can only be accounted for if *wúlùn* forms a constituent with the disjunctive phrase 'John or Bill', the result of which can combine with *dōu*. Since *dōu* semantically requires a conjunctive phrase as its argument on its left, the combination of *wúlùn* and a disjunctive phrase must be a conjunctive phrase. Therefore, *wúlùn* has to play a semantic role and cannot be semantically vacuous.

That *wúlùn* combines with a disjunctive phrase is further supported by the example in (4.31), where a conjunctive phrase appearing after *wúlùn* and before *dōu* leads to ungrammaticality.

(4.31) *无论　约翰　和　比尔　都　　能　抬－起　那　张　　桌子。
　　　　*wúlùn　John　hé　Bill　dōu　néng　tái-qǐ　nà　zhāng　zhuōzi.
　　　　no matter　John　and　Bill　DOU　can　lift-up　that　CL　　table
　　'*No matter John and Bill, they can lift the table.'

Since the sentence in (4.26), repeated in (4.32) below, which minimally differs from (4.31) in not having *wúlùn*, is grammatical, the ungrammaticality of (4.31) must be due to the incompatibility of *wúlùn* with a conjunctive phrase. This in turn indicates that *wúlùn* indeed selects a disjunctive phrase, as, for example, in (4.29).

(4.32) 约翰　和　　比尔　都　　能　抬-起　那　张　　桌子。
　　　　John　hé　Bill　dōu　néng　tái-qǐ　nà　zhāng　zhuōzi.
　　　　John　and　Bill　DOU　can　lift-up　that　CL　　table
　　'John and Bill each can lift the table.' Not: '*John and Bill together can lift the table.'

Thus, the correct syntax for *wúlùn Disjunctive-phrases dōu* is (4.33i), not (4.33ii).

(4.33)　　i.　[[*wúlùn Disjunctive-phrases*] *dōu*]

　　　　ii.　*[*wúlùn* [*Disjunctive-phrases dōu*]]

The above structural analysis of *wúlùn Disjunctive-phrases dōu* U-FCIs can be carried over to the analyses of (*wúlùn*) *wh dōu* U-FCIs, since *wúlùn*, at least when it is present, has selectional requirements that need to be met and a semantic contribution that has to be made. So what about when it is phonologically absent? Is it still present for semantics? The answer is yes. One thing we can conclude from the grammatical contrast among (4.29)-(4.32) is that the type of phrases that *wúlùn* selects has to be different from the type of phrases that *dōu* selects. In other words, given a grammatical phrase *wúlùn X dōu* U-FCIs where *X* stands for the constituent that sits in between, *X dōu* cannot be grammatical, as illustrated in (4.29) and (4.30). Similarly, given a grammatical phrase

Y dōu, *wúlùn Y dōu* U-FCIs cannot be grammatical, as illustrated in (4.32) and (4.31). Going back to (*wúlùn*) *wh dōu* U-FCIs, this means that *wúlùn* must be semantically present in *wh dōu* U-FCIs in order to keep the construction grammatical; otherwise, *wh dōu* alone would be ungrammatical.

Thus, the correct syntax for *wúlùn wh dōu* U-FCIs is (4.34i), not (4.34ii).

(4.34)   i. [[*wúlùn wh*] *dōu*]

         ii. *[*wúlùn* [*wh dōu*]]

The discussion above supports Lin's (1996) claim of the selectional property of *wúlùn*. More importantly, it presents evidence for the semantic necessity of *wúlùn* even when it is phonologically absent in the U-FCIs, which directly refutes the proposals developed in Dong 2009; Liao 2011; Tsai 2014; Xiang 2015 that focus only on *wh dōu* parts.

4.2.3   The syntactic position of (*wúlùn*) *wh dōu* U-FCIs

When the phrase (*wúlùn*) *wh* is a thematic subject in an episodic sentence, it occurs to the left of the negation marker *méiyǒu*. The sentence in (4.2), repeated in (4.35), is such an example.

(4.35) 大家   谁   都   没有   想出   一   个   可行   的
       dàjiā   shuí dōu   méiyǒu xiǎngchū yí   gè kěxíng   de
       everyone who   DOU   not.R think-out one CL feasibleness DE
       办法。
       bànfǎ.
       solution
       'Idiomatic: No one thought out a feasible solution.' (Tao & Xiao 2012)

In fact, it can only occur to the left of *méiyǒu*. The sentences in (4.36) and (4.37) are

both ungrammatical on the intended reading.

(4.36) *大家　　　都　　没有　　谁　想出　　　一　个　可行　　　的
　　　　dàjiā　　　dōu　méiyǒu shuí xiǎngchū yí　gè　kěxíng　　de
　　　　everyone　DOU　not.R　who think-out one CL　feasibleness DE
办法。
bànfǎ.
solution
'Intended: No one thought out a feasible solution.'

(4.37) *大家　　没有　　谁　都　想出　　　一　个　可行　　　的
　　　　dàjiā　　méiyǒu shuí dōu　xiǎngchū yí　gè　kěxíng　　de
　　　　everyone　not.R　who DOU　think-out one CL　feasibleness DE
办法。
bànfǎ.
solution
'Intended: No one thought out a feasible solution.'

When the phrase (*wúlùn*) *wh* is a thematic object in an episodic sentence, it has to

move to the left of the negation marker *méiyǒu*. For example, the phrase (*wúlùn*) *shénme*

('(no matter) what') in (4.15), repeated in (4.38), is the thematic object of the verbal

predicate *shuō* ('to say'). Since Mandarin is an SVO language, the canonical object

position is right after the predicate. However, the phrase (*wúlùn*) *shénme* cannot stay

behind the verb *shuō*, rather it has to move out of its base position, as illustrated in (4.39).

(4.38) 她　*(无论)*　　什么　　都　　没　　说。
　　　　tā　(wúlùn)　　shénme dōu　méi　shuō.
　　　　she　(no-matter)　what　　DOU　not.R　say
'Lit. No matter what it was, she did not say it. Idiomatic: She did not say anything.'

(4.39) *她　都　　没　说　*(无论)*　　什么。
　　　　tā　dōu　méi　shuō (wúlùn)　　shénme.
　　　　she　DOU　not.R　say　(no-matter)　what
'Intended: No matter what it was, she did not say it.'

Similarly to (*wúlùn*) *wh* phrases as subject, those phrases as object must appear before *méiyŏu*. They cannot appear behind it. (4.40) illustrates this point[15].

(4.40) *她 没 *(无论)* 什么 都 说。
      *tā méi (wúlùn) shénme dōu shuō.
      she not.R (no-matter) what DOU say
    'Intended: She did not say anything.'

Note that the sentences in (4.37) and (4.40) are grammatical by themselves, but it means something different from their intended meaning. Take (4.40) as an example. It actually means that it was not the case that no matter what it was, she said it. In this case, the negation marker *méiyŏu* serves as a meta-negation that scope over the whole sentence. When *méiyŏu* functions as a meta-negation, it is equivalent to 不-是/bú-shì/('lit. not.IR-be; i.e., it is not the case that...'); thus the sentence in (4.40) means the same as (4.41).

(4.41) 她 不是 *(无论)* 什么 都 说 了。
      tā bú-shì (wúlùn) shénme dōu shuō le.
      she not.IR-be (no-matter) what DOU say LE
    'It was not the case that no matter what it was, she said it.'

If *méiyŏu* is a meta-negation when it is before (*wúlùn*) *wh dōu* FCIs, one would predict that it can scope over a negative sentence as well. This prediction is borne out. The sentence in (4.42) has two negation markers and is interpreted as a case of double negation.

(4.42) 她 没 *(无论)* 什么 都 没有 说。
      tā méi (wúlùn) shénme dōu méiyŏu shuō.
      she not.R (no-matter) what DOU not.R say
    'It was not the case that she did not say anything.'

---

[15]Note that the non-cooccurrence of *méiyŏu* and *le* shows up in (4.40), too. I do not know why it is like this.

This is to be contrasted with *méiyǒu* in (4.38), where adding another negation marker below it is disallowed, as illustrated in (4.43).

(4.43) *她 *(无论)   什么   都   没   没有   说。
        *tā (wúlùn)   shénme dōu   méi   méiyǒu shuō.
        she (no-matter) what   DOU   not.R not.R   say

This indicates that the negation marker *méiyǒu* that is to the left of (*wúlùn*) *wh dōu* U-FCIs has a different syntactic status from *méiyǒu* that is to the right of (*wúlùn*) *wh dōu* U-FCIs. Thus, the sentence in (4.40), despite its grammaticality by itself, would not constitute a counter-example to the claim that (*wúlùn*) *wh dōu* U-FCIs are always to the left of the sentential negation marker *méiyǒu*.

Given that the scope interpretation among operators is from left to right in Mandarin, with the element to the left scoping over the one to the right, (*wúlùn*) *wh dōu* U-FCIs are interpreted as scoping over *méiyǒu*. In fact, they can never be interpreted as scoping below *méiyǒu*. This fact lends support to the proposal developed in Chapter 2 that *méiyǒu* is under T, as it is consistent with Diesing's (1992) Mapping Hypothesis which proposes that presuppositional quantifiers are interpreted above T.

4.2.4 Appendix: Against *dōu* as a maximality or presuppositional operator

Recently, in attempting to unify the use of *dōu* in various contexts, there have been two additional proposals, both of which argue against Lin's (1996) proposal that *dōu* is a generalized distributor in the sense of Schwarzschild 1991, 1996.

The three major contexts that are under discussion in these two proposals are: (i) in a sentence with a distributive reading (4.44); (ii) in a sentence with (*wúlùn*) *wh dōu* U-FCIs (4.45); (iii) in a scalar sentence with (*lián*) . . . *dōu* ('even') (4.46 and 4.47).

(4.44) 他们　都　　吃 了　一　个　苹果。*(Xiang 2008: ex.1)*
　　　　tāmén　dōu　chí le　yí　gè　píngguǒ.
　　　　they　DOU　eat LE　one　CL　apple
　　　'They both ate an apple.' NOT: 'They ate an apple together.'

(4.45) *(无论)*　谁　都　　可以 来。　*(Giannakidou & Cheng 2006: ex.74a)*
　　　　(wúlùn)　shuí dōu　kěyǐ　lái.
　　　　no-matter　who DOU　can　　come
　　　'No matter who can come.'

(4.46) 连　　张三　　都　　知道　李四。
　　　　lián　Zhāngsān dōu　zhīdào Lǐsì.
　　　　LIAN　Zhangsan DOU　know　Lisi
　　　'Even Zhangsan knows Lisi.'

(4.47) 张三　　*(连)*　一　个　人　　都　　*(没)*　请。
　　　　Zhāngsān (lián)　yí　gè　rén　dōu　*(méi)*　qǐng.
　　　　Zhangsan LIAN　one CL　people DOU　*(not.R)*　invite
　　　(Xiang 2015: ex.6)

　　　'John didn't even invite one person.'

In a nutshell, one proposal considers *dōu* a maximality operator that picks up the maximal member in a contextually given set (Giannakidou & Cheng 2006; Cheng & Giannakidou 2013; Cheng 2009; Xiang 2008), and the other proposal claims that it is a presuppositional operator that invokes a set of alternatives (Tsai 2014; Xiang 2015). I will refer the former as *the maximality approach*, and the latter *the presupposition approach*.

The biggest problem of the maximality approach lies in its failure to account for the basic distributive property of *dōu*. Suppose *tāmén* ('they') in (4.44) refers to *John and Mary*. According to the maximality approach, *dōu* will pick up the maximal member, namely, *John and Mary*. This maximal member will then combine with the predicate, which gives us 'John and Mary ate an apple', a sentence with ambiguity between a collective and a distributive reading. However, (4.44) is not ambiguous and only has a distributive reading. Thus, the maximality approach wrongly predicts the interpretation for an unambiguous distributive sentence with *dōu*.

The problem for the presupposition approach is different. While it can account for the distributivity of *dōu*, it does not give a semantics of different *dōu* sentences that accord with native speakers' intuition. For example, Xiang (2015) treats *dōu* as "a special exhaustivity operator: a presuppositional exhaustivity operator that operates on sub-alternatives and has a pre-exhaustification effect." In the footnote, she points out *dōu*'s affinity to the recursive exhaustification operation in Fox 2007 and the pre-exhaustification operator in (Chierchia 2006, 2013), which is reflected in the semantics of *dōu* that she proposes. In (4.48), *dōu* is defined to have two components: presupposition and assertion.

(4.48) Xiang's (2015) denotation for *dōu*:

$$\textbf{dou}(p) = \exists q \in \text{Sub} - \mathcal{A}lt(p).\, p \,\wedge\, \forall q \in \text{Sub} - \mathcal{A}lt(p)\,[\,\neg\, O(q)]$$

    i. Presupposition: p has some sub-alternatives.

    ii. Assertion: the prejacent p is true, and the exhaustification of each sub-alternative is false.

The sub-alternatives of a proposition p, i.e. $\text{Sub} - \mathcal{A}lt(p)$, is defined as all the alternatives that are semantically weaker than p, thus are included in p, as illustrated in (4.49).

(4.49) $\text{Sub} - \mathcal{A}lt(p) = \{q : q \in \mathcal{A}lt(p) \land p \subset q\}$.

These sub-alternatives will then undergo exhaustification, which is done by an exhaustification operator O that takes a proposition p as its argument and asserts that p is true, but all the semantically stronger alternatives of p are false, as defined in (4.50).

(4.50) $O(p) = p \land \forall q \in \mathcal{A}lt(p)[p \nsubseteq q \rightarrow \neg q]$.

Putting (4.49) and (4.50) together, one derives the meaning of **dou**(p) under the denotation in (4.48) as follows: **dou**(p) presupposes that p has some semantically weaker sub-alternatives, and it asserts that p is true and it is not the case that only the sub-alternatives are true. For example, under Xiang's proposal, the meaning of (4.26), repeated here in (4.51), is that John and Bill can lift up the table, and it is not the case that only John can lift up the table, and it is not the case that only Bill can lift up the table.

(4.51) 约翰 和　 比尔 都　　 能　 抬-起 那　 张　　 桌子。
　　　 John hé　 Bill dōu　 néng tái-qǐ nà　 zhāng zhuōzi.
　　　 John and Bill DOU can　 lift-up that CL　 table
　　　 'John and Bill each can lift the table.' Not: '*John and Bill together can lift the table.'

Unlike the maximality approach, Xiang's proposal can derive the basic distributive reading associated with a *dōu* sentence such as (4.51), and the distributivity comes from the presupposition of *dōu*[16]. It is clear from Xiang's definition that *dōu* is treated as a sentential operator that takes propositions as arguments. Thus, the logical form of a *dōu* sentence will have *dōu* take the whole sentence without it as an argument. This is schematized in (4.52)[17].

---

[16]Xiang (2015) does not specify how to get the distributive reading, and her examples only include predicates that take singular arguments.

[17]The details of the clause structure is ignored here.

(4.52) Surface Form: A and B DOU VP.

Logical Form: DOU [A and B VP]

Accordingly, the logical form of (4.51) is going to be (4.53).

(4.53) DOU [John and Bill can lift-up that CL table]

With this logical form, the presupposition of *dōu* requires that the prejacent *John and Bill can lift up the table* has some sub-alternatives, according to (4.48). In order for the prejacent to be able to have sub-alternatives in this case, the prejacent has to have a distributive reading. In other words, if *j* stands for the proposition *john can lift up the table* and *b* for the proposition *bill can lift up the table*, the meaning of the prejacent *p* has to be *j + b*, in which case, the sub-alternatives of the prejacent are *j* and *b*. If the prejacent were interpreted collectively, it would end up having no sub-alternatives under certain scenarios, since the collective reading of *John and Bill can lift up the table* does not necessarily entail either *j* or *b*. One such scenario would be that neither John nor Bill alone can lift up the table but the two together can. In this case, the collective reading would be true, but both *j* and *b* are false. In other words, one cannot find any sub-alternatives for the prejacent, thus violating the presupposition of *dōu*.

Thus the presupposition approach to *dōu* seems to capture the distributive property nicely, though not as straightforwardly as Lin's (1996)/Lin's (1998) proposal of *dōu* as a generalized distributive operator. However, the derivation of the semantics of U-FCIs is much complicated by the presupposition approach to *dōu* on the one hand, and Xiang's (2015) misrepresentation of the form of U-FCIs on the other hand. Xiang, like Dong (2009); Liao (2011), wrongly identifies the U-FCIs in Mandarin with the form of *wh* DOU instead of (*wúlùn*) *wh dōu*. She analyzes Mandarin *wh*-words as existential indefinites,

and claims that the prejacent of *dōu* in a universal free choice sentence such as (4.54) is equivalent to a disjunction. Thus, given a domain of two people John and Mary, the prejacent *p* of *dōu* in (4.54) is *shúi got an invitation*, as illustrated in (4.55); and *p* equals the disjunction of *john got an invitation* and *mary got an invitation*, which is shown in (4.56).

(4.54) 谁　　都　　收　　到　　了　邀请。*(Xiang (2015: ex.27))*
　　　　shúi　dōu　shōu　dào　le　yāoqǐng.
　　　　who　DOU　receive　arrive　LE　invitation
　　　　'Everyone got an invitation.' (Xiang's (2005) original translation)

(4.55) LF of (4.54):

　　　　[都　　*]* (　谁　　收　　到　　了　邀请　　　)
　　　　[dōu　] (　shúi　shōu　dào　le　yāoqǐng　)
　　　　[DOU] (　who　receive　arrive　LE　invitation　)
　　　　'[DOU] (*shúi* got an invitation)'

(4.56) *p = shúi got an invitation = john got an invitation ∨ mary got an invitation*

Xiang claims that sub-alternatives of a disjunction are the disjuncts[18]; accordingly, the sub-alternatives of *p* is *john got an invitation* and *mary got an invitation*, abbreviated as $f(j)$ and $f(b)$, where f stands for the one-place predicate $\lambda x.\text{GotAnInvitation}(x)$, for the discussion below. Xiang gives the following derivation for the meaning of (4.54) on the logical form in (4.55), as illustrated in (4.57).

(4.57) $[\text{DOU}]\, p = p \wedge \neg O(f(j)) \wedge \neg O(f(b))$

　　　　$= (f(j) \vee f(b)) \wedge \neg O(f(j)) \wedge \neg O(f(b))$

---

[18]This is against her definition of sub-alternatives. However, as it stands, the prejacent *p* does not seem to have stronger sub-alternatives, since both of the disjuncts in (4.56) are stronger than *p*. Xiang is equivocal on this issue.

$$= (f(j) \lor f(b)) \land [\, f(j) \rightarrow f(b)\,] \land [\, f(b) \rightarrow f(j)\,]$$

$$= f(j) \land f(b)$$

Note that the meaning of (4.54) in (4.57) is John got an invitation and Mary got an invitation, which is semantically simpler than the sentence in (4.58). For the meaning of (4.58), according to Xiang's (2015) semantics in (4.48), is John and Mary got an invitation, and not only John got an invitation, and not only Mary got an invitation. This is contrary to native speakers' intuition. Intuitively, the sentence with U-FCIs in (4.59), which is another way to say (4.54) on the domain of John and Mary, has a richer meaning than the 'ordinary' *dōu* sentence in (4.58).

(4.58) 约翰　　和　玛丽　都　　收　　　到　　了　邀请。
　　　　Yuēhàn　hé　Mǎlì　dōu　shōu　　dào　　le　yāoqǐng.
　　　　John　　and　Mary　DOU　receive　arrive　LE　invitation
　　　　'Both John and Mary got an invitation.'

(4.59) 约翰　　和　玛丽　谁　都　　收　　　到　　了　邀请。
　　　　Yuēhàn　hé　Mǎlì　shúi　dōu　shōu　　dào　　le　yāoqǐng.
　　　　John　　and　Mary　who　DOU　receive　arrive　LE　invitation
　　　　'John and Mary, no matter who they are, they got invitation.'

In fact, the intuition about the meaning difference between (4.58) and (4.59) is not without reason. If one assumes a strict compositionality for semantics and does not assume that *shúi* ('who') in (4.59) is semantically vacuous, the fact that (4.59) has one more lexical item than (4.58) does imply that the former is semantically richer than the latter.

Xiang might argue that the meaning of (4.54)/(4.59) is not simply the last step in (4.57), but rather the whole derivation. However, the best that this modification could do as far as I can tell is equate the meaning of the U-FC sentence in (4.59) with the ordinary *dōu* sentence in (4.58), which is still contrary to the intuition. Thus, the presupposition

approach to *dōu* cannot give an adequate account for the meaning of various kinds of *dōu* sentences.

To sum up, the maximality approach gives a wrong prediction on a simple distributive reading, whereas the presuppositional approach fails to give an adequate semantics for various kinds of sentences with *dōu*. Therefore, neither of them has succeeded in what they have claimed to do.

Before moving on to the next section, I would like to briefly re-examine the original arguments against Lin's (1998) proposal of *dōu* as a generalized distributor put forward in Xiang 2008. The necessity for such a re-examination lies in the fact that Xiang's (2008) arguments have been followed in many later works that try to give a unified semantics for *dōu* that could account for its ability to appear in seemingly diverse contexts.

In a nutshell, Xiang's (2008) main argument is that if *dōu* is strictly a generalized distributive operator (D-operator) as defined in Schwarzschild 1996, a sentence with plural subjects and *dōu* should allow a collective reading. This is because the definition of cover as defined in (4.60) allows a cover that is a set of a singleton set with each individual in the domain of discourse.

(4.60) The definition of cover: (Schwarzschild 1996: 69)

    C covers A if:

    1. C is a set of subsets of A

    2. Every member of A belongs to some set in C

    3. $\varnothing$ is not in C

For example, given a domain of $D = \{a, b, c\}$, a possible cover over the domain D would be the set $\{\{a, b, c\}\}$. Since a cover like this only has one element, when it combines with the D-operator as defined in (4.61), the result is a collective reading.

(4.61) The semantics of D-operator: (Schwarzschild 1996: 70)

$x \in [\![D(Cov)(alpha)]\!]$ iff $\forall y[(y \in [\![Cov]\!] \land y \subseteq x) \rightarrow y \in [\![\alpha]\!]$

Thus, the dichotomy between distributive and collective can be eliminated and the collective reading is just a 'special' distributive reading, a point advocated in Schwarzschild 1996: §5.3 in particular. However, as known from section 4.97, a sentence with *dōu* can never have such a collective reading, which constitutes Xiang's (2008) main argument against Lin's (1998) proposal.

Although Xiang's (2008) argument is valid that *dōu* is not a strict D-operator as defined in Schwarzschild 1996, it does not give a knockdown argument against *dōu* as a distributive operator, since one could simply add a condition to restrict cover C over A to a non-singleton set for the semantics of *dōu*. In other words, *dōu* could be considered a modified D-operator that shares some important properties with the original one such as allowing an intermediate reading, a point that cannot be given an adequate account in some recent proposals on the semantics of *dōu* including Xiang's (2008) own.

4.3 The semantic composition of (*wúlùn*) *wh dōu* U-FCIs

4.3.1 Lin 1996

Lin (1996) proposes a semantics for (*wúlùn*) *wh dōu* U-FCIs that starts with the basic properties of *dōu*. Contrary to previous work treating *dōu* as a universal quantifier (see Lee 1986; Cheng 1991, 1995), he proposes that *dōu* is an overt realization of the generalized distributive operator proposed in Schwarzschild 1991 which requires a plural argument. For Lin, this means that the semantic denotation of (*wúlùn*) *wh* in (*wúlùn*) *wh*

dōu FCIs must be a plurality. Coupled with a Hamblin-style semantics for *wh*-words and a set-denotation for pluralities in the spirit of Schwarzschild 1991, 1996, Lin proposes that *wúlùn* denotes a generalized union operator on sets, a step that forces him to assign a singleton set as the denotation of an individual. Accordingly, the semantics of *(wúlùn) shénme shū* ('(no matter) what book') in (4.62) is a set of all the books in the domain. If we assume a universe with three books *a*, *b*, and *c* for the domain, the semantic calculation of *(wúlùn) shénme shū* will be the one illustrated in (4.63).

(4.62) 他 无论 什么 书 都 不 看。
  tā wúlùn shénme shū dōu bú kàn.
  he no-matter what book DOU not.IR read
  'He does not read any books.'

(4.63) ⟦ *(wúlùn) shénme shū* ⟧ = ⟦ *wúlùn* ⟧ (⟦ *shénme shū* ⟧)

  = ∪ { {*a*}, {*b*}, {*c*} } = {*a*} ∪ {*b*} ∪ {*c*} = { *a*, *b*, *c* }

Since *dōu* is proposed to be a distributor, *dōu* will distribute the property denoted by the predicate of a sentence over each member of the set, which gives rise to a universal reading of the sentence.

Lin's (1996) proposal has two problems: one is semantic, and the other one is ontological. As the brief summary above shows, his proposal on the meaning of *(wúlùn) wh dōu* U-FCIs can account for its universal quantificational force. However, this turns out to be the only component in the denotation of *(wúlùn) wh dōu* U-FCIs, which is undesirable since this would suggest that a sentence like (4.64) with a *(wúlùn) wh dōu* U-FCI would mean exactly the same as a sentence such as (4.65) or (4.66) with a canonical universal quantifier such as *měi* ('every') or *suǒyǒu* ('all').

126

(4.64) 张三　　无论　　什么　书　都　　没　看。
Zhāngsān wúlùn shénme shū dōu méi kàn.
Zhangsan no-matter what book DOU not.R read
'No matter what book it was, Zhangsan did not read it.'[19]

(4.65) 张三　　每　本　书　都　　没　看。
Zhāngsān měi běn shū dōu méi kàn.
Zhangsan every CL book DOU not.R read
'Lit. For each book *x*, Zhangsan did not read *x*.'

(4.66) 张三　　所有　的　书　都　　没　看。
Zhāngsān suǒyǒu de shū dōu méi kàn.
Zhangsan all DE book DOU not.R read
'Lit. For every book *x*, Zhangsan did not read *x*.'

It is true that these three sentences have the same truth conditions, but (4.64) seems to have a free choice 'flavor' in addition to a simple universal quantification. This free choice flavor is missing in Lin's semantics for (*wúlùn*) *wh dōu* U-FCIs[20]. However, Lin does not seem to think this is a problem, since he does point out the free choice meaning associated with (*wúlùn*) *wh dōu* and treats it as a result of widening the domain of quantification to all the entities in the universe (Lin 2006: 109-111). This treatment is clearly too strong. For example, the sentence in (4.2), repeated in (4.67) below, has a free choice flavor despite its domain is confined to the contextual denotation of *dàjiā* ('we'), which is clearly not equal to the individuals in the whole universe. Thus, Lin's (1996) proposal captures the universal force of (*wúlùn*) *wh dōu* U-FCIs, but it does not spell out its free choice component[21].

---

[19]The Mandarin sentence denotes an episodic event. Thus, the English translation is to be interpreted episodically.

[20]A recent proposal in the spirit of Lin 1996 for constructions similar to (*wúlùn*) *wh dōu* U-FCIs in English can be found in Rawlins 2013 a.o.

[21]Similar issues have been pointed out by Barbara Partee to Lin, as noted in the footnote on Lin 1996: 110.

(4.67)　大家　谁　都　没有　想出　一　个　可行　的　办法。
　　　　dàjiā　shuí　dōu　méiyǒu　xiǎngchū　yí　gè　kěxíng　de　bànfǎ.
　　　　we　who　DOU　not.R　think-out　one　CL　feasibleness　DE　solution
'Idiomatic: No one thought out a feasible solution.' (Tao & Xiao 2012)

A more serious problem with Lin's (1996) proposal lies in his choice of set-denotation for pluralities and of Hamblin semantics for *wh* words. He does not seem to notice that the intended plurality denoted by the phrase *(wúlùn) shénme shū*, as illustrated in (4.63), repeated in (4.68), essentially means the same as a Hamblin-style *wh* word, since the Hamblin-style denotation of a *wh* word is also a set of entities in the domain (4.69).

(4.68)　⟦ *(wúlùn) shénme shū* ⟧ = ⟦ *wúlùn* ⟧ (⟦ *shénme shū* ⟧)

　　　　= ∪ { {a}, {b}, {c} } = {a} ∪ {b} ∪ {c} = { a, b, c }

(4.69)　⟦ *shénme shū* ⟧ = { a, b, c }

This is undesirable, since no one would want to claim that pluralities are *wh* words, or vice versa. In fact, this problem is not only for Lin 1996, rather it is a general problem when one combines a set-denotation for pluralities with a set-denotation for *wh* words. The application of sets in each field may give a consistent picture in that specific field, but as shown above, the combination of these two leads to some undesirable implications.

4.3.2　Giannakidou & Cheng 2006; Cheng & Giannakidou 2013

Giannakidou & Cheng's (2006)/Cheng & Giannakidou's (2013) proposal on the semantics of FCIs in Mandarin is based on a two-way classification as illustrated in (4.70)-(4.72)[22].

---

[22]I leave out *rénhé* U-FCIs for the discussion here, which is included in Cheng & Giannakidou 2013, but not in Giannakidou & Cheng 2006.

(4.70) 谁　都　　进来　了。
　　　 shuí dōu　 jìnlái le.
　　　 who DOU　 enter LE
　　　 'Everyone entered.' (original translation, Giannakidou & Cheng (2006: ex.5a))

(4.71) *哪　 个　学生　　都　　进来　了。
　　　 *nǎ　 gè　xuéshēng dōu　 jìnlái le.
　　　 which CL　student　　DOU　 enter LE
　　　 'Every/any student entered.' (original judgement and translation, Giannakidou & Cheng (2006: ex.5b))

(4.72) 哪　　个　学生　　都　　可以 进来。
　　　 nǎ　　gè　xuéshēng dōu　 kěyǐ jìnlái.
　　　 which CL　student　　DOU　 can　 enter
　　　 'Any student can enter.' (Giannakidou & Cheng (2006: ex.5c))

For Giannakidou & Cheng (2006), bare *wh* phrases do not always give rise to FC readings since they can also occur in episodic contexts where they are considered to be a universal quantifier as indicated in their original translation of (4.70); by contrast, *nǎ* CL NPs cannot occur in episodic contexts and have to occur in non-veridical contexts (Giannakidou 1998), which means that they are always FCIs.

However, their intuitions on the above data are not shared by all native speakers of Mandarin. For example, Lin (1996: 117) marks the episodic sentence in (4.73) ungrammatical, which is quite similar to (4.70).

(4.73) *谁　都　　已经　　离开 了。
　　　 shuí dōu　 yǐjīng　 líkāi le.
　　　 who DOU　 already leave LE
　　　 (Lin 1996: 117)

The following sentence from the internet sounds perfectly fine with *nǎ* CL NPs occurring in an episodic sentence.

129

(4.74) 为什么　　　中国　　古代　　　无论　　哪　　个　朝代　　都
　　　　wèishénme Zhōngguó gǔdài　　wúlùn　　nǎ　　gè　cháodài dōu
　　　　why　　　　China　　ancient times no matter which CL dynasty DOU
　　　　没有　　完全　　　统一　朝鲜　　半岛？
　　　　méiyǒu wánquán　tǒngyī Cháoxiǎn Bàndǎo?
　　　　not.R　completely　unify　Korea　　peninsula
　　　　'Why is it the case that no matter which dynasty in ancient China it was, it did not
　　　　unify the Korean Peninsula completely?'[23]

While these counter-examples are not a knockdown argument against their empirical generalization, they at least suggest subtlety on speakers' judgments on the grammaticality of this type of construction.

Even if one puts aside the counter examples and gives Giannakidou & Cheng (2006) the benefit of the doubt, their proposal on FCIs in Mandarin still suffers from false predictions. Adapting Lin's (1996) insights on (*wúlùn*) *wh dōu* constructions, Giannakidou & Cheng (2006) propose to analyze *wúlùn* as an intensionalization operator (4.75), given that the sentence in (4.76), as opposed to (4.70), appears in a modal context.

(4.75) ⟦ *wúlùn* ⟧ = $\lambda P_{<s,et>}\lambda w\lambda x.P(x)(w)$ (Giannakidou & Cheng 2006: 175)

(4.76) *(无论)*　　谁　都　　可以　来。
　　　　(wúlùn)　shuí dōu　kěyǐ lái.
　　　　(no-matter) who DOU can　come
　　　'No matter who can come.' (original translation in Lin (1996))

Since *nǎ* CL NPs only occurs in intensional contexts as illustrated in examples such as (4.72), *wúlùn* is argued to be always present in *nǎ* CL NPs FCIs either overtly or covertly (Giannakidou & Cheng 2006: 176). In other words, whether a *wh* phrase is a FCI depends on whether *wúlùn* is present.

---

[23]http://tieba.baidu.com/p/2986741569 （accessed on Dec. 03, 2015）

Giannakidou & Cheng (2006) argues further that Mandarin has definite as well as indefinite FCIs, depending on whether *dōu* is present or not. For them, the phrase *nǎ běn shū* without *dōu* in (4.77) is an indefinite FCI, whereas the one with *dōu* in (4.78) is a definite FCI. (In)definiteness to them seems to be context-dependent. As Giannakidou & Cheng (2006: 174) put it, "...(73b) (here 4.78) can only be interpreted as 'there is absolutely no book what-so-ever (from a contextually determined set) that he wants to buy. In (73a) (here 4.77) there is no contextually determined set of books that we are talking about."

(4.77) 他　不　　想　　买　哪　　本　书。
　　　　tā　bù　　xiǎng　mǎi　nǎ　　běn　shū.
　　　　he　not.R　want　buy　which　CL　book
　　　　'He doesn't want to buy any book (in particular).' (original translation, Giannakidou & Cheng 2006: ex.73a)

(4.78) 他　哪　　本　书　都　　不　　想　　买。
　　　　tā　nǎ　　běn　shū　dōu　bù　　xiǎng　mǎi.
　　　　he　which　CL　book　DOU　not.R　want　buy
　　　　'He doesn't want to buy any book at all.' (original translation, Giannakidou & Cheng 2006: ex.73b)

Since the only difference between (4.77) and (4.78) with respect to definiteness seems to be the availability of *dōu*, *dōu* is argued to function like a definite article that picks out the maximal member of a set, as defined in (4.79).

(4.79) $[\![\ d\bar{o}u\ ]\!] = \lambda P_{<s,et>}\iota(\lambda w\lambda x.P(x)(w))$ (Giannakidou & Cheng 2006: 176)

One major issue that Giannakidou & Cheng's (2006) proposal seems to overlook is that by tying *wúlùn* with *nǎ* CL NPs to form FCIs, it is predicted that *wúlùn* should be able to appear in front of *nǎ běn shū*, an indefinite FCI according to them, in (4.77); but, in fact, it cannot (4.80), which has already been shown in the previous sections.

(4.80) *他 不　　想　 买　 无论　　　哪　　 本　 书。
　　　 *tā bù　 xiǎng mǎi wúlùn　　 nǎ　 běn shū.
　　　 he not.R want buy no matter which CL book
　　　 'Intended: He doesn't want to buy any book (in particular).'

Another major issue is that the iota operator *dōu* also appears in sentences with bare *wh* phrases such as (4.70). As defined in (4.79), *dōu* takes an intensionalized property as its argument. However, since the bare *wh* phrase in (4.70) has been explicitly argued not to have *wúlùn* in its front, it is hard to see how they would derive the meaning of (4.70). This is crucial for them, since sentences with bare *wh* phrases constitute the empirical basis for their theoretical claims that "wh-indeterminates do not form a uniform class" (Giannakidou & Cheng 2006: 135). Without a principled account for the meaning of a sentence with a bare *wh* phrase, their claims would be left groundless.

4.3.3   The semantics of *wh*-words

Following Hamblin 1973, I assume that the semantic denotation of a *wh* word consists of all possible elements of the same kind in a contextualized domain. However, differing from him in treating *wh* words denotating a *set* of entities, I assume that the semantic denotation of a *wh* word is a 'special' *disjunction* of each element of the same kind in that domain (cf. Karttunen 1977; Ciardelli et al. 2013; Ciardelli & Roelofsen 2014). Following Partee & Rooth 1983, I define a 'special' disjunctive operator $\vee_{<et,t>}$ as a two-place operator that takes NP arguments of type $< et, t >$ and gives back an NP argument of the same type, as illustrated in (4.81)[24].

(4.81) $[\![\vee_{<et,t>}]\!] = \lambda \mathscr{P}_{<et,t>}. \lambda \mathscr{Q}_{<et,t>}. \lambda P_{<e,t>}. \mathscr{P}(P) \vee_t \mathscr{Q}(P).$

---

[24]In principle, one could define a $\vee_e$, but this would blur the possibility to treat proper names as quantifiers on a par with standard strong quantifiers.

This 'special' disjunctive operator $\vee_{<et,t>}$ is to be differentiated from the logical disjunctive operator $\vee_t$ that takes propositions as arguments, but $\vee_{<et,t>}$ is related to $\vee_t$ by a type-shifting rule that is defined in Partee & Rooth 1983[25]. Thus, given a domain of individuals D = {Ann, Bob, Chris}, the semantic denotation of *shuí* ('who') on this domain will be the disjunctive form in (4.82), where a stands for the person Ann, etc.

(4.82) $[\![$ *shuí* $]\!] = a \vee_{np} b \vee_{np} c$[26]

This disjunctive meaning for *wh*-words is considered to be identical to a disjunctive phrase in natural language. Thus, the meaning of *shuí* in (4.82) is identical to the meaning of the disjunctive phrase *a or b or c*, i.e., *Ann or Bob or Chris* in English, or Ann或Bob或Chris in Mandarin. In other words, $\vee_{<et,t>}$ corresponds to disjunctive words in natural language such as *or* in English or 或(者) ('or') in Mandarin.

There are several advantages to equating the meaning of a *wh*-word to a disjunction of entities rather than a set of entities. Firstly, a set does not automatically work with logical operators such as conjunction or negation, but a disjunctive form does. Secondly, a disjunctive form can also be considered equivalent to the meaning of a disjunctive phrase. For example, *shuí* given the denotation in (4.82) means the same as 'Ann or Bob or Chris', which gives us a straightforward interpretation when they are under the scope of negation. Thus, (4.83) means the same as (4.84), i.e., John did not see Ann, and John did not see Bob, and John did not see Chris.

(4.83) 约翰　　没有　　看见　　谁。
　　　　yuēhàn　méiyǒu　kànjiàn　shuí.
　　　　John　　not　　see　　who
　　　　'John did not see anyone.'

---

[25]In the following discussion, $\vee$ is equivalent to $\vee_t$.

[26]The semantic type of proper names is changed accordingly from e to $<et,t>$ (Montague 1973/1974).

(4.84) 约翰　　没有　　看见　　安　　或　　鲍勃　或　柯立思。
　　　　yuēhàn　méiyǒu　kànjiàn　Ann　huò　Bob　huò　Chris.
　　　　John　　not　　see　　Ann　or　Bob　or　Chris
　　　'John did not see anyone.'

Finally, as discussed in Section 4.2.2, the word *wúlùn* requires either a disjunctive phrase or a *wh* word to form a grammatical sentence; thus, equating the meaning of a *wh*-word with a disjunctive phrase fulfills the syntax and semantics of *wúlùn* automatically.

4.3.4   The semantics of (*wúlùn*) *wh dōu* universal FCIs

Now that we have specified the structure of (*wúlùn*) *wh dōu* Universal FCIs based on the properties of *dōu* and *wúlùn*, and we have also specified the semantic denotation of question words, we are now in a position to spell out the semantic composition of (*wúlùn*) *wh dōu* Universal FCIs. Take (4.85) as an example.

(4.85) 无论　　　谁　都　　没有　　说话。
　　　　wúlùn　　shuí　dōu　méiyǒu　shuōhuà.
　　　　no-matter　who　DOU　not.R　talk
　　　'No matter who he was, he did not talk.'

Suppose the domain of universe contains two individuals Ann and Bob. In notation: $D = \{a, b\}$. The meaning of *shuí* on this domain is given in (4.86), meaning *Ann or Bob*.

(4.86) ⟦ *shuí* ⟧ = $a \vee_{<et,t>} b$

Since $\vee_{<et,t>}$ is defined as a two-place functor that takes NP arguments of type $<et, t>$ in (4.81), repeated here in (4.87), it requires that the denotation of individuals in the domain

have a quantifier type of $<et,t>$ instead of the basic type of e (Montague 1973/1974).

Thus, we have the denotations for the individuals as illustrated in (4.88) and (4.89).

(4.87) $[\![\vee_{<et,t>}]\!] = \lambda \mathscr{P}_{<et,t>}. \lambda \mathscr{Q}_{<et,t>}. \lambda P_{<e,t>}. \mathscr{P}(P) \vee \mathscr{Q}(P).$

(4.88) $[\![[_{\text{NP}} \text{Ann}]]\!] = \lambda P_{<e,t>}. a(P).$

(4.89) $[\![[_{\text{NP}} \text{Bob}]]\!] = \lambda P_{<e,t>}. b(P).$

Putting (4.87), (4.88), and (4.89) together gives us the meaning of *shuí* in the domain defined above, as illustrated in (4.90).

(4.90) $[\![[_{\text{NP}} \textit{shuí}]]\!] = a \vee_{<et,t>} b = [\vee_{<et,t>}] ([\![\text{Ann}]\!]) ([\![\text{Bob}]\!]) = \lambda P_{<e,t>}. a(P) \vee b(P).$

As argued in Section 4.2.2, the correct syntax for (*wúlùn*) *wh dōu* Universal FCIs has the form in (4.91), where *wúlùn* combines with *wh* first.

(4.91) $[[\textit{wúlùn wh}] \textit{dōu}]$

Thus, we need a denotation for *wúlùn*. Here I take the negation marker *wú* in *wúlùn* as non-accidental and propose to define $[\![\textit{wúlùn}]\!]$ as a 'special' negation operator $\neg_{<<et,t>,<et,t>>}$ that takes NP arguments of type $<et,t>$ and returns a property of predicates of type $<e,t>$, as illustrated in (4.92).

(4.92) $[\![\textit{wúlùn}]\!] = \neg_{<<et,t>,<et,t>>} = \lambda \mathscr{P}_{<et,t>}. \lambda P_{<e,t>}. \neg \mathscr{P}(P).$

Applying (4.92) to (4.90), we arrive at the denotation of $[\![[\textit{wúlùn wh}]]\!]$ on the domain $D = \{a, b\}$ as the one illustrated in (4.93).

(4.93) $[\![w\acute{u}l\grave{u}n]\!]\ (\ [\![\ [_{NP}\ shu\acute{\iota}]\ ]\!]\ )\ =\ [\neg_{<<et,t>,<et,t>>}]\ (\ a\ \vee_{<et,t>}\ b\ )\ =$

$\quad [\ \lambda\mathscr{P}_{<et,t>}.\lambda P_{<e,t>}.\neg\mathscr{P}(P).\ ]\ (\ \lambda P_{<e,t>}.a(P)\ \vee\ b(P).\ )\ =\ \lambda P_{<e,t>}.\neg(\ a(P)\ \vee\ b(P)).$

The last step in (4.93) can be further simplified via De Morgan's Laws, and we thus have the meaning of (*wúlùn*) *wh* as in (4.94).

(4.94) $[\![\ [\ w\acute{u}l\grave{u}n\ wh\ ]\ ]\!]\ =\ \lambda P_{<e,t>}.\neg(\ a(P)\ \vee\ b(P)).\ =\ \lambda P_{<e,t>}.\neg a(P)\ \wedge\ \neg b(P).$

Note that the result of (4.94) denotes a set of properties that neither Ann or Bill has, which is still a single element of a quantifier type. Since *dōu* requires a conjunctive phrase, the result above cannot serve as an argument of *dōu* as it stands. In order to solve this problem, we again follow Partee & Rooth 1983 to define a 'special' two-place conjunctive operator $\wedge_{<et,t>}$ that takes arguments of type $<et,t>$ and returns a constituent of the same type, as defined in (4.95)[27].

(4.95) $\wedge_{<et,t>}\ =\ \lambda\mathscr{P}_{<et,t>}.\lambda\mathscr{Q}_{<et,t>}.\lambda P_{<e,t>}.\ \mathscr{P}(P)\ \wedge_t\ \mathscr{Q}(P).$

What (4.95) says is that the result of $\wedge_{<et,t>}$-conjoining two sets of properties is a set of properties that commonly shared by the two sets. Accordingly, a set of properties that neither Ann or Bill has is equivalent to a $\wedge_{<et,t>}$-conjunction of the set of properties that A does not have and the set of properties that B does not have, as defined in (4.96).

(4.96) $\lambda P_{<e,t>}.\neg a(P)\ \wedge\ \neg b(p).\ =\ \lambda P_{<e,t>}.\neg a(P).\ \wedge_{<et,t>}\ \lambda P_{<e,t>}.\neg b(P).$

Since (4.96) is a conjunctive phrase, it can serve as an argument of *dōu*, whose denotation is defined in (4.97).

---

[27]This conjunctive operator $\wedge_{<et,t>}$ is on a par with the disjunctive operator $\vee_{<et,t>}$, as defined in (4.81).

(4.97) $[\![\, d\bar{o}u \,]\!] = \lambda P_{<e,t>}.\lambda \mathcal{Q}_{<et,t>}.\mathcal{Q}(P).$

Now that we have got each component, we are ready to assign a semantics for the sentence in (4.85) at the beginning of this section, repeated here in (4.113).

(4.98) 无论　　　谁　都　　没有　　说话。
　　　wúlùn　　shuí　dōu　méiyǒu　shuōhuà.
　　　no-matter　who　DOU　not.R　talk
　　'No matter who he was, he did not talk.'

The syntax/LF of (4.113) is illustrated in (4.99).

(4.99)
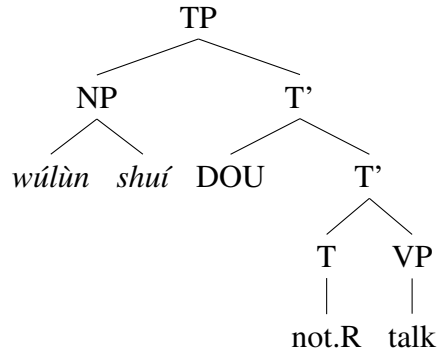
Ignoring the temporal component, we define the denotation of *méiyǒu* in (4.100).

(4.100) The denotation of *méiyǒu*, ignoring the temporal component:

$[\![\, [.\text{T not. R}] \,]\!] = \lambda P_{<e,t>}.\neg P.$

The denotation of the verb *talk* is defined in (4.101).

(4.101) $[\![\, [.\text{VP talk}] \,]\!] = \lambda x_e \in D.\textbf{\textit{talk}}(x).$

137

The denotation of the whole clause in (4.113) based on the structure in (4.99) is calculated step by step in (4.102).

(4.102) ⟦ DOU ⟧ (⟦ [.T′ [.T not.R] [.VP talk]] ⟧) (⟦ [.NP *wúlùn shuí*] ⟧)

$= [\lambda P_{<e,t>}.\lambda \mathcal{Q}_{<et,t>}.\mathcal{Q}(P).] ([\lambda P_{<e,t>}.\neg P.] (\lambda x_e \in D.\textbf{talk}(x).))$

$(\lambda P_{<e,t>}.\neg a(P). \wedge_{<et,t>} \lambda P_{<e,t>}.\neg b(P).)$

$= [\lambda P_{<e,t>}.\lambda \mathcal{Q}_{<et,t>}.\mathcal{Q}(P).] (\lambda x_e \in D.\neg\textbf{talk}(x).)$

$(\lambda P_{<e,t>}.\neg a(P). \wedge_{<et,t>} \lambda P_{<e,t>}.\neg b(P).)$

$= [\lambda \mathcal{Q}_{<et,t>}.\mathcal{Q}(\lambda x_e \in D.\neg\textbf{talk}(x).).] (\lambda P_{<e,t>}.\neg a(P). \wedge_{<et,t>} \lambda P_{<e,t>}.\neg b(P).)$

$= [\lambda P_{<e,t>}.\neg a(P). \wedge_{<et,t>} \lambda P_{<e,t>}.\neg b(P).] (\lambda x_e \in D.\neg\textbf{talk}(x).)$

$= \neg a(\lambda x_e \in D.\neg\textbf{talk}(x).) \wedge \neg b(\lambda x_e \in D.\neg\textbf{talk}(x).)$

$= \neg\neg\textbf{talk}(a) \wedge \neg\neg\textbf{talk}(b)$

$= \textbf{talk}(a) \wedge \textbf{talk}(b)$

However, as the result of the derivation in (4.102) shows, when we try to put the meaning of *wúlùn shuí* in (4.96), *dōu*, the negation marker *méiyǒu* and the predicate VP *talk* together to work out the meaning of the sentence in (4.113), we arrive at a meaning that is totally opposite to what the sentence is supposed to mean. This is because when *dōu* distributes the property $\lambda x_e \in D.\neg\textbf{talk}(x).$ denoted by the combination of *méiyǒu* and *talk* to each conjunct in its conjunction argument, the result is a conjunction of two propositions: one says that it is not the case that Ann does not talk, and the other says that it is not the case that Bill does not talk. In other words, the result says that Ann and Bill both talk. This is exactly the opposite of what (4.113) is supposed to mean, namely, neither Ann nor Bill talk.

It is not hard to see that the problem originates from the result of combining *wúlùn* with *wh* in (4.93). Given that this result carries the negation component from *wúlùn* and

essentially functions as a quantifier that takes arguments of predicate types, it would negate every predicate 'given' by *dōu*. In other words, a direct semantic composition of (*wúlùn*) *wh dōu* U-FCIs that follows basic rules of functional application and those of standard logical operators modulo type-shifting would lead us to a false meaning for this type of U-FCIs. In addition, the so-called *free choice* flavor seems to be missing as well.

To solve the problem, I propose a covert exhaustification operator $O_{<<et,t>,<et,t>>}$ (mnemonic for the English word *only*) in the spirit of Fox 2007; Chierchia 2006, 2013. This operator is to be attached to the *wh* word before it combines with *wúlùn* in (*wúlùn*) *wh dōu* U-FCIs. A preliminary meaning of $O_{<<et,t>,<et,t>>}$ is defined in (4.103).

(4.103) The denotation of $O_{<<et,t>,<et,t>>}$ (preliminary):

$$O_{<<et,t>,<et,t>>} = \lambda x_{<et,t>} \in D.\lambda P_{<e,t>}. \, x(P) \wedge \forall y \in D(y \neq x \rightarrow \neg y(P)).$$

(4.103) says that $O_{<<et,t>,<et,t>>}$ takes an individual x and a property P as its arguments and asserts that x has the property P, but all the individuals other than x in the domain does not. In order for $O_{<<et,t>,<et,t>>}$ to be able to take a disjunctive phrase, i.e., the denotation of *wh* words, define a distributivity property for $O_{<<et,t>,<et,t>>}$ as in (4.104).

(4.104) The distributivity of $O_{<<et,t>,<et,t>>}$ (preliminary):

$$\forall x_{<et,t>} \in D \text{ and } \forall y_{<et,t>} \in D:$$

$$O_{<<et,t>,<et,t>>}(x \vee_{<et,t>} y) = O_{<<et,t>,<et,t>>}(x) \vee_{<et,t>} O_{<<et,t>,<et,t>>}(y).$$

Now the syntax/LF of (4.113) is (4.105) instead of (4.99).

(4.105)

```
                        TP
              ┌──────────┴──────────┐
            NP1                     T'
       ┌─────┴─────┐          ┌─────┴─────┐
     wúlùn        NP2        DOU          T'
              ┌────┴────┐            ┌─────┴─────┐
    O_{<<et,t>,<et,t>>}  shuí        T           VP
                                     │           │
                                  not.R        talk
```
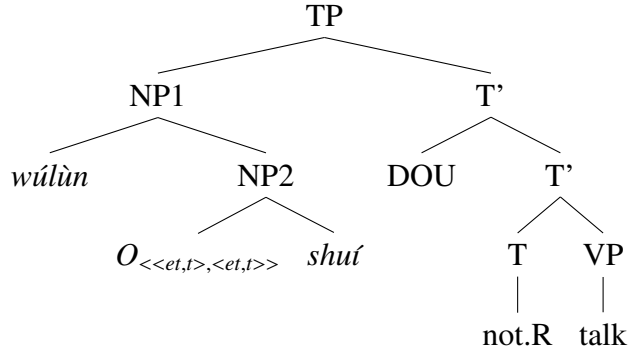
Thus, we derive the meaning of $[._{NP2}\ O_{<<et,t>,<et,t>>}\ shuí\,]$ by applying the denotation of $O_{<<et,t>,<et,t>>}$ to the denotation of *shuí*, as illustrated in (4.106).

(4.106) $[O_{<<et,t>,<et,t>>}\,]\ (\,[\![\ shuí\ ]\!]) = [\ O_{<<et,t>,<et,t>>}\,]\ (\ a\ \lor_{<et,t>}\ b\ )$

$= O_{<<et,t>,<et,t>>}(a)\ \lor_{<et,t>}\ O_{<<et,t>,<et,t>>}(b)$ \hspace{2em} by (4.104)

$= [\lambda P_{<e,t>}.\,a(P)\ \land\ \forall y \in\ D(y \neq a \rightarrow \neg y(P))]\lor_{<et,t>}$

$[\lambda P_{<e,t>}.\,b(P)\ \land\ \forall y \in\ D(y \neq b \rightarrow \neg y(P))]$ \hspace{2em} by (4.103)

$= [\lambda P_{<e,t>}.\,a(P)\ \land\ \neg b(P).]\ \lor_{<et,t>}\ [\lambda P_{<e,t>}.\,b(P)\ \land\ \neg a(P).]$ \hspace{1em} by $D = \{a,b\}$

$= \lambda P_{<e,t>}.(\,a(P)\ \land\ \neg b(P))\ \lor\ (\,b(P)\ \land\ \neg a(P)).$

The denotation of *wúlùn* then combines with the result of (4.106) to derive the meaning of NP1 in (4.105). This derivation is shown in (4.107).

(4.107) $[\![\ wúlùn\ ]\!]\ (\,[O_{<<et,t>,<et,t>>}]\ (\,[\![\ shuí\ ]\!])\,)$

$= [\lambda \mathscr{P}_{<et,t>}.\lambda P_{<e,t>}.\,\neg \mathscr{P}(P).]\ (\,[\ O_{<<et,t>,<et,t>>}\,]\ (\,[\![\ shuí\ ]\!])\,)$ by (4.92)

$= [\lambda \mathscr{P}_{<et,t>}.\lambda P_{<e,t>}.\,\neg \mathscr{P}(P).]$

$(\lambda P_{<e,t>}.(\,a(P)\ \land\ \neg b(P))\ \lor\ (\,b(P)\ \land\ \neg a(P))).$ by (4.106)

$= \lambda P_{<e,t>}.\neg[\ (\,a(P)\ \land\ \neg b(P))\ \lor\ (\,b(P)\ \land\ \neg a(P))\,]$

$= \lambda P_{<e,t>}.\neg(\,a(P)\ \land\ \neg b(P))\ \land\ \neg(\,b(P)\ \land\ \neg a(P))$

$$= \lambda P_{<e,t>}.(\neg a(P) \lor b(P)) \land (\neg b(P) \lor a(P))$$

$$= \lambda P_{<e,t>}.(a(P) \rightarrow b(P)) \land (b(P) \rightarrow a(P))$$

$$= \lambda P_{<e,t>}.a(P) \leftrightarrow b(P)$$

There are two situations in which the formula $a(P) \leftrightarrow b(P)$ in the last step of (4.107) is true. Either both $a(P)$ and $b(P)$ are true, or, both $a(P)$ and $b(P)$ are false. This amounts to saying that the result of (4.107) denotes a set of properties that either both Ann and Bob have or neither Ann nor Bob have. This is different from (4.94) where the combination of *wúlùn* and *shuí* directly results in a set of properties that neither Ann nor Bob have. As is shown above, (4.94) would lead to false sentence denotation; therefore, in order to arrive at a conjunction of two positive conjuncts, one needs to eliminate properties that neither Ann nor Bob have. Thus, one derives (4.108) from the last step in (4.107).

(4.108) $[\![$ *wúlùn* $]\!]$ ($[O_{<<et,t>,<et,t>>}]$ ($[\![$ *shuí* $]\!]$))

$$= \lambda P_{<e,t>}.(a(P) \rightarrow b(P)) \land (b(P) \rightarrow a(P))$$

$$\equiv_{IE} \lambda P_{<e,t>}.a(P) \land b(P) \text{ (after deleting the contradictory scenario)}$$

The last step in (4.108) gives us a positive conjunctive phrase that can serve as an argument of *dōu*. The rest of the semantic derivation for (4.105) is shown in (4.109).

(4.109) $[\![$ DOU $]\!]$ ($[\![$ [.T′ [.T not.R] [.VP talk]] $]\!]$) ($[\![$ [.NP *wúlùn* ([$O_{<<et,t>,<et,t>>}$] ($[\![$ *shuí* $]\!]$))] $]\!]$)

$$= [\lambda P_{<e,t>}.\lambda \mathscr{Q}_{<et,t>}.\mathscr{Q}(P).] (\lambda x_e \in D.\neg \textbf{\textit{talk}}(x).) (\lambda P_{<e,t>}.a(P) \land b(P))$$

$$= \neg \textbf{\textit{talk}}(a) \land \neg \textbf{\textit{talk}}(b)$$

This gives a correct interpretation of the meaning of the sentence in (4.113) on the domain of two individuals $D = \{a, b\}$.

The above proposal for the denotation of (*wúlùn*) *wh dōu* Universal FCIs accounts for two basic properties of this type of FCIs. Its universal force comes from the conjunction that *dōu* distributes a property over, and its free choice flavor is encoded in the semantic derivation by the application of the exhaustivity operator $O_{<<et,t>,<et,t>>}$ and the denotation of *wúlùn*. What the derivation in (4.107) basically says is that it is not the case that *only* Ann has the property *P* and it is not the case that *only* Bob has the property *P*, which can be naturally followed by a sentence such as 'In fact, Ann and Bob both have the property *P*' without causing contradiction. Similar inference is impossible when the exhaustivity operator $O_{<<et,t>,<et,t>>}$ is absent from the semantic derivation of [.$_{NP}$ (*wúlùn*) *wh*], as the following inference in (4.110) leads to contradiction.

(4.110) It is not the case that Ann has the property *P*.

and

It is not the case that Bob has the property *P*.

In fact,

Ann and Bob both have the property *P*.

(CONTRADICTION)

Note that the inference pattern in (4.110) is exactly what the direct composition of *wúlùn* and *wh* attempts to do. In other words, the failure of the direct combination is a logic problem that is rooted in semantics. In order to get the correct meaning that would not lead to contradiction, the logical form of the sentence needs to be changed, which in turn warrants the addition of the proposed operator $O_{<<et,t>,<et,t>>}$.

The functions of $O_{<<et,t>,<et,t>>}$ and *wúlùn* can be visualized straightforwardly with the help of a truth table[28]. For example, The truth table in (4.111) illustrates the truth

---

[28]For illustration purposes, I substitute *a* for *a*(*P*), and *b* for *b*(*P*), etc. in truth tables.

conditions for the formula $a(P) \leftrightarrow b(P)$ behind $\lambda P_{<e,t>}$ in (4.107). As is shown, this formula is true when both $a(P)$ and $b(P)$ are true (S1), or both of them are false (S4), which corresponds to two scenarios: one is that both Ann and Bob have P; and the other is neither Ann nor Bob has P.

(4.111) The truth table for $a(P) \leftrightarrow b(P)$:

S(ituations)	a	b	a $\leftrightarrow$ b
(1)	1	1	1
(2)	1	0	0
(3)	0	1	0
(4)	0	0	1

By definition in (4.103), the function of $O_{<<et,t>,<et,t>>}$ is to pick out situations where only one member in the domain is true of a property P, but not the others. This amounts to picking out S2 and S3 in the truth table in (4.111), where either $a(P)$ is true but $b(P)$ is false or vice versa. In the semantic derivation in (4.107), the situations that are picked out by $O_{<<et,t>,<et,t>>}$ are subsequently negated by the negation operator denoted by *wúlùn*. This is equivalent to deleting S2 and S3 in the truth table. Thus, the combined functions of $O_{<<et,t>,<et,t>>}$ and *wúlùn* are to delete the rows that make $a(P) \leftrightarrow b(P)$ false in its truth table, which is illustrated in (4.112).

(4.112) The truth table for $a(P) \leftrightarrow b(P)$:

S(ituations)	a	b	a ↔ b
(1)	1	1	1
(2)	1	0	0
(3)	0	1	0
(4)	0	0	1

In the case with two individuals in the domain, the situations that remain after the deletion of some other situations by $O_{<<et,t>,<et,t>>}$ and *wúlùn* turn out to be only two scenarios, one of which is irrelevant for our purposes by a pragmatic rule and the other of which is exactly the situation that we want. As we will see in Section 4.3.5, the issue becomes complicated when the domain of quantification has more than two individuals, and a refined denotation for $O_{<<et,t>,<et,t>>}$ is called for as well. However, despite the complication, the general idea of how $O_{<<et,t>,<et,t>>}$ and *wúlùn* work, which is equivalence to deletion in a truth table as discussed above, remain the same. In fact, as will be shown in section 4.3.5, the use of a truth table can significantly simplify the procedure of deriving the correct meaning.

4.3.5 Domains of quantification with more than two entities

Section 4.3.4 illustrates a semantic derivation for the sentence in (4.85), repeated in (4.113) below, with a domain of two individuals Ann and Bob.

(4.113) 无论　　谁　都　　没有　　说话。
　　　　wúlùn　　shuí　dōu　　méiyǒu　shuōhuà.
　　　　no-matter　who　DOU　not.R　　talk
　　　'No matter who he was, he did not talk.'

The crucial step in deriving the free choice flavor of (4.113) is the application of the exhaustification operator $O_{<<et,t>,<et,t>>}$ to each disjunct in the denotation of *wh*-words, the result of which is a disjunctive phrase that functions as the argument of the denotation of *wúlùn*. As is illustrated in (4.106) and (4.107), the result of combining $O_{<<et,t>,<et,t>>}$, the denotation of *wh*-words, and the denotation of *wúlùn* gives us two possible situations with a domain of two individuals, one of which is relevant for our purposes.

With a domain of more than two individuals, the semantic derivation of free choice becomes more complicated. In addition, a refined denotation is needed for $O_{<<et,t>,<et,t>>}$ in order to be able to recursively apply it during the semantic derivation, as will be shown in the following. To illustrate, let's take a domain of three individuals Ann, Bob and Chris. In notation: $D = \{a, b, c\}$. With this domain, the denotation of *shuí* ('who') in (4.113) becomes (4.114).

(4.114) $[\![\ shuí\ ]\!] = a \vee_{<et,t>} b \vee_{<et,t>} c$

The results of applying $O_{<<et,t>,<et,t>>}$ to each disjunct of the denotation of *shuí* ('who') in (4.114) are illustrated in (4.115)-(4.117).

(4.115) $O_{<<et,t>,<et,t>>} ([\![\ Ann\ ]\!]) = \lambda P_{<e,t>}. a(P) \wedge \neg b(P) \wedge \neg c(P).$

(4.116) $O_{<<et,t>,<et,t>>} ([\![\ Bob\ ]\!]) = \lambda P_{<e,t>}. b(P) \wedge \neg a(P) \wedge \neg c(P).$

(4.117) $O_{<<et,t>,<et,t>>} ([\![\ Chris\ ]\!]) = \lambda P_{<e,t>}. c(P) \wedge \neg a(P) \wedge \neg b(P).$

Combining the semantics of *wúlùn* with a disjunction of (4.115)-(4.117) gives us the result in (4.118).

(4.118) $\llbracket$ *wúlùn* $\rrbracket$ ($[O_{<<et,t>,<et,t>>}]$ ($\llbracket$ *shuí* $\rrbracket$))

$= [\lambda \mathscr{P}_{<et,t>}.\lambda P_{<e,t>}. \neg \mathscr{P}(P).]$ ($[O_{<<et,t>,<et,t>>}]$ ($\llbracket$ *shuí* $\rrbracket$)) by (4.92)

$= [\lambda \mathscr{P}_{<et,t>}.\lambda P_{<e,t>}. \neg \mathscr{P}(P).]$

$((\lambda P_{<e,t>}. a(P) \wedge \neg b(P) \wedge \neg c(P).) \vee$

$(\lambda P_{<e,t>}. b(P) \wedge \neg a(P) \wedge \neg c(P).) \vee$

$(\lambda P_{<e,t>}. c(P) \wedge \neg a(P) \wedge \neg b(P).))$

$= \lambda P_{<e,t>}.(\neg(a(P) \wedge \neg b(P) \wedge \neg c(P).)) \wedge$

$(\neg(b(P) \wedge \neg a(P) \wedge \neg c(P).)) \wedge$

$(\neg(c(P) \wedge \neg a(P) \wedge \neg b(P).)).$

$= \lambda P_{<e,t>}.(\neg a(P) \vee b(P) \vee c(P).) \wedge$

$(\neg b(P) \vee a(P) \vee c(P).) \wedge$

$(\neg c(P) \vee a(P) \vee b(P).)$

$= \lambda P_{<e,t>}.(a(P) \rightarrow (b(P) \vee c(P))) \wedge (b(P) \rightarrow (a(P) \vee c(P))) \wedge$

$(c(P) \rightarrow (a(P) \vee b(P)))$

As the result in (4.118) shows, the relation among each conjunct is less straightforward than the one in (4.107) with a domain of two individuals. However, as discussed at the end of Section 4.3.4, the function of $O_{<<et,t>,<et,t>>}$ and the denotation of *wúlùn* is essentially to delete rows that make the formula behind $\lambda P_{<e,t>}$ false. Therefore, given the truth table for the formula $(a(P) \rightarrow (b(P) \vee c(P))) \wedge (b(P) \rightarrow (a(P) \vee c(P))) \wedge (c(P) \rightarrow (a(P) \vee b(P)))$, the situations where it is false are to be deleted, as illustrated in (4.119). This is similar to the case as demonstrated in (4.111) with a two-individual domain.

(4.119) The truth table for

$$(a(P) \rightarrow (b(P) \vee c(P))) \wedge (b(P) \rightarrow (a(P) \vee c(P))) \wedge (c(P) \rightarrow (a(P) \vee b(P))):$$

Ss	a	b	c	a → (b ∨ c)	b → (a ∨ c)	c → (a ∨ b)	∧
(1)	1	1	1	1	1	1	1
(2)	1	1	0	1	1	1	1
(3)	1	0	1	1	1	1	1
(4)	1	0	0	0	1	1	0
(5)	0	1	1	1	1	1	1
(6)	0	1	0	1	0	1	0
(7)	0	0	1	1	1	0	0
(8)	0	0	0	1	1	1	1

Unlike (4.112) with a domain $D = \{a, b\}$, there are more than two situations that make the formula $(a(P) \rightarrow (b(P) \vee c(P))) \wedge (b(P) \rightarrow (a(P) \vee c(P))) \wedge (c(P) \rightarrow (a(P) \vee b(P)))$ true. Ignoring the last situation S8 for semantic irrelevance, the truth conditions for $(a(P) \rightarrow (b(P) \vee c(P))) \wedge (b(P) \rightarrow (a(P) \vee c(P))) \wedge (c(P) \rightarrow (a(P) \vee b(P)))$ as illustrated in (4.119) can be understood as a disjunction of all the situations that make the formula true, which gives us the disjunctive form in (4.120).

(4.120) $(a(P) \rightarrow (b(P) \vee c(P))) \wedge (b(P) \rightarrow (a(P) \vee c(P))) \wedge (c(P) \rightarrow (a(P) \vee b(P)))$

$\equiv_{IE} \lambda P_{<e,t>}.(a(P) \wedge b(P)) \vee (b(P) \wedge c(P)) \vee (a(P) \wedge c(P)) \vee (a(P) \wedge b(P) \wedge c(P))$

The result in (4.120) cannot be an argument for *dōu* since *dōu* requires a conjunction of individuals in the domain. In order to derive a correct argument for *dōu*, we apply $O_{<<et,t>,<et,t>>}$ and the denotation of *wúlùn* to the last step in (4.120). However, a refined denotation of $O_{<<et,t>,<et,t>>}$ is needed in order for it to be able to take each disjunct as its argument. This is because the denotation for $O_{<<et,t>,<et,t>>}$, as is defined in (4.103),

repeated here in (4.121), only applies to atomic individuals in the domain. Accordingly, a plurality denoted by $\lambda P_{<e,t>}.\, a(P) \wedge b(P)$, also written as $a \wedge_{<et,t>} b$, for example, cannot serve as an argument of $O_{<<et,t>,<et,t>>}$[29].

(4.121) The denotation of $O_{<<et,t>,<et,t>>}$ (preliminary):

$$O_{<<et,t>,<et,t>>} = \lambda x_{<et,t>} \in D.\lambda P_{<e,t>}.\, x(P) \wedge \forall y \in D(y \neq x \rightarrow \neg y(P)).$$

To save the semantic calculation from being undefined, two modifications are called for. First, the domain of quantification needs to be enlarged to include pluralities besides atomic individuals. For example, the previous domain of two atomic individuals $D = \{a, b\}$ is changed into $D = \{a, b, a \wedge b\}$, and the previous domain of three atomic individuals $D = \{a, b, c\}$ is changed into $D = \{a, b, c, a \wedge_{<et,t>} b, b \wedge_{<et,t>} c, a \wedge_{<et,t>} c, a \wedge_{<et,t>} b \wedge_{<et,t>} c\}$. Second, a revised denotation of $O_{<<et,t>,<et,t>>}$ is needed in order for it to be able to take non-atomic individuals as its argument, which is defined in (4.122).

(4.122) The revised denotation of $O_{<<et,t>,<et,t>>}$ (final):

$O_{<<et,t>,<et,t>>} =$

$\begin{cases} \lambda x.\lambda P.\, x(P) \wedge \forall y[(y \text{ is atomic and } y \neq x) \rightarrow \neg y(P)]. & \text{if } x \text{ denotes an atomic individual;} \\ \lambda x.\lambda P.\, x(P) \wedge \forall y[(y \text{ is atomic and } y \neq \text{ an atomic individual in x}) \rightarrow \neg y(P)]. & \text{if } x \text{ denotes a plurality.} \end{cases}$

Apply ⟦ *wúlùn* ⟧ and the revised denotation for $O_{<<et,t>,<et,t>>}$ to $\lambda P_{<e,t>}.(a(P) \wedge b(P)) \vee (b(P) \wedge c(P)) \vee (a(P) \wedge c(P)) \vee (a(P) \wedge b(P) \wedge c(P))$. The result is illustrated in (4.123).

(4.123) ⟦ *wúlùn* ⟧ $(O_{<<et,t>,<et,t>>} (\lambda P_{<e,t>}.(a(P) \wedge b(P)) \vee (b(P) \wedge c(P)) \vee (a(P) \wedge$

$c(P)) \vee (a(P) \wedge b(P) \wedge c(P))))$

---

[29]The term *pluralities* used here is different from the notion of pluralities as defined in Link 1983 in one crucial aspect. Pluralities used here are intrinsically distributive since they are formed by intersecting their properties, therefore, they cannot serve as subject of predicates that require indivisible pluralities such as *meet* or *gather*.

$$= [\![\text{ \textit{wúlùn} }]\!] \ (O(\lambda P_{<e,t>}.(a(P) \wedge b(P)) \vee_{<et,t>} O(\lambda P_{<e,t>}.(b(P) \wedge c(P)) \vee_{<et,t>}$$

$$O(\lambda P_{<e,t>}.(a(P) \wedge c(P))) \vee_{<et,t>} O(\lambda P_{<e,t>}.(a(P) \wedge b(P) \wedge c(P))))$$

The calculation of the last disjunct $O(\lambda P_{<e,t>}.(a(P) \wedge b(P) \wedge c(P)))$ encounters a problem, namely, there is no atomic individual y in the domain such that y is not the same as each conjunct of the plurality denotated by $a \wedge b \wedge c$. In other words, the last disjunct has a presupposition failure and therefore undefined. For this reason, we remove the last disjunct from further semantic derivation, which leads to (4.124).

(4.124) The derivation after removing $O(\lambda P_{<e,t>}.(a(P) \wedge b(P) \wedge c(P)))$ in (4.123)[30]:

$[\![\text{ \textit{wúlùn} }]\!] \ (O(\lambda P_{<e,t>}.(a(P) \wedge b(P)) \vee_{<et,t>} O(\lambda P_{<e,t>}.(b(P) \wedge c(P)) \vee_{<et,t>}$

$O(\lambda P_{<e,t>}.(a(P) \wedge c(P))) \vee_{<et,t>} O(\lambda P_{<e,t>}.(a(P) \wedge b(P) \wedge c(P))))$

$\cong [\![\text{ \textit{wúlùn} }]\!]$

$(O(\lambda P_{<e,t>}.(a(P) \wedge b(P)) \vee_{<et,t>} O(\lambda P_{<e,t>}.(b(P) \wedge c(P)) \vee_{<et,t>} O(\lambda P_{<e,t>}.(a(P) \wedge c(P)))$

$=$

$\lambda P_{<e,t>}.((a(P) \wedge b(P)) \rightarrow c(P)) \wedge ((b(P) \wedge c(P)) \rightarrow a(P)) \wedge ((a(P) \wedge c(P)) \rightarrow b(P))$

Even though the last step in (4.124) is in a conjunctive form, it cannot be combined with *dōu* since it is not a plurality, as least not on the surface. Again, we turn to truth tables to simplify it, as illustrated in (4.125).

---

[30]The symbol $\cong$ means that the two formulas before and after it are the same modulo deletion of a disjunct due to presupposition failure.

(4.125) The truth table for

$$((a(P) \land b(P)) \rightarrow c(P)) \land ((b(P) \land c(P)) \rightarrow a(P)) \land ((a(P) \land c(P)) \rightarrow b(P)):$$

Ss	a	b	c	$(a \land b) \rightarrow c$	$(b \land c) \rightarrow a$	$(a \land c) \rightarrow b$	$\land$
(1)	1	1	1	1	1	1	1
(2)	1	1	0	0	1	1	0
(3)	1	0	1	1	1	0	0
(4)	1	0	0	1	1	1	1
(5)	0	1	1	1	0	1	0
(6)	0	1	0	1	1	1	1
(7)	0	0	1	1	1	1	1
(8)	0	0	0	1	1	1	1

Out of the eight situations in the truth table in (4.125), S8 is deleted due to semantic irrelevance as discussed in the previous sections. The situations S4, S6, and S7 are deleted because the scenarios where only one person but not the others has a property are ruled out in the semantic derivation of the first round in (4.119). In other words, four out of eight situations are relevant to the current discussion, and they are S1, S2, S3, and S5. As is shown in (4.125), the only scenario that can make the formula $((a(P) \land b(P)) \rightarrow c(P)) \land ((b(P) \land c(P)) \rightarrow a(P)) \land ((a(P) \land c(P)) \rightarrow b(P))$ true is when each atomic proposition is true, i.e., S1. This leads us to the simplification in (4.126) for the formula under discussion.

(4.126)

$\lambda P_{<e,t>}.((a(P) \land b(P)) \rightarrow c(P)) \land ((b(P) \land c(P)) \rightarrow a(P)) \land ((a(P) \land c(P)) \rightarrow b(P))$

$\equiv_{recursion} \lambda P_{<e,t>}.a(P) \land b(P) \land c(P),$

where $\equiv_{recursion}$ means that the formula after it is derived from the one before it by recursively applying predefined operators.

150

Since the last step in (4.126) is a conjunction of atomic individuals, it can function as an argument for *dōu*.

Note that S2, S3, and S5, the situations that make the formula false, are situations where two individuals have a certain property but not the third. In this respect, it is similar to deletion of S4, S6, and S7 as these are the situations where one individual has a certain property but not the other two. In other words, the function of applying ⟦ *wúlùn* ⟧ and $O_{<<et,t>,<et,t>>}$ recursively to disjunctions at different phases of the semantic derivation is to delete 'partial situations', i.e., situations where only part of the individuals in the domain has certain properties. The result of the recursion gives us a universal meaning that is consistent with what (*wúlùn*) *wh dōu* Universal FCIs means.

4.4   Conclusion

The purpose of this chapter is to show that one type of non-canonical presuppositional quantifiers, namely (*wúlùn*) *wh dōu* Universal FCIs, must be interpreted above the sentential negation marker *méiyǒu*, and their relative position lends support to the proposal developed in Chapter 2 that *méiyǒu* is in T, based on Diesing's (1992) Mapping Hypothesis.

I gave a detailed analysis on the syntax and semantics of (*wúlùn*) *wh dōu* Universal FCIs, which are often translated into English as *no matter wh-* phrases. Based on the syntactic as well as semantic constraints of the word *dōu*, I argued that the word *wúlùn*, despite its phonological optionality, is obligatory for semantics. I then showed that the interpretation position of (*wúlùn*) *wh dōu* U-FCIs is above the sentential negation maker *méiyǒu*, regardless whether it is the thematic subject or object of a sentence. In the last part of this chapter, I proposed a semantic analysis for (*wúlùn*) *wh dōu* U-FCIs that

utilizes the scalar-implicature approaches to FCIs advanced in Fox 2007; Chierchia 2006, 2013. The new semantics can explain both the universal quantification and the free choice flavor that are associated with (*wúlùn*) *wh dōu* U-FCIs, and it is thus advantageous over several previous proposals.

CHAPTER 5

(LIÁN)...*DŌU* ('EVEN') IN MANDARIN

Another non-canonical presuppositional quantifier in Mandarin Chinese is the *(lián)* ...*dōu* ('even') scalar quantifier[1]. This construction shares several structural properties with *(wúlùn) wh dōu* U-FCIs; in particular, it must be interpreted above the negation marker *méiyǒu* as well, regardless whether it is a thematic subject or a thematic object. This lends another support to the T-status of *méiyǒu* developed in Chapter 2.

The chapter is organized in the following way. Section 5.1 illustrates the structural properties of the *(lián)*...*dōu* ('even') construction and points out their similarities to the structure of *(wúlùn) wh dōu* U-FCIs. Section 5.2 specifies the interpretation position of the *(lián)*...*dōu* ('even') construction relative to $(\emptyset_{yǒu})$/*méiyǒu*. Section 5.3 concludes the chapter.

---

[1]The *(lián)*...*dōu* ('even') construction has a variant *(lián)*...*yě* ('even') that I will not discuss in this chapter. This is similar to the variation between *(wúlùn) wh dōu* U-FCIs and *(wúlùn) wh yě* U-FCIs discussed in Chapter 4.

5.1 *(Lián)...dōu* ('even') in Mandarin

The (连)...都/(lián)...dōu/ ('even') construction in Mandarin expresses a scalar meaning that is on a par with *even* in English. For instance, the sentence in (5.1) asserts that Zhangsan invited Lisi and presupposes that (i) Zhangsan invited people other than Lisi, and, (ii) the likelihood of Zhangsan inviting Lisi is smaller than the likelihood of Zhangsan inviting the other people. Thus, the sentence has a flavor of surprise or unexpectedness from the speaker's point of view.

(5.1) 张三   *(连)*   李四 *(都)*   邀请   了。
Zhāngsān (lián)   Lǐsì *(dōu) yāoqǐng le.
Zhangsan (LIAN) Lisi *(DOU) invite   LE
'Zhangsan invited even Lisi.'

The *(lián)...dōu* ('even') construction has several properties that are quite similar to those of *(wúlùn) wh dōu* universal free choice Items. As shown in (5.1), the word *lián* is optional, but the word *dōu* is obligatory. This is reminiscent of the optionality of *wúlùn* and the obligatoriness of *dōu* in *(wúlùn) wh dōu* U-FCIs, as discussed in Chapter 4.

In *(wúlùn) wh dōu* U-FCIs, the phrase *(wúlùn) wh* ('no matter *wh*') can appear either before or after the sentential subject. For instance, the phrase *(wúlùn) shuí* ('no-matter who') appears after the subject *Zhāngsān* in (5.2), and it can also appear in its front, as shown in (5.3).

(5.2) 张三   *(无论)*   谁 *(都)*   邀请   了。
Zhāngsān (wúlùn)   shuí *(dōu) yāoqǐng le.
Zhangsan (no-matter) who *(DOU) invite   LE
'No matter who he was, Zhangsan invited him.'

(5.3) *(无论)*　　谁　张三　　　*(都)*　邀请　　了。
　　　　(wúlùn)　shuí Zhāngsān *(dōu)　yāoqǐng le.
　　　　(no-matter) who Zhangsan *(DOU)　invite　　LE
　　　　'No matter who he was, Zhangsan invited him.'

The same pattern is observed in the *(lián)... dōu* ('even') construction. In (5.1), the *lián* phrase appears after the subject *Zhāngsān*; but it can also appear before it, as illustrated in (5.4).

(5.4) *(连)*　李四　张三　　　*(都)*　邀请　　了。
　　　　(lián)　Lǐsì　Zhāngsān *(dōu)　yāoqǐng le.
　　　　(LIAN) Lisi　Zhangsan *(DOU)　invite　　LE
　　　　'Zhangsan invited even Lisi.'

Finally, as discussed in Chapter 4, when a *(wúlùn) wh* phrase is the thematic object of the main predicate of a clause, it nevertheless cannot appear in the canonical object position of the verb, i.e., the position after the verb in Mandarin since Mandarin is an SVO language. Thus, the following sentence in (5.5) is ungrammatical because the phrase *wúlùn shuí* ('no-matter who') is behind the verb *yāoqǐng* ('to invite'). This is to be contrasted with (5.2).

(5.5) *张三　　　都　　邀请　　了　无论　　　谁。
　　　　*Zhāngsān dōu　yāoqǐng le　wúlùn　　shuí.
　　　　Zhangsan DOU　invite　　LE　no-matter who
　　　　'Intended: No matter who he was, Zhangsan invited him.'

This syntactic constraint shows up in the *(lián)... dōu* ('even') construction as well. When a *lián* phrase is the thematic object of the main predicate of a clause, it cannot appear after the main predicate. This property explains the ungrammaticality observed in the sentence in (5.6), since the phrase *lián Lǐsì* ('even Lisi') is after the main verb *yāoqǐng* ('to invite').

(5.6) *张三　　都　　邀请　　了　连　　李四。
　　　*Zhāngsān dōu　yāoqǐng le　lián　Lǐsì.
　　　Zhangsan　DOU　invite　　LE　LIAN　Lisi.
　　　'Intended: Zhangsan invited even Lisi.'

5.2　The position of *(lián)*-phrases in a negative sentence with *méiyǒu*

When a *lián* phrase is the thematic object of the predicate in a sentence, it has to move out of its base object position (Shyu 1995; Badan 2008; Badan & Del Gobbo 2015; Constant & Gu 2010; Cheng & Vicente 2013 a.o.), as illustrated in (5.4) and (5.6). Since the negation marker *méiyǒu* is argued to be in T, and presuppositional quantifiers are argued to be interpreted above T, one would predict that the the *lián* phrase would move to a position above *méiyǒu*. This prediction is borne out. Take (5.7) and (5.8) as examples.

(5.7) 张三　　连　　李四　都　　没有　　邀请。
　　　Zhāngsān lián　Lǐsì　dōu　méiyǒu　yāoqǐng.
　　　Zhangsan LIAN Lisi　DOU　not.R　invite
　　　'Zhangsan did not even invite Lisi.'

(5.8) *张三　　没有　连　　李四　都　　邀请。
　　　*Zhāngsān méiyǒu lián　Lǐsì　dōu　yāoqǐng.
　　　Zhangsan　not.R　LIAN Lisi　DOU　invite
　　　'Intended: Zhangsan did not even invite Lisi.'

In (5.7), the phrase *(lián) Lǐsì dōu* ('even Lisi') is in front of the negation marker *méiyǒu* and the sentence is grammatical. However, when it follows *méiyǒu*, the sentence is bad, as shown in (5.8).

Similar to the situation on the structural position of the phrase (*wúlùn*) *wh* and *méiyǒu* in Section 4.2.3 of Chapter 4, the sentence in (5.8) is grammatical on the reading

156

that it was not the case that Zhangsan even invited Lisi, in which case the negation

marker *méiyǒu* functions as meta-negation that takes a clause/proposition as its argument.

Evidence for *méiyǒu* being meta-negation in (5.8) comes from the following sentence in

(5.9), where another *méiyǒu* can be added, and the sentence meaning changes accordingly.

(5.9) 张三　　　没有　　连　　李四　都　　没有　　邀请。
　　　 Zhāngsān méiyǒu lián   Lǐsì   dōu   m'eiyǒu yāoqǐng.
　　　 Zhangsan not.R   LIAN   Lisi   DOU   not.R   invite
　　　 'It was not the case that Zhangsan did not even invite Lisi.'

Since scope interpretation in Mandarin is from left to right, the *(lián)*-phrase is

interpreted above *méiyǒu* in a sentence such as (5.7). This is exactly what the proposal of

méiyǒu being in T would predict, according to Diesing's (1992) Mapping Hypothesis.

Thus, the *lián . . . dōu* construction gives another evidence that $(\emptyset_{yǒu})$/*méiyǒu* is under T.

5.3 Conclusion

In this chapter, I illustrated several similarities between the *(lián) . . . dōu* ('even') construc-

tion and *(wúlùn) wh dōu* U-FCIs with respect to their surface position, including the fact

that the *(lián)*-phrase must be interpreted above $(\emptyset_{yǒu})$/*méiyǒu*. Since the *(lián)*-phrase

is a presuppositional quantifier, and its interpretation position relative to $(\emptyset_{yǒu})$/*méiyǒu*

lends another support to the argument that it is under T.

CHAPTER 6

CONCLUSION

In this dissertation, I presented arguments for the proposal that there is a T(ense) projection (TP) in the clause structure of Mandarin. The argumentation proceeded in four steps. The first two steps can be seen as a systematic formalization of similar intuitions on the syntactic status of *yǒu*/*méiyǒu* as functional heads (Huang 1990; Cheng 1991 a.o.) and the validity of Diesing's (1992) Mapping Hypothesis for Mandarin (Cheng 1991; Hole 2006).

At the first step (Chapter 2), I argued that temporal interpretation of a non-future negative episodic eventive sentence is located on the sentential negation marker *méiyǒu*, from which I posited a phonologically null element $\emptyset_{yǒu}$ which encodes non-future temporality in T. $\emptyset_{yǒu}$ realizes as *yǒu* when the negation marker *méi* moves from its base position in Neg to attach to it in T.

At the second step, I discussed existential constructions in Mandarin, which use the same word *yǒu*/*méiyǒu* as in non-future episodic eventive sentences (Chapter 3). I proposed a structure for them, where the word *yǒu* is a verb in V and it assigns a patient role to its NP argument. This structural proposal requires that existential constructions in this language be interpreted below T. I provided evidence showing that the proposed structure makes correct predictions with respect to the formation of negative sentences and polar questions. As to the temporal structure of non-future episodic existential sentences, I proposed that they share the same T headed by $\emptyset_{yǒu}$ with non-future episodic eventive sentences. However, unlike the latter, the former do not have AspP and *v*P between TP and VP. This proposal gives us a coherent picture of quantifier interpretation in Mandarin which is consistent with Diesing's (1992) Mapping Hypothesis.

To further support the TP proposal for Mandarin, I investigated two non-canonical presuppositional quantifiers and their interpretational position in a clause structure. They are *(wúlùn) wh dōu* universal free choice items (Chapter 4) and *(lián) . . . dōu* ('even') scalar quantifiers (Chapter 5). I showed that both of them must be interpreted above $\emptyset_{y\check{o}u}$(/*méiyǒu*) in an episodic sentence.

BIBLIOGRAPHY

Amritavalli, R. 2014. Separating tense and finiteness: anchoring in Dravidian. *Natural Language and Linguistics Theory* 32. 283–306.

Amritavalli, R. & K. A. Jayaseelan. 2005. Finiteness and negation in Dravidian. In Guglielmo Cinque & Richard S. Kayne (eds.), *The Oxford handbook of comparative syntax*, chap. 5, 178–220. Oxford University Press.

Aoun, Joseph, Elabbas Benmamoun & Lina Choueiri. 2010. *The syntax of Arabic*. Cambridge University Press.

Bach, Emmon. 1986. The algebra of events. *Linguistics and Philosophy* 9. 5–16.

Badan, Linda. 2008. The *even*-construction in Mandarin Chinese. In R. Djamouri & R. Sybesma (eds.), *Chinese Linguistics in Leipzig*, 101–116. Paris: EHESS-CRLAO.

Badan, Linda & Francesca Del Gobbo. 2015. The *Even*-construction and the low periphery in Mandarin Chinese. In Wei-Tien Dylan Tsai (ed.), *Cartography of Chinese Syntax*, 33–74. OUP.

Baker, C. L. 1991. The syntax of English *not*: the limits of core grammar. *Linguistic Inquiry* 22(3). 387–429.

Bittner, Maria. 2012. Temporality: universals and variation. ms.

Bohnemeyer, Jürgen & Mary Swift. 2004. Event realization and default aspect. *Linguistics and Philosophy* 27. 263–296.

Carlson, Gregory N. 1980. *Reference to kinds in English*. Outstanding dissertations in Linguistics. Garland Publishing.

Chao, Yuen Ren. 1968. *A grammar of spoken Chinese*. University of California Press, Berkeley.

Cheng, Lisa Lai-Shen. 1991. *On the typology of* wh-*questions*: MIT dissertation.

Cheng, Lisa Lai-Shen. 1995. On *Dou*-quantification. *Journal of East Asian Linguistics* 4(3). 197–234.

Cheng, Lisa Lai-Shen. 2009. On *Every* type of quantificational expression in Chinese. In Monika Rathert & Anastasia Giannakidou (eds.), *Quantification, definiteness, and nominalization*, 53–75. Oxford University Press.

Cheng, Lisa Lai-Shen & Anastasia Giannakidou. 2013. The non-uniforminty of *Wh*-indeterminates with polarity and free choice in Chinese. In Kook hee Gil, Steve Harlow & George Tsoulas (eds.), *Strategies of quantification*, 123–151. Oxford University Press.

Cheng, Lisa Lai-Shen, C.-T. James Huang & Jane Tang. 1996. Negative particle questions: a dialectal comparison. In James R. Black & Virginia Motapanyane (eds.), *Microparametric syntax and dialect variation*, 41–78. John Benjamins Publishing Company.

Cheng, Lisa Lai-Shen & Luis Vicente. 2013. Verb doubling in Mandarin Chinese. *Journal of East Asian Linguistics* 22(1). 1–37. doi:10.1007/s10831-012-9095-6.

Chierchia, Gennaro. 2006. Broaden your views: implicatures of domain widening and the 'logicality' of language. *Linguistic Inquiry* 37(4). 535–590.

Chierchia, Gennaro. 2013. *Logic in grammar: Polarity, free choice, and intervention*. Oxford University Press.

Chomsky, Noam. 1993. A minimalist program for linguistic theory. In Kenneth Hale & Samuel Jay Keyser (eds.), *The view from Building 20: Linguistics essays in honor of Sylvain Bromberger*, 1–52. MIT Press.

Chomsky, Noam. 1995. *The minimalist program*. (Current studies in Linguistics 28). Cambridge, Massachusetts: MIT Press.

Ciardelli, Ivano, Jeroen Groenendijk & Floris Roelofsen. 2013. Inquisitive semantics: A new notion of meaning. *Language and Linguistics Compass* 7(9). 459–476. doi:10.1111/lnc3.12037.

Ciardelli, Ivano & Floris Roelofsen. 2014. Composing alternatives. In *Hand-*

out for Sinn und Bedeutung 19, https://www.dropbox.com/s/9fwooq0g4hhf25o/ sub-2014-composing-alternatives.pdf?dl=0.

Comrie, Bernard. 1976. *Aspect: an introduction to the study of verbal aspect and related problems*. Cambridge University Press.

Constant, Noah & Chloe C. Gu. 2010. Mandarin 'even', 'all' and the trigger of focus movement. In *Proceedings of the 33rd Annual Penn Linguistics Colloquium*, 21–30.

Davidson, Donald. 1967. The logical form of action sentences. In *The logic of decision and action*, 81–95. Pittsburgh, PA: University of Pittsburgh Press. Reprinted in: D. Davidson (ed.). *Essays on Actions and Events.* Oxford: Clarendon Press, 1980, 105-122.

Despić, Miloje. 2011. *Syntax in the absence of determiner phrase*: University of Connecticut dissertation.

Despić, Miloje. 2013. Binding and the structure of NP in Serbo-Croatian. *Linguistic Inquiry* 44(2). 239–270.

Diesing, Molly. 1992. *Indefinites*. MIT Press.

Dong, Hongyuan. 2009. *Issues in the semantics of Mandarin questions*: Cornell University dissertation.

Duanmu, San. 1988. The lack of scope ambiguity in Chinese. ms.

Enç, Mürvet. 1987. Anchoring conditions for tense. *Linguistic Inquiry* 18(4).

Ernst, Thomas. 1995. Negation in Mandarin Chinese. *Natural Language and Linguistics Theory* 13(4). 665–707.

Fox, Danny. 2007. Free choice disjunction and the theory of scalar implicatures. In Uli Sauerland & Penka Stateva (eds.), *Presupposition and implicature in compositional semantics*, 71–120. Basingstoke; New York: Palgrave Macmillan.

Frege, Gottlob. 1923-6. Logische untersuchungen. dritter teil: Gedankengefuge. In *Beitrage zur philosophie des deutschen idealismus 3*, 36–51.

Gasde, Horst-Dieter. 2004. Yes/no questions and A-not-A questions in Chinese revisited. *Linguistics* 42(2). 293–326.

Giannakidou, Anastasia. 1998. *Polarity sensitivity as (non)veridical dependency.* John Benjamins.

Giannakidou, Anastasia. 2001. The meaning of free choice. *Linguistics and Philosophy* 24. 659–735.

Giannakidou, Anastasia & Lisa Lai-Shen Cheng. 2006. (in)Definiteness, polarity, and the role of *wh*-morphology in free choice. *Journal of semantics* 23. 135–183. doi:10.1093/jos/ffl001.

Haegeman, Liliane. 1995. *The syntax of negation.* Cambridge University Press.

Hamblin, C. L. 1973. Questions in Montague English. *Foundations of Language* 10. 41–53.

Haspelmath, Martin. 1995. Diachronic sources of 'all' and 'every'. In Emmon Bach, Elois Jelinek, Angelika Kratzer & Barbara Partee (eds.), *Quantification in natural language*, 363–382. Kluwer, Dordrecht.

Heim, Irene & Angelika Kratzer. 1998. *Semantics in generative grammar.* Blackwell.

Hole, Daniel. 2006. Mapping VPs to restrictors: Anti-Diesing effects in Mandarin Chinese. In Klaus von Heusinger & Ken Turner (eds.), *Where semantics meets pragmatics*, 337–380. Elsevier.

Hsieh, Miao-Ling. 2001. *Form and meaning: negation and question in Chinese*: University of Southern California dissertation.

Hu, Jianhua, Haihua Pan & Liejiong Xu. 2001. Is there a finite vs. nonfinite distinction in Chinese? *Linguistics* 39(6). 1117–1148.

Huang, C.-T. James. 1984. On the distribution and reference of empty pronouns. *Linguistic Inquiry* 15. 531–574.

Huang, C.-T. James. 1987. Existential sentences in Chinese and (in)definiteness. In

Eric J. Reuland & Alice G. B. ter Meulen (eds.), *The representation of (in)definiteness*, 226–253. MIT Press.

Huang, C.-T. James. 1990. Shuo *shì* he *yǒu* ('On '*Be*' and '*Have*' in Chinese). In *Bulletin of the institute of history and philology* 59, 43–64.

Huang, C.-T. James. 1991. Modularity and Chinese A-not-A questions. In Carol Georgopoulos & Roberta Ishihara (eds.), *Interdisciplinary approaches to language: essays in honor of S.-Y. Kuroda*, 305–332. Kluwer Academic Publishers.

Huang, C.-T. James. 1998/1982. *Logical relations in Chinese and the theory of grammar*. Cambridge, Massachusetts: MIT dissertation.

Huang, C.-T. James. 2003. The distribution of negative NPs and some typological correlates. In Yen-hui Audrey Li & Andrew Simpson (eds.), *Functional structure(s), form and interpretation: perspectives from East Asian languages*, 262–280. RoutledgeCurzon.

Huang, C.-T. James, Y.-H. Audrey Li & Yafei Li. 2009. *The syntax of Chinese.* Cambridge syntax guides. Cambridge University Press.

Huang, Cheng-Teh James. 1982. *Logical relations in Chinese and the theory of grammar*: MIT dissertation.

Huang, Shi-Zhe. 1996. *Quantification and predication in Mandarin Chinese: a case study of* DOU: University of Pennsylvania dissertation.

Kamp, Hans & Christian Rohrer. 1983. Tense in texts. In R. Bauerle, Chr. Schwarze & A. von Stechow (eds.), *Meaning, use and the interpretation of language*, 250–269. De Gruyter.

Karttunen, Lauri. 1977. Syntax and semantics of questions. *Linguistics and Philosophy* 1. 1–44.

Klein, Wolfgang. 1994. *Time in language*. Routledge.

Kratzer, Angelika. 1998. More structural analogies between pronouns and tenses. In

Devon Strolovitch & Aaron Lawson (eds.), *Proceedings of semantics and linguistic theory (SALT)*, vol. VIII, 92–110. CLC publications.

Kratzer, Angelika & Junko Shimoyama. 2002. Indeterminate pronouns. ms.

Krifka, Manfred. 1989. Nominal reference, temporal constitution and quantification in event semantics. In R. Bartsch, Johan van Benthem & P. van Emde Boas (eds.), *Semantics and contextual expression*, 75–115. Dordrecht: Foris.

Krifka, Manfred. 1998. The origins of telicity. In Susan Rothstein (ed.), *Events and grammar*, 197–235. Kluwer, Dordrecht.

Laka, Miren Itziar. 1990. *Negation in syntax: on the nature of functional categories and projections*: Massachusetts Institute of Technology dissertation.

Law, Paul. 2006. Adverbs in A-not-A questions in Mandarin Chinese. *Journal of East Asian Linguistics* 15. 97–136. doi:10.1007/s10831-005-4916-5.

Lee, Thomas. 1986. *Studies on quantification in Chinese*: University of California, Los Angeles dissertation.

Li, Charles N. & Sandra Thompson. 1981. *Mandarin Chinese: a functional reference grammar*. Berkeley: University of California Press.

Li, Yen-hui Audrey. 1985. *Abstract case in Chinese*: University of Southern California dissertation.

Li, Yen-Hui Audrey. 1990. *Order and constituency in Mandarin Chinese*, vol. 19 Studies in natural language and linguistic theory. Kluwer Academic Publishers.

Liao, Hsiu-Chen. 2011. *Alternatives and exhaustification: Non-interrogative uses of Chinese* Wh-*words*: Harvard University dissertation.

Lin, Jo-Wang. 1996. *Polarity licensing and wh-phrase quantification in Chinese*: University of Massachusetts Amherst dissertation.

Lin, Jo-Wang. 1998. Distributivity in Chinese and its implications. *Natural Language Semantics* 6. 201–243.

Lin, Jo-Wang. 2003a. Aspectual selection and negation in Mandarin Chinese. *Linguistics* 41(3). 425–459.

Lin, Jo-Wang. 2003b. Temporal reference in Mandarin Chinese. *Journal of East Asian Linguistics* 12. 259–311.

Lin, Jo-Wang. 2006. Time in a language without tense: The case of Chinese. *Journal of Semantics* 23. 1–53.

Link, Godehard. 1983. The logical analysis of plurals and mass terms: a lattice-theoretic approach. In R. Bauerle et al. (ed.), *Meaning, use and the interpretation of language*, 302–323. De Gruyter.

Löbner, Sebastian. 1989. "schon-erst-noch": an integrated analysis. *Linguistics and Philosophy* 12(2). 167–212.

Lü, Shuxiang (ed.). 1980. *Xiandai hanyu ba bai ci*. HongKong: The Commerical Press.

Maienborn, Claudia. 2001. On the position and interpretation of locative modifiers. *Natural Language Semantics* 9. 191–240.

Maienborn, Claudia. 2005. On the limits of the Davidsonian approach: the case of copula sentences. *Theoretical Linguistics* 31. 275–316.

McCawley, James D. 1994. Remarks on the syntax of Mandarin yes-no questions. *Journal of East Asian Linguistics* 3(2). 179–194.

Mittwoch, Anita. 1977. Negative sentences with *until*. In Woodford A. Beach, Samuel E. Fox & Shulamith Philosoph (eds.), *Proceedings of CLS 13*, 410–417.

Montague, Richard. 1973/1974. The proper treatment of quantification in ordinary English. In Richmond H. Thomason (ed.), *Formal philosophy: Selected papers of Richard Montague*, 17–34. Yale University Press.

Nunes, Jairo. 1995. *The copy theory of movement and linearization of chains in the Minimalist Program*: University of Maryland, College Park dissertation.

Ouhalla, Jamal. 1991. *Functional categories and parametric variation*. London: Rout-

ledge.

Partee, Barbara & Mats Edward Rooth. 1983. Generalized conjunction and type ambigu-
ity. In Rainer Bäuerle, Christoph Schwarze & Arnim von Stechow (eds.), *Meaning,
use and the interpretation of language*, 361–393. Walter de Gruyter & Co. Reprinted
in Portner, Paul and Barbara H. Partee (eds), *Formal Semantics: The Essential
Readings*, pp. 334-356; 2002 by Blackwell Publishers Ltd.

Pesetsky, David & Esther Torrego. 2007. The syntax of valuation and the interpretability
of features. In Simin Karimi, Vida Samiian & Wendy K. Wilkins (eds.), *Phrasal and
clausal architecture: syntactic derivation and interpretation in honor of Joseph E.
Emonds*, 262–294. Amsterdam, NLD: John Benjamins Publishing Company.

PKU, CCL. 2009. Center for Chinese Linguistics PKU Corpus. Accessed in December,
2013. http://ccl.pku.edu.cn:8080/ccl_corpus/.

Pollock, Jean-Yves. 1989. Verb movement, universal grammar, and the structure of IP.
Linguistic Inquiry 20(3). 365–424.

Potts, Christopher. 2003. *The logic of conventional implicatures*: University of California,
Santa Cruz dissertation.

Progovac, Ljiljana. 1994. *Negative and positive polarity*. Cambridge University Press.

Rawlins, Kyle. 2013. (un)conditionals. *Natural Language Semantics* 40. 111–178.

Rizzi, L. 1990. *Relativized minimality*. MIT Press.

Ross, John Robert. 1967. *Constraints on variables in syntax*: MIT dissertation.

Schwarzschild, Roger. 1991. *On the meaning of definite plural noun phrases*: University
of Massachusetts Amherst dissertation.

Schwarzschild, Roger. 1996. *Pluralities*, vol. 61 Studies in linguistics and philosophy.
Kluwer Academic Publishers.

Shyu, Shu-Ing. 1995. *The syntax of focus and topic in Mandarin Chinese*: University of
Southern California dissertation.

Simpson, Andrew. 2015. Verbal answers to yes/no questions, focus, and ellipsis. In Wei-Tian Dylan Tsai Audrey Li, Andrew Simpson (ed.), *Chinese syntax in a cross-linguistic perspective*, 300–333. Oxford University Press.

Simpson, Andrew & Zoe Wu. 2002. From D to T - determiner incorporation and the creation of tense. *Journal of East Asian Linguistics* 11. 169–209.

Smith, Carlota S. 1991. *The parameter of aspect*. Dordrecht, The Netherlands: Kluwer.

Smith, Carlota S. 1997. *The parameter of aspect*. Dordrecht; Boston: Kluwer.

Smith, Carlota S. & Mary S. Erbaugh. 2005. Temporal interpretation in Mandarin Chinese. *Linguistics* 43(4). 713–756.

Soh, Hooi Ling & Meijia Gao. 2008. Mandarin sentential *-le*, perfect and English *already*. In Johannes Dolling, Tatjana Heyde-Zybatow & Martin Schafer (eds.), *Event structures in linguistic form and interpretation*, 447–473. Walter de Gruyter.

Sun, Hongyuan. 2014. *Temporal construals of bare predicates in Mandarin Chinese*: Leiden University dissertation.

de Swart, Henriëtte. 1996. Meaning and use of *not...until*. *Journal of Semantics* 13. 221–263.

Sybesma, R. P. E. 2007. Whether we tense-agree overtly or not. *Linguistic Inquiry* 38(3). 580–587.

Sybesma, Rint. 1997. Why Chinese verb *-le* is a resultative predicate. *Journal of East Asian Linguistics* (215-261).

Tan, LeKun. 2012. The usage of Taiwanese *U* and Mandarin *You* as a result of language contact between Taiwanese and Taiwan Mandarin. *Taiwan Xuezhi (Monumenta Taiwanica)* 5. 1–26.

Tao, Hongyin & Richard Xiao. 2012. *The UCLA Chinese Corpus (2nd edition)*. Lancaster: UCREL. http://www.lancs.ac.uk/fass/projects/corpus/UCLA/.

Tarski, A. 1935/1956. Der Wahrheitsbegriff in den formalisierten Sprachen (1935). In

Logic, semantics, metamathematics, 152–278. Oxford University Press.

Teng, Shou-Hsin. 1973. Negation and aspects in Chinese. *Journal of Chinese Linguistics* 1(1). 14–37.

Teng, Shou-Hsin. 1975. Predicate movements in Chinese. *Journal of Chinese Linguistics* 3(1). 60–75.

Teng, Shou-Hsin. 1977. Modification and the structures of existential sentences, 175–183. Reprinted in *Studies on Modern Chinese Syntax*, 2005. First published in Symposium on Chinese Linguistics, pp 197-210. Taiwan: Student Books Co.

Travis, Lisa deMena. 2010. *Inner aspect*. Springer.

Tsai, Cheng-Yu Edwin. 2014. Unifying Mandarin *dou*-constructions. NELS 45 Poster Abstract.

Tsai, Wei-Tien Dylan. 2001. On subject specificity and theory of syntax-semantics interface. *Journal of East Asian Linguistics* 10(2). 129–168.

Tsai, Wei-Tien Dylan. 2002. *You* 'have' in Taiwan Mandarin and dialects– on the social and historical aspects of grammatical theories. *Tsing Hua Xue Bao ('Tsing Hua Journal of Chinese Studies')* 32(2). 495–528.

Tsai, Wei-Tien Dylan. 2008a. Left periphery and *how-why* alternations. *Journal of East Asian Linguistics* 17(2). 83–115.

Tsai, Wei-Tien Dylan. 2008b. Tense anchoring in Chinese. *Lingua* 118. 675–686.

Verkuyl, H. J. 2008. *Binary tense*. CSLI Publications.

Wang, William S-Y. 1965. Two aspect markers in Mandarin. *Language* 41(3). 457–470.

Xiang, Ming. 2005. *Some topics in comparative constructions*: Michigan State University dissertation.

Xiang, Ming. 2008. Plurality, maximality and scalar inferences: a case study of Mandarin *Dou*. *Journal of East Asian Linguistics* 17. 227–245.

Xiang, Yimei. 2015. Mandarin particle *dou*: A pre-exhaustification operator over sub-

alternatives. EACL9 Handout.

Xiao, Hang & Guang-Jin Jin. 2013. Yu liao ku zai xian (*Corpus online*). online. http://www.cncorpus.org/login.aspx.

Xu, Liejiong. 1985-1986. Towards a lexical-thematic theory of control. *Linguistic Review* 5. 345–376.

Zanuttini, Raffaella. 1991. *Syntactic properties of sentential negation. a comparative study of Romance languages*: University of Pennsylvania dissertation.

Zimmerman, Malte. 2011. Discourse particles. In Klaus von Heusinger, Claudia Maienborn & Paul Portner (eds.), *Semantics (hsk 33.2)*, chap. 76., 2011–2038. De Gruyter.