Toward a Theory of Mandarin Quantification

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Toward a Theory of Mandarin Quantification

A dissertation presented

by

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to

The Department of Linguistics

in partial fulfillment of the requirements

for the degree of

Doctor of Philosophy

in the subject of

Linguistics

Harvard University

Cambridge, Massachusetts

April 2015

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Toward a Theory of Mandarin Quantification

Abstract

The goal of this dissertation is to show that certain puzzles in the syntax and semantics of Mandarin quantification can be explained from the perspective of Hamblin semantics. Following Kratzer and Shimoyama (2002), it is proposed that certain Mandarin quantificational expressions (including *wh*-phrases, numeral phrases, and strong quantificational phrases) denote sets of individual alternatives. They expand to sets of propositions in a pointwise manner and are selected by propositional operators. The distribution and interpretation of Mandarin quantificational expressions are constrained by the way alternatives interact with associated operators.

Chapter 1 illustrates a number of issues in the behavior of Mandarin existential *wh*-phrases and numeral phrases, which cannot be easily explained by previous accounts. Chapter 2 investigates the properties of three logical operators *háishì*, *huòshì* and *háiyǒu*, which provide the initial motivation for a Hamblin-style approach to the system of Mandarin quantification. It is argued that these three operators make a case for reading off Hamblin alternatives directly from the clausal syntax, and that, based on evidence from morphology and existential construal, *wh*-phrases in Mandarin pattern together with *háishì*-disjunctions and thus should receive a uniform semantic treatment.

All types of quantificational expressions discussed in the first two chapters interact with the preverbal particle *dōu* in one way or another, and thus this element plays a special role in Mandarin quantification. Chapter 3 critically reviews three influential theories on *dōu*: Shyu's (1995) focus-based theory, Lin's (1996) distributivity-based theory, and Giannakidou and Cheng's (2006) maximality-based theory. Chapter 4 is devoted to a novel proposal on the syntax and semantics of *dōu*, where it is argued that syntactically *dōu* is a modal head that agrees with a universal quantifier that collects alternatives introduced by the quantificational phrase to its left, and semantically provides existential quantification over possible worlds. It is shown that this proposal allows for a

uniform account of *dōu* across different *dōu*-constructions, per the Hamblin-style analysis of quantificational phrases across-the-board.

Finally, Chapter 5 reexamines the interpretations of existential *wh*-phrases and argues that in the few cases discussed the existential reading comes from not the c-commanding operator in the surface structure but from an invisible operator that collects alternatives. This operator is introduced into the syntax via agreement with the preverbal particle *jìu*, which is a related element to *dōu* and is overt in some of the cases at hand but not in others. Further consequences of the present approach to the behavior of NumPs and strong quantifier phrases are also discussed.

Contents

Acknowledgments

The completion of this dissertation is not possible without the help and support from many individuals. My deepest gratitude goes to my advisor Jim Huang ("Huang Laoshi"). Jim is an admirable scholar, mentor, and teacher, whose work and passion have largely shaped my thoughts about research and being a researcher. I thank him for spending many hours discussing my projects with me, listening to my crazy and wild ideas, and pulling me back on the right track each time. Meanwhile, I am grateful for Jim giving me a lot of freedom to explore my own interests and topics. It has been a privilege to be his student.

I would like to thank my other committee members, Isabelle Charnavel, Shigeru Miyagawa and Masha Polinsky, for their insights, time and encouragement during the course of writing. Their questions and comments forced me to rethink and rebuild my arguments and analyses. It was a great pleasure to be able to learn from them.

I am indebted to Michael Becker, Isabelle Charnavel, Gennaro Chierchia, Amy Rose Deal, Irene Heim, Jim Huang, Jay Jasanoff, Brad Larson, Shigeru Miyagawa, Andreea Nicolae, Masha Polinsky, Nina Radkevich, and Kevin Ryan, with whom I am very fortunate to have taken/attended classes. Their intellectual input and influence are gratefully acknowledged. I particularly thank Gennaro and Amy Rose for their joint seminar in fall 2011 that led me into the wonderland of quantification, and Masha for guiding me into experimental linguistics.

My sincere thanks are also due to Lisa Cheng, Chris Collins, Howard Lasnik, Omer Preminger, Satoshi Tomioka, Dylan Tsai, John Whitman, and Ming Xiang for discussions and comments at different stages of my writing.

My colleagues have been an important part of my life at Harvard: Cristina Aggazzotti, Dorothy Ahn, Sun-Hee Bae, Laurence ("Lo") B-Violette, Gašper Beguš, Lena Borise, Lauren Eby Clemens, Hannes Fellner, Zuzanna Fuchs, Aurore Gonzalez, Laura Grestenberger, Yuyin He, Yujing Huang, Julie Jiang, Sverre Johnsen, Caitlin Keenan, Alex Klapheke, Tyler Lau, Jenny Lee, Daphne Liao, Louis Liu, Marek Majer, Dora Mihoc, Hiroki Narita, Andreea Nicolae, Dennis Ott, Pooja Paul, Hazel Pearson, Patrick Rich, Jacopo Romoli, Greg Scontras, Laine Stranahan, Yimei Xiang, and Chrissy Zlogar. I thank them for making the Department of Linguistics a lovely, supportive and fun community. Special thanks to Yimei for her friendship in these five years and countless hours of conversations about linguistics and many other things.

I appreciate helpful discussions with Ting-Chun Chen, Noah Constant, Michael ("mitcho") Erlewine, Annie Gagliardi, Jing Jin, Ken Mai, Chieu Nguyen, and Zheng Shen.

I thank the department administrators Holly Jones, Helen Lewis, Cheryl Murphy, and Kate Pilson for their generous assistance in various aspects. Helen, you are truly missed.

To my former advisor, Dylan Tsai, and former teachers at National Tsing Hua University and National Chiao Tung University, thank you for introducing me into different areas of linguistics. To Lichu Lin and Shin-Tza Wu at National Chung Cheng University, thank you for your encouragement throughout the years.

Beyond academics, I would like to thank Jim and Emily ("Shimu") for their generosity and hospitality. To Alicia Chi, Phoebe Hsieh, Louis Liu, Che-Hang Yu, and everyone in the HTROCSC, thank you for your warm friendship.

I have been extremely lucky to have more than a few extended family members around the Boston area and East Coast. Thank you, uncle Jer-Yuan and auntie Katie, for your caring and helping me settle down when I came to the U.S. five years ago. Thank you, Miao, Janice and Joy for being such great cousins to hang out with. Thank you, Jo, Sean, Tom, Gloria, Ben and Gabby for a memorable Christmas. Thank you, Vicki, Robert, Leonard and Alicia for giving me more family memories and laughters.

Finally, nothing I have now would be possible without the unconditional support and love from my parents, Che-Jen and Hsiu-Chin, and sister, Yu-Chieh. My gratitude to them is beyond words.

For my parents and sister

Chapter 1

Reassessing Mandarin quantification

1.1 Goal of this dissertation

This dissertation is an attempt to show that Kratzer and Shimoyama's (2002) Hamblin-style approach is desirable and consequential to the understanding of Mandarin quantification, in particular the meaning and structure of the following:

- certain conjunctive and disjunctive expressions;

- quantificational phrases (including numeral phrases and strong quantifiers); and

- various *dōu*-constructions.

It will be demonstrated that several types of quantificational phrases in Mandarin do not behave the way predicted by existing accounts, and that such phrases show morphosyntactic connection to a number of conjunctive and disjunctive markers. These together motivate the present approach. A significant portion of this dissertation is devoted to the unification of *dōu*-quantification, one of the most persistent topics in the generative studies of Mandarin grammar. It will be argued that *dōu* is a modal that consistently interacts with a preceding expression which denotes a set of Hamblin alternatives.

1.2   A reassessment of interrogative *wh*-phrases

I would like to begin with a well known and much discussed issue in the study of Mandarin quantification: the syntax of interrogative and non-interrogative *wh*-phrases.

1.2.1   *Wh*-phrases in Mandarin

Many researchers since Huang (1982a,b) have touched on the syntax and semantics of Mandarin as a *wh*-in-situ language. In addition to interrogative uses, *wh*-expressions in Mandarin also have non-interrogative uses, which in many ways pattern with the "indeterminates" in Japanese (Kuroda 1965).[1] In particular, Mandarin *wh*-phrases may have interrogative, existential or universal interpretation depending on the licensing conditions.

The following examples demonstrate *wh*-in-situ of Mandarin *wh*-questions, including the argumental 'what' and 'who' and adverbial 'where' and 'why.'

(1)   a.   Ni   zai   chi shenme (dongxi)?
           you PERF eat what   thing
           'What are you eating?'

      b.   Lisi xihuan shei?
           Lisi like   who
           'Who does Lisi like?'

      c.   Ni   zuotian   zai nali   chi wancan?
           you yesterday   at where eat dinner
           'Where did you have dinner yesterday?'

      d.   Ni   zuotian   weishenme mei-you   lai?
           you yesterday   why   not-have come
           'Why didn't you come yesterday?'

One crucial observation on Mandarin in-situ *wh*-phrases is that they come in two types. Those in one type do not seem to obey island constraints, which raises the question of whether they undergo *wh*-movement or not. The *wh*-question (2) exemplifies the fact that *shei* 'who' can take scope out of a CNPC:

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[1] Cheng (1991, 1995), Li (1992), Aoun and Li (1993), Tsai (1994), Cheng and Huang (1996), Lin (1996, 1998b), Dong (2009), He (2011), Liao (2011) and many others.

(2) Ni mai-le   [$_{DP}$ [$_{CP}$ shei xie e_i] de shu$_i$]?   (Huang 1982a: 493)
    you buy-PERF   who write   REL book
    'Who is the x such that you bought books that x wrote?'

Shei can also escape *Wh*-Island:

(3) Ni xiang-zhidao [$_{CP}$ shei mai-le   sheme]?   (Huang 1982a: 267)
    you want-know   who buy-PERF what
    a. 'Who is the x such that you wonder what x bought?'

    b. 'What is the x such that you wonder who bought x?'

On the other hand, the *wh*-expressions of the other type do observe island effects. The adverbs *weishenme* 'why' and *zenme* 'how' belong to this type.

(4) a.   * [$_{NP}$ [$_S$ Ta weishenme xie]   de shu] zui   youqu?   (Huang 1982a: 527)
              he why   write DE book most interesting
          'Books that he wrote why are most interesting?'

     b.   * [$_{NP}$ [$_S$ Ta zenme xie]   de shu] zui   youqu?
              he how   write DE book most interesting
          'Books that he wrote how are most interesting?'

The analysis on Mandarin *wh*-questions proposed by Huang (1982a) maintains that they in fact move at the level of LF but such covert operation is immune to island constraints (Subjacency), and that the *wh*-adverbs in (4) are exceptions to this paradigm, the behaviors of which are explained via the Empty Category Principle (ECP, Chomsky 1981).[2]

A different approach is advocated by Tsai (1994), which allows Mandarin *wh*-expressions to stay in-situ even at LF except those in (4).[3] The way this is achieved is by adopting the theory of *unselective binding* originally proposed by Lewis (1975) that is later developed by Heim (1982) for English indefinites and by Pesetsky (1987) for non-moved *which*-phrases in English multiple *wh*-questions. Under Tsai's (1994) reinterpretation of Heim's and Pesetsky's analysis, Mandarin *wh*-phrases are Heimian variables associated with a CP-level Q-operator via unselective binding. They have no quantificational force or interrogative meaning on their own. Since *wh*-phrases do not move at all, no island effects are expected.

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[2]This view has been changed since Fiengo et al. (1989); see Huang et al. 2008: Section 7.4.3 for further elaborations.

[3]Tsai (1994) makes a finer distinction among several uses of *zenme* 'how' and claims that only a subclass of them are subject to locality. See Stepanov and Tsai 2008 and Tsai 2008a for in-depth discussions on island-sensitive *wh*-adverbs.

(5) $Q_x \ldots [_{\text{matrix clause}} \ldots [_{\text{island}} \ldots \textbf{\textit{wh}}(x) \ldots] \ldots]$

        unselective binding

At the same time, unselective binding also allows certain *wh*-adverbs as exceptions to this binding mechanism, given that they are not categorically nominal and thus do not qualify as variables for binding.

Tsai's (1994) treatment based on unselective binding provides a straightforward explanation for the non-interrogative uses of Mandarin *wh*-expressions. Consider the examples in (6):

(6)   a. Ta bu xiang chi shenme.   (Huang 1982a: 242)
            he not want eat what
            'He didn't want to eat <u>anything</u>.'

       b. Shei dou xihuan ta.   (Huang 1982a: 244)
            who DOU like   he
            '<u>Everyone</u> likes him.'

       c. Ta yiwei wo xihuan shenme.   (Li 1992: 125)
            he think I   like   what
            'He thinks I like <u>something</u>.'

As Huang (1982a), Cheng (1991), Li (1992) and many others have observed, there is a variety of contexts where *wh*-words give rise to non-interrogative interpretations, including (negative) polarity, universal and existential, as shown in (6). In these cases, the occurrence of *wh*-expressions must be licensed in appropriate environments (e.g. in the scope of negation). The theory of unselective binding provides a unifying solution of both interrogative and non-interrogative *wh*-phrases by treating them as variables to be bound by operators of different sorts ($\exists$, $\forall$, or Q), though "binding" and "licensing" still need to be properly distinguished.

1.2.2 A historical perspective

As alluded to earlier, unselective binding is adopted by Heim (1982) for indefinites. There, indefinites are variables whose quantificational force can vary with adverbs of quantification (Q-adverbs), i.e., unselective binders. Pesetsky (1987) makes use of unselective binding in his analysis of the so-called *D-linked wh*-phrases that do not undergo overt movement. His claim is basically that in-situ *wh*-phrases are bound by a Q-operator in the sense of Baker 1970 in much the same

way as a Heimian indefinite is bound by an unselective binder. This binding mechanism is applied to the system of Japanese indeterminates by Nishigauchi (1990). Tsai (1994) follows this line of thought and develops an unselective binding approach for Mandarin *wh*-quantification, as mentioned.

One should notice that the Lewis-Heim unselective binding approach is *not* developed for *question meaning* per se. Rather, one major motivation behind unselective binding is the *quantificational variability effects* (QVEs) of indefinites in, e.g., (7):

(7) If a man owns a donkey, he always/usually/sometimes/seldom beats it.

In the Lewis-Heim treatment, indefinites such as *a man* introduce a "novel" variable to be bound by the Q-adverb, from which they obtain quantificational force. Importantly, Heim also analyzes pronouns such as *it* and *him* in (8) as being able to be bound by a Q-adverb (or Existential Closure), though the Novelty Condition of indefinites is not applicable to pronouns.

(8) If a cat likes a friend of mine, I always give it to him.

Note that neither *wh*-in-situ nor Baker's (1970) Q-morpheme plays a role in this framework, since Heim does not discuss interrogative pronouns at all.

As Pesetsky (1987) establishes the connection between *wh*-in-situ and Baker's Q-morpheme, he is aware that the similarity existed not between indefinites and D-linked *which*-phrases but between *pronouns* and *which*-phrases, in that both introduced "familiar" entities into the discourse (Pesetsky 1987: 119–120). This was a plausible move at that time when E-type pronouns (Evans 1980) were treated along with indefinites, which could be bound by the same unselective binder for indefinites, as in (9).

(9) $\exists_i$ [Some men$_i$ walked in the room. They$_i$ were wearing fur coats].

That is, the parallalism between Heim's and Pesetsky's uses of unselective binding (by Q-adverbs vs. by Baker's Q-morpheme) is based upon the referential properties of (E-type) pronouns and D-linked *wh*-phrases, respectively. But nothing beyond. For Pesetsky, there is *no* indication of whether Heimian indefinites, which exhibit QVEs, should pattern with *wh*-words, nor is there any consequence for the relation between the referentiality of pronouns/*which*-phrases and the meaning of questions. He is quite explicit about this limitation:

"There is thus a natural connection between *which*-phrases and one instance of unselective binding—namely, the discourse binding seen with pronouns. The connection between this discourse binding and the interpretation of questions, however, remains to be drawn." (Pesetsky 1987: 120)

In effect, Pesetsky's interpretation of Baker's Q-morpheme is correlated with, and *only* with, the D-linkedness shared between *which*-phrases and (E-type) pronouns rather than question interpretation. On the other hand, the unselective binders in Heim's system, i.e., Q-adverbs, is associated with *quantificational force*, not long-distance/wide existential scope or question interpretation. (DRT treats indefinites as *variables* but not *referential* expressions.) Hence, the Q-morpheme and Q-adverbs have very different characters in their original formulations, despite the same label "unselective binder."

In short, only when E-type pronouns are analyzed as "familiar" indefinites (or bound variables) can we maintain the parallelism between the two versions of unselective binding in Heim 1982 and Pesetsky 1987, as the D-linking analysis actually distinguishes *which*-phrases from variable-like nonreferential indefinites. Nevertheless, such parallelism breaks down when E-type pronouns are no longer treated as bound variables but instead as definite descriptions (Heim 1990, Elbourne 2005). Pesetsky's observation about the D-linkedness of *wh*-in-situ still holds, but the analysis that hinges heavily on the analogy between the Q-morpheme and Q-adverbs seems no longer valid.

Recall that the unselective binding approach for Mandarin *wh*-phrases is intended to capture the fact that they can be interrogative or non-interrogative expressions; as the former they can obtain interrogative scope out of an island, and as the latter they are on a par with polarity items which need a licensor. However, these phenomena are essentially orthogonal to the coverage of either Heim's (1982) or Pesetsky's (1987) proposal; question meaning and NPI-like properties are irrelevant to what unselective binding was initially designed for.

This much is the historical reason that makes me agnostic and worried about the unselective binding treatment of Mandarin *wh*-phrases. Note that this is not a knockdown argument against it; it could very well be the case that unselective binding turns out to be the right analysis for Mandarin *wh*-quantification despite the fact that the latter has an entirely different set of phenomena. The key question here is whether unselective binding makes any wrong predictions.

Reinhart (1997, 1998) points out that unselective binding faces empirical problems if we look

closely at the interpretation. Consider (10a), where the *which*-phrase is in the *if*-clause (an island). The semantic representation of unselective binding is shown in (10b).

(10) a. Who will be offended if we invite which philosopher?

b. $\{p : \exists x \exists y \land p = \text{we invite } y \land y \text{ is a philosopher} \rightarrow x \text{ will be offended}\}$

Reinhart notes that (10b), where the restriction part of *which philosopher* remains in the antecedent, yields the wrong truth condition: anything that is not a philosopher will render (10b) true because the antecedent of the conditional implication is false. Note that this is not just one accidental case in which unselective binding happens to fail; it is a logical consequence from the design of this theory, which predicts wrong interpretations in all downward entailing contexts (Reinhart 1997: 364). (10a) is just one of them. This is a dilemma when unselective binding is seriously considered: on the one hand, the in-situ and variable-like characteristics of Mandarin *wh*-phrases are just so pervasive that the traditional existential-quantifier analysis of Karttunen (1977) seems empirically unmotivated; on the other hand, letting the NP-restriction of a *wh*-expression part from the existential quantifier derives the wrong meaning, as discussed.[4]

1.2.3 Rethinking wide-scope *wh*-phrases

Now, in the previous section I mentioned that Mandarin *wh*-arguments can access matrix scope out of an island, cf. (2). Consider another example in (11):

(11) Lisi xihuan [$_{NP}$ [$_{CP}$ shei xie e_i] de   shu$_i$]?
Lisi like   who write   REL book
Lit. 'Lisi likes the book that who wrote?'

The absence of island effects in cases like (11) has been claimed to be a strong argument for unselective binding (if LF-movement is constrained by locality; cf. Huang 1982a). However, there is evidence that (11) actually does *not* show exceptional wide *wh*-scope, contra the usual assumption. The crucial observation is that (11) is not equivalent to (12), where the *wh*-word *shei* 'who' is in the (post-copular position of the) main clause:

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[4]It is in fact quite unclear how the "Q-operator" in the unselective binding approach should be interpreted in semantics; see Dong 2009 for a detailed discussion.

(12) [$_{NP}$ Lisi xihuan de shu$_i$] shi shei xie t_i de?
       Lisi like   REL book be who write   DE
       'Who is it that wrote the book that Lisi likes?'

How do we know (11) and (12) are different? In the scenario described in (13), we find that (12) is a felicitous question for you to ask, whereas (11) is not.[5]

(13) Zhangsan says Lisi has recently spent days reading a book that he likes a lot. You wonder who wrote that book.

Intuitively speaking, the reason why (11) is judged incompatible with this scenario is that the former strongly prefers the established existence of multiple authors and the respective books they wrote. In other words, (11) is an inquiry of the true answer from a set of options such as those in (14) (assuming for simplicity that each author wrote exactly one book):

(14) {the book John wrote, the book Mary wrote, the book Bill wrote, . . . }

Since in the scenario (13) only one book is made salient, the requirement that a set such as (14) be relevant is not met, thus the infelicity. By contrast, (12) does not impose such requirement. This difference suggests that (11) and (12) are indeed different, which turns out to be a puzzle if the *wh*-word takes matrix scope in (11) like the one does in (12).

We should note that (11) is actually not a question about the identity of the author; instead, by uttering (11) the speaker inquires *which book Lisi likes* by asking the hearer to identify the author of the book Lisi likes. That is to say, (11) is more like a *which*-question on books, one that requires a non-singleton set of books be under discussion. (12), on the other hand, is an ordinary *who*-question; as long as there is more than one book-author in the world, (12) is felicitous. This observation again indicates that (11) does not exhibit long-distance *wh*-scope; rather, the *wh*-word seems to take scope *inside* the Complex NP Island. This is not predicted by unselective binding. Moreover, (11) should not be given a translation like 'Who is x such that Lisi likes the book that x wrote?', a meta-language often employed in the literature for similar "wide-scope" constructions. The reason is that such translation poses no restriction on the *wh*-phrase and does not faithfully reflect the factual difference between (11) and (12).

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[5]I attribute the observation to Zheng Shen (p.c.) that contextual settings like (13) can be used to show the absence of wide *wh*-scope of (11) and similar island-embedding cases.

The distinction of (11) vs. (12) has not been discussed anywhere in the literature, as far as I am aware, let alone any consensus on how to best account for these cases. Nevertheless, what we can take from the above discussion is that the question meaning of a *wh*-construction does *not* always entail that the *wh*-phrase therein takes widest scope per se. If the question meaning of a *wh*-construction can be associated with a larger constituent containing a *wh*-phrase, it is no longer necessary for the *wh*-phrase to appear in CP (as in the LF-movement approach) or to directly connect to something in CP (as in the unselective binding approach) to derive the question meaning (though something in a *wh*-sentence still needs to be connected to C).

My conclusion is that the mysterious wide-scope or long-distance phenomena in Mandarin *wh*-constructions should be reevaluated with a better understanding of what exactly "wide scope" means in the semantic component for any Mandarin *wh*-question where the *wh*-phrase does not occur in the matrix clause. In the end, one should not be surprised if unselective binding, an approach that seems more suitable for Mandarin-type *wh*-constructions than covert *wh*-movement, turns out to be unrelated to question meaning, since the latter was not what unselective binding was intended to capture in the first place. However, that a *wh*-construction with an embedded *wh*-expression can be understood as a question is still a fact that has to be addressed.

1.3 A reassessment of non-interrogative *wh*-phrases

As mentioned earlier, the variety of non-interrogative uses of *wh*-expressions in Mandarin calls for the view that treats them as "variables," however this term is cashed out. The insight of the studies on this area is that Mandarin *wh*-phrases pattern with polarity items in that their quantificational force co-varies with licensing operators (Huang 1982a, Cheng 1991, Li 1992).

1.3.1 Existential *wh*-phrases

Based on findings from previous studies, Lin (1998b) classifies the licensing environments of Mandarin existential *wh*-items into three major groups (see the references in footnote 1):

- Group A: Negation, non-*wh*-questions, and *if*-clauses
- Group B: Epistemic modality environments
- Group C: Some sort of "future" environments

The environments in Group A are among the representative affective contexts which are known to license negative polarity items (NPIs). Some examples are given in (15).

(15) a. *Negative context*:   (Lin 1998b: 220)

   Wo **mei** mai shenme (dongxi).
   I   not buy what   thing
   'I didn't buy anything.'

   b. *Conditional clause*:

   Yaoshi shei/shenme ren   qifu   ni, . . .
   if   who/what   man bully you
   'If somebody bullies you. . .'

   c. *Yes-no question*:

   Shei you   qifu ni   le   **ma**?
   who again bully you PERF Q
   'Did somebody bully you again?'

The second group comprise epistemic adverbs/modals/verbs, the "inference" aspectual marker *le* and nonfactive verbs (Li 1992). Relevant examples are shown in (16) below.

(16) a. *Epistemic adverb/modal*:   (Lin 1998b: 223)

   Ta **yiding**/**dagai**   shi bei shenme shi   gei dange-le.
   he must/probably be   by what   thing by delay-PERF
   'He must/probably have been delayed by something.'

   b. *Epistemic verb*:

   Kongpa ta you shenme hua   yao   shuo.
   afraid   he have what   word want say
   'I am afraid that he has something to day.'

   c. *Inference* le: (Li 1992: 133)

   Ta kandao shenme **le**.
   he see   what   PERF
   'He saw something.'

   d. *Nonfactive verb*:   (Li 1992: 129)

   Zhangsan **yiwei**/**renwei** wo mai-le   shenme (keshi wo genben mei mai renhe dongxi).
   Zhangsan think/think   I buy-PERF what   but I   at.all   not buy any   thing
   'Zhangsan thinks that I bought something (but I didn't buy anything at all).'

Group C involves a diverse set of contexts such as VP-complements of certain modal expressions and attitude verbs, imperatives, and consequent clauses that refer to the future. The examples in (17) belong to this third group.[6]

(17) a. *Modal verbs*: (Lin 1998b: 225)

Wo mingtian **hui** qu mai *(ge) shenme dongxi song ta de.
I   tomorrow will go buy   CL what   thing   give he DE
'I will go to buy something for him.'

b. *Imperatives*: (Lin 1998b: 226)

(Nimen) shei qu bang wo na   ge diezi lai.
 you   who go help me take CL plate come
'Somebody go to get a plate for me.'

c. *Verb complements of 'want'*:

Wo **xiang** chi *(dian) shenme (dongxi).
I   want eat   CL   what   thing
'I want to eat something.'

d. *Consequent clauses*: (Lin 1998b: 227)

Ni yaoshi bu fangxin dehua, jiu **jiao/zhao** *(ge) shei pei   ta yiqi   qu.
you if   not relax   if   then ask/find   CL who accompany him together go
'If you are anxious, ask somebody to accompany him.'

One important feature that distinguishes Group C from the other two is the general (though not absolute) requirement that a classifier-like element (e.g. *dian*) co-occur with the existential *wh*-phrase.[7]

Based on the given data, Lin (1998b: 230) suggests that the licensing environments of Mandarin existential *wh*-phrases can be captured by the *Non-Entailment-of-Existence Condition* in (18) (where EPW stands for "existential polarity *wh*-phrase").[8]

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[6]Strictly speaking, "consequent clauses" as exemplified by (17d) do not constitute an independent category, for (17d) could be regarded as an imperative.

[7]This last group is possibly related to the use of *wh*-phrases in Mandarin as "*wh*-placeholders" discussed by Cheung (2014). Such *wh*-expressions typically consist of a demonstrative, a classifier and a *wh*-word.

[8]Jim Huang points out to me that Lin's NEEC is closely related to the *nonveridicality* condition of Giannakidou (1998, 1999). Whether the licensing conditions of Mandarin existential *wh*-phrases can be recast in terms of (non)veridicality is an issue that I am unable to address here.

(18) Non-Entailment-of-Existence Condition on EPWs (NEEC)

The use of an EPW is felicitous iff the proposition in which the EPW appears does not entail existence of a referent satisfying the description of the EPW.

Structurally, the existential *wh*-phrases in all the data above occur in the scope of a relevant licensing operator, and in this sense their relation is akin to that of a variable and its binder (Li 1992).[9] Where an overt operator does not precede the *wh*-item (e.g., a sentence-final question particle), one may assume that the latter is still within the c-commanding domain of the former.

Having briefly reviewed the general facts of Mandarin EPWs, I would now like to point out five potential problems, most of which apply generally to the current literature of Mandarin EPWs and not specifically to Lin 1998b.

I. Other modal/attitudinal contexts. Given the way the NEEC is described, EPWs will be licensed in other kinds of modal contexts than the epistemic ones as well, since the existence of the referent of an EPW will generally not be entailed in modal contexts. This wrongly predicts that deontic/dynamic modality concerning permission/ability can also license an EPW, which is however not borne out:

(19) a. % Lisi keyi/bixu mai shenme (dongxi).
          Lisi can/must buy what   thing
          Intended: 'Lisi$_{deo}$/must$_{deo}$ buy something/anything.'

      b. % Lisi neng/ken ban   shenme (dongxi).
          Lisi can/willing move what   thing
          Intended: 'Lisi can$_{dyn}$/is willing to move something/anything.'

Clausal complements of some attitude verbs like 'hope' do not entail the existence of the referent of an EPW, either, but they do not license an EPW if without the classifier *dian*:

(20) % Wo xiwang ta mai-le   shenme (dongxi).
        I hope   he buy-PERF what   thing
        Intended: 'I hope he bought something.'

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[9]It should be clarified that the "variable-binder" relation of the licensing operator and an EPW should be taken as a metaphor at best but not its literal sense, because an EPW is not directly bound by its licensor. Instead, it is bound by an existential quantifier *introduced by the licensor*. In other words, there is only one quantifier that binds the *wh*-variable in the EPW-licensing environments—the existential quantifier.

II. The role of classifiers. There is a non-negligible correlation between the presence of a classifier and the existential interpretation in Group C environments. As Lin (1998b: 249) himself acknowledges, "it might be that a classifier is added to bring out the narrow scope existential reading and suppress the interrogative reading." Importantly, if this is the case, the classifier becomes the key licensor of existential *wh*-items in Group C, rather than the somewhat murky notion of "future" contexts. This possibility has unfortunately not been explored in the literature of Mandarin non-interrogative *wh*-items, as far as I am aware.

III. Non-uniform existential interpretations. In the three groups of licensing contexts, the meaning an EPW fluctuates between a purely existential "*some*-NP" and an NPI-like "*any*-NP." I am not aware of any literature that is devoted to this nuance, which is nevertheless an important one, since *some* and *any* simply cannot be equivalent. The difficulty of teasing the two interpretations apart lies in the fact that in certain licensing contexts of EPWs, *some* and *any* are both possible:

(21)   a. If someone/anyone bullies you, let me know.   *Conditionals*

       b. Did someone/anyone bully you again?   *Questions*

       c. Grab some/any drink and join the party!   *Imperatives*

In other contexts, however, *some* and *any* behave drastically differently:

(22)   a. I didn't buy *something/anything.   *Negative contexts*

       b. He must have bought something/*anything.   *Epistemic modals*

       c. I thought he bought something/*anything.   *Nonfactive verbs*

The fact that Mandarin EPWs can occur in all the environments in (22) is particularly striking, as it becomes unclear what exactly the meaning of EPWs is: if they are purely existential terms like *some*-NPs, we expect them not to appear under negation because *some*-NPs have positive polarity properties; and if they are NPIs of the *any*-type, which are typically associated with "domain widening" effects (Kadmon and Landman 1993), we should not be able to translate them as *some*-NPs, contrary to the fact. To complicate this picture even more, note that *any*-NPs are ambiguous between NPIs and free choice items (FCIs) (as in *To continue, press any button*) which are subject to different licensing conditions and which are in fact more like "universal" quantifiers. An EPW in

the context of (21c) may well fall into this latter category, thus increasing the difficulty of pinning down the meaning of an EPW.

Here is where we stand: Mandarin EPWs can be interpreted existentially in a number of licensing contexts, but they are sometimes NPI-like and sometimes not (and when not, a classifier-like expression (e.g. *dian*) is obligatory in certain situations). A descriptive generalization like Lin's (1998b) NEEC provides an initial rationale of when Mandarin EPWs come to be existential indefinites, but leaves open how to characterize the mechanism.

It is conceivable that these patterns may be handled by a system that treats EPWs as existential phrases just like English *wh*-phrases, but can be optionally equipped with NPI-/FCI-related features, which lead to their restricted distribution (cf. Liao 2011). In a system of this kind, Mandarin EPWs will act like special *any*-NPs which can be interpreted as interrogative phrases when outside licensing contexts.

However, Karttunen's (1977) original analysis takes *wh*-phrases to be simple existentials, not polarity items. Assimilating Mandarin *wh*-constructions to those in English also masks the differences between these two languages, which only takes us a step back from achieving a theory that highlights crosslinguistic differences. But more important is that why Mandarin *wh*-phrases can bear features typical of polarity-sensitive items is precisely a fact that we strive to explain. Taking the problem to be the assumption is circular reasoning; in the end, we would still not know why Mandarin *wh*-phrases have both interrogative and non-interrogative uses. Finally, it is not obvious why Mandarin EPWs are consistently translated as *some*-NPs in certain environments if they are inherently NPIs/FCIs. The fact that EPWs can occur in a broad range of environments and alternate between different kinds of existential terms is a strong indication that we need a different story for Mandarin than for English.

From a purely syntactic point of view, the simplest solution to the behaviors of EPWs is that they are variables to be bound by a (c-commanding) existential quantifier, along the lines of the unselective binding theory. The only additional stipulation needed is perhaps that the licensing contexts of EPWs must introduce an existential quantifier. Even so, the range of possible interpretations of EPWs is still not accounted for. Finally, unselective binding was not intended as a theory of polarity items, the reason of which is not hard to see: *any*-NPs resist QVEs that are typical of

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simple indefinites (Dayal 1998).

IV. Negative contexts. Related to the interpretation problem just discussed is that EPWs embedded in a negative VP have a different meaning than those in other licensing contexts.

(23) Wo mei mai shenme (dongxi).   = (15a)
      I   not buy what   thing
      'I didn't buy anything.'

Examples of this kind constitute possibly the strongest argument for analyzing Mandarin *wh*-phrases as polarity items, because they are translatable as *anything* in this context. However, as Dong (2009) and Liao (2011) have discussed in some detail, such sentences may have a "second reading" which is not obtainable from the sentence itself. (23), for instance, seems to infer that I actually bought something insignificant/not special, an inference that is unexpected in a *wh*-as-NPI account.

If such "insignificant/not special" inference is a "second reading" of negative sentences like (23), we expect that they are always ambiguous between this reading and the usual one according to which *shenme* 'what' is a real NPI. There is independent evidence that the inference is obligatory, hence the negative sentences under discussion are actually not ambiguous. Dong (2009) observes that such sentences can mostly be answers to a *wh*-question, as in (425); it sounds odd as a standalone sentence, as in (25).

(24) a. Ni mai-le   shenme?   (Dong 2009: 141)
          You buy-PERF what
          'What did you buy?'

      b. Mei mai shenme, (jiu yi-zhi bi).
          Not buy what   just one-CL pen.
          'Nothing in particular, just a pen.'

(25) ? Zhangsan qu-le   yitang shangdian. Zuihou ta mei mai shenme.
        Zhangsan go-PERF once   store   finally he not buy what
        'Zhangsan went to the store. In the end he didn't buy anything.'

Moreover, Dong notes that the additional inference of the negative sentences is an uncancellable implicature which comes close to an entailment relation, as evidenced by (26).

(26) ?? Wo mei mai shenme, qishi   wo shenme dou mei mai.   (Dong 2009: 142)
         I   not buy what   actually I   what   DOU not buy
         ??'I didn't buy anything, and in fact I bought nothing.'

These facts are clearly not observed for other licensing contexts of non-interrogative *wh*-phrases, and Dong argues that negative contexts is not a standard type of licensing environment.

There is one more argument against analyzing a *wh*-phrase in a negative VP as an NPI. If *shenme* in (23) means 'anything,' we predict that it can be substituted by the phrase *renhe dongxi*, which literally means 'anything.' This prediction is not borne out, as shown by the following contrasts.

(27)   *Q: Do you want to have dinner together?*

    a. Wo duzi   tong, bu xiang chi **renhe** dongxi.
        I   stomach pain not want eat any   thing
        'I have stomach pains and (I) don't want to eat anything.'

    b. Wo duzi   tong, # bu xiang chi **shenme** dongxi.
        I   stomach pain   not want eat what   thing
        Intended: Same as above

(28)   a. Zuotian   de wancan dou hai zai,   yinwei wo mei chi **renhe** dongxi.
        yesterday DE dinner DOU still present because I   not eat any   thing
        'The dinner from yesterday is still there, because I didn't eat anything.'

    b. Zuotian   de wancan dou hai zai,   # yinwei wo mei chi **shenme** dongxi.
        yesterday DE dinner DOU still present because I   not eat any   thing
        Intended: Same as above

Overall, the distinction between a *wh*-word in the scope of negation and a regular NPI is quite robust. As far as I am aware, there has not been any attempt in explaining Dong's (2009) observations or the difference in the minimal pairs exemplified by (27)/(28).

V. Resistance to modification. Lastly, the literature on Mandarin EPWs has not paid much attention to the fact that they tend to resist modification, as shown in (29).[10]

(29)   a. * Lisi mei-you chi [NP ni   mai de shenme].   cf. (15a)
        Lisi not-have eat   you buy DE what
        Intended: 'Lisi didn't eat anything you bought.'

    b. * Lisi dagai   mai-le   [NP hen gui   de shenme].   cf. (16a)
        Lisi probably buy-PERF   very expensive DE what
        Intended: 'Lisi probably bought something expensive.'

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[10]Such sentences become grammatical if the *wh*-word is replaced by a non-interrogative common noun, e.g. *dongxi* 'thing.'

    c.   * Lisi yiwei wo kanjian-le [$_{NP}$ zhan-zai nali   de shei].   cf. (16d)
        Lisi think I   see-PERF   stand-at there DE who
        Intended: 'Lisi thought I saw someone standing there.'

If Mandarin EPWs are existential phrases, it is puzzling why they cannot head a complex, mod-ified nominal phrase. As a matter of fact, even the interrogative interpretation is not available for these sentences if without the relevant licensing operator. The examples in (30) can only be understood as echo questions.

(30)   a. % Lisi chi-le   [$_{NP}$ ni   mai de shenme]?
          Lisi eat-PERF   you buy DE what
          Not: 'What did Lisi eat that you bought?' (Okay as an echo question)

       b. % Lisi mai-le   [$_{NP}$ hen gui   de shenme]?
          Lisi buy-PERF   very expensive DE what
          Not: 'What expensive thing did Lisi buy?' (Okay as an echo question)

       c. % Lisi kanjian-le [$_{NP}$ zhan-zai nali   de shei]?
          Lisi see-PERF   stand-at there DE who
          Not: 'Who was the one standing there that Lisi saw?' (Okay as an echo question)

To convey the intended question meaning, (30a), for instance, will have to be reorganized into the topicalization configuration in (31).

(31)   Ni mai de dongxi, Lisi chi-le   shenme/na-yi-ge?
      you buy DE thing   Lisi eat-PERF what/which-one-CL
      'Among the things you bought, what/which one did Lisi eat?'

In many of Lin's (1998b) examples, e.g. (15a), (15b), (16a) and (17a), the *wh*-words also precede a common noun such as *dongxi* 'thing' or *ren* 'person.' This indicates that Mandarin *wh*-words are more on a par with NP-modifiers syntactically. If this is the case, it would be implausible to say that Mandarin *wh*-words are existentially quantified in the same way as *a boy* is.

1.3.2 Universal *wh*-phrases

Mandarin *wh*-phrases can also obtain universal quantificational force, however the licensing con-dition is quite different. Unlike the existential cases, universal-like *wh*-phrases have to appear to the *left* of the licensor *dōu*, i.e., in a position external to the syntactic scope of *dōu*.[11]

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[11]Huang 1982a, Lee 1986, Cheng 1991, Chiu 1993, Tsai 1994, among many others.

(32) a. Lisi shenme *(dou) xihuan.
         Lisi what   DOU like
         'Lisi likes everything.'

      b. * Lisi dou xihuan shenme.
         Lisi DOU like   what
         Intended: 'Lisi likes everything.'

This asymmetry between universal and existential *wh*-phrases is especially striking if one looks at the Japanese indeterminate system, where *wh*-words combine with *-mo* and *-ka* to form universal and existential quantifiers, respectively. Since *wh*-expressions in both languages can be used non-interrogatively, why does Mandarin have the universal-existential split with respect to licensing non-interrogative *wh*-words, and how are they licensed if they are not c-commanded by *dōu*? Even more curiously, why *must* they occur outside the scope of *dōu*?

It has almost become customary in the literature to attribute this peculiar pattern to an EPP or some "strong" feature (à la Chomsky 1995) on *dōu* that triggers overt phrasal movement (e.g. Shyu 1995, Lin 1998a, Wu 1999, Dong 2009, Liao 2011). While this idea seems quite straightforward and nicely captures the word order, one should keep in mind that Mandarin is a *wh*-in-situ language *par excellence*: the puzzles about the *wh*-constructions of Mandarin all stem precisely from the fact that it does *not* exercise the kind of overt *wh*-movement as in English, whether in questions or in other non-interrogative Ā-constructions. In addition, we have seen from the very beginning that *wh*-indefinites are firmly in-situ inside the domain of a licensing operator; why do they break this rule and resort to movement when *dōu* is present?

One may argue that the "movement" of the *wh*-phrase in (32a) is a Mandarin-specific type of movement driven by focus, since *dōu* appears in other focus-related contexts as well (Shyu 1995). This analysis will not work for *wh*-phrases, as the notion of "focus" does not automatically deliver universal quantification. It also does not help us better understand why universal *wh*-items occur *outside* the scope of *dōu*.

In subsequent chapters, I will argue against the prevalent view that a *dōu*-sentence involves overt movement of the associate phrase at its left (in (32a), the *wh*-phrase) and propose that *dōu* is only a subpart of a larger paradigm in which a focus-like expression (not necessarily interrogative) is uniformly associated with a monomorphemic word that follows it. The so-called "*wh...dōu*" construction exemplified by (32a) will fall out as a special case where the associate is an indeter-

minate expression.

I summarize the discussion of Mandarin *wh*-constructions with the following generalizations:

- Interrogative *wh*-phrases are uniformly in-situ. The alleged island-insensitive "wide scope" property of them may not be the right characterization of the relevant phenomena.

- Existential *wh*-phrases are uniformly in the scope of licensors, but their meanings shift between *some*-NPs and *any*-NPs (NPIs/FCIs).

- Universal *wh*-phrases display the opposite syntactic pattern: they precede the licensor *dōu*.

1.4 A reassessment of indefinites in Mandarin

Despite all the potential problems mentioned, unselective binding still looks like an appealing account on the face of *wh*-constructions in Mandarin. The idea that Mandarin *wh*-items function like "variables" of some sort is still worth pursuing, since they do show "quantificational variability" to some extent, though *not* to the same extent as English indefinites.

Now, what about non-*wh* indefinites Mandarin? If the *wh*-elements of this language exhibit polarity-like properties and are more or less comparable to English polarity items, it is natural for one to speculate that its indefinite expressions probably will behave in the same manner.

Throughout this dissertation, "indefinites" in Mandarin refer to nominal "numeral-classifier phrases" such as *liang-ge ren* 'two people,' which I will label NumP, following Li (1998). I will not discuss bare nouns except in the short introductory illustration below. Bare nouns can also be used as indefinites but their other possible interpretations (e.g. generic) cause unnecessary complications, and for this reason I will set them aside.

1.4.1 Existential contexts

Before exploring whether Mandarin NumPs show variable-like properties, let us take a quick overview of where they typically occur.

The first thing to note is that Mandarin does not have indefinite or negative DP expressions that correspond to *somebody* or *nobody* in English. The sequences *you ren* 'have person' and the negative *mei-you ren* 'not-have person' in the examples in (33) below cannot be deemed nominal

phrases (Huang 2003). Rather, they consist of the modal verb *yǒu* 'have' and a bare noun, and in the negated case the negation *méi* that is left-attached to *yǒu*.

(33) a. **You ren** kanjian-le Lisi.
    have person see-PERF Lisi
    'Somebody saw Lisi.' / 'There was somebody who saw Lisi.'

   b. * Lisi kanjian-le **you ren**.
    Lisi see-PERF have person
    'Intended: 'Lisi saw somebody.'

   c. **Mei-you ren** kanjian Lisi.
    not-have person see Lisi
    'Nobody saw Lisi.' / 'There was nobody who saw Lisi.'

   d. * Lisi kanjian-le **mei-you ren**.
    Lisi see-PERF not-have person
    'Intended: 'Lisi saw nobody.'

In other words, *somebody* and *nobody* must be "decomposed" in Mandarin into a "VP-syntax" containing a modal verb and a bare noun, and (33b) and (33d) are ruled out because *yǒu* cannot appear postverbally. A bare noun in Mandarin does not require the co-occurrence of *(mei-)you*; however, if it is construed as a nonspecific subject the modal verb *yǒu* must be present, as in (33a)/(33c); otherwise the bare noun receives a definite/generic interpretation (Li and Thompson 1981, Cheng and Sybesma 1999).

There is a related pattern in Mandarin NumPs. A NumP is perfect in object position of an episodic (non-generic), aspectually marked sentence, as in (34a). If the predicate has no aspect marker, the sentence sounds "incomplete" (Tang and Lee 2000, Tsai 2008b), as in (34b). Further, a NumP cannot serve as the subject of an episodic sentence if without the existential modal verb *yǒu* 'have' (Li and Thompson 1981), as in (34c)–(34d).

(34) a. Lisi na-le san-ben shu.
    Lisi take-PERF three-CL book
    'Lisi took three books.'

   b. % Lisi na san-ben shu.
    Lisi take three-CL book

   c. * San-ge ren xiao le.
    three-CL person laugh PERF

      d.   You san-ge ren   xiao le.
            have three-CL person laugh PERF
            'Three people laughed.' / 'There are three people who laughed.'

The obligatoriness of *yǒu* in (34d) is quite puzzling and there exist some exceptions to this generalizations (Li 1998, Tsai 2001). The point of the data shown in (34) is that the distribution of Mandarin NumPs is restricted; they seem to require certain syntactic "licensors" in order to be grammatical. In episodic contexts, they are "licensed" only when appearing in postverbal position of an aspectually marked sentence or when they follow *yǒu*, an IP-level auxiliary (Huang 1987). This is clearly not the case in English, in which indefinite DPs can freely occur in subject and object positions without being embedded under *there-be*.

1.4.2 Adverbial quantification/generic contexts

Let us now turn to NumPs in intensional quantificational contexts. As mentioned, if they are Heimian variables they should display QVEs. The purpose of this subsection is to show that they actually don't. This constitutes an empirical challenge to the unselective binding approach to Mandarin because QVEs are among the typical characteristics of indefinites.

To my knowledge, there has been little discussion on the QVEs of Mandarin indefinites/NumPs, which is surprising given the abundant literature on *wh*-indefinites of this language. If Mandarin *wh*-items behave as indefinites, other nominal phrases that look more like ordinary indefinites, e.g. NumPs, should as well. And this is not a difficult task: we only need to put a singular NumP in the scope of an adverb of quantification (Q-adverb) and see if we obtain QVEs. The fact is that it doesn't: in none of the examples in (35) below can the NumP be quantified by the Q-adverb, and as a matter of fact these are all awkward sentences.[12]

  (35)   a.   * Lisi zongshi zai Amazon mai yi-ben shu.
               Lisi always at Amazon buy one-CL book
               Intended: 'Lisi always orders a book at Amazon.'

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[12]Some of these sentences, e.g. (35b) and (35c), may be improved if the numeral expression is stressed and contrastively interpreted, but such contrastive reading is irrelevant to the nonspecific interpretation we are currently concerned with.

b. * Lisi henshao yong yi-tai diannao.
Lisi seldom use one-CL computer
Intended: 'Lisi seldom uses a computer.'

c. * Lisi changchang gen yi-wei tongxue taolun zuoye.
Lisi usually with one-CL classmate discuss assignment
Intended: 'Lisi usually discusses assignments with a classmate.'

d. * Yi-ge yuyianxuejia changchang shi dui de.
one-CL linguist usually be right DE
Intended: 'A linguist is usually right.'

e. * Yi-zhi mao changchang zhui laoshu.
one-CL cat usually chase mouse
Intended: 'A cat usually chases mice.'

Here is an example modeled on the famous donkey sentence:

(36) % Ruguo Lisi xihuan yi-ge nusheng, ta changchang hui gei ta xie xin.
If Lisi like one-CL girl he usually will to she write letter
Intended: 'If Lisi likes a girl, he usually writes her letters.'

This sentence has one available reading where the Q-adverb 'usually' ranges over the times in which Lisi likes a girl. Hence, if Lisi likes Mary, then (36) conveys that Lisi writes Mary letters frequently. However, (36) does not have the intended reading "for most girls, if Lisi likes them, he writes them letters" where the Q-adverb is intended to bind the NumP 'one girl.' Put differently, the Q-adverb takes scope *below* an invisible generic/necessity operator (Heim 1982), the latter being the quantifier that binds every Lisi-likes-one-girl situation. An appropriate paraphrase of (36) would be the following:

(37) Generally/Typically, if Lisi likes a girl, he writes her letters frequently.

In addition, a Mandarin NumP also cannot be quantified in certain generic or "characterizing" sentences (Carlson and Pelletier 1995) without overt Q-adverbs. The examples below in (38) are all bizarre sentences and not just short of the intended generic interpretation, and the contrast with their English counterparts is quite sharp.[13]

(38) a. * Lisi wancan hou he yi-bei cha.
Lisi dinner after drink one-cup tea
Intended: 'Lisi drinks a cup of tea after dinner.'

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[13]These examples become grammatical if the NumPs are replaced by bare nouns.

b. * Lisi ling-dao   xinshui de shihou mai yi-ben shu.
   Lisi receive-PERF salary   DE time   buy one-CL book
   Intended: 'When Lisi receives a salary, he buys a book.'

c. * Yi-ge   lanqiu-yuan   hen gao.
   one-CL basketball-player very tall
   Intended: 'A basketball player is tall.'

d. * Yi-zhi   mao zhui laoshu.
   one-CL cat   chase mouse
   Intended: 'A cat chases mice.'

e. * Yi-ge   aierlan-ren   you lanse-de yanjing.
   one-CL Ireland-person have blue-DE eye
   Intended: 'An Irish person has blue eyes.'

I do not have an analysis of how Mandarin generic sentences work, but it seems fair to say that these examples present an empirical challenge to any theory that attempts to treat Mandarin NumPs as variables that are subject to binding by Q-adverbs/the generic operator.

In this regard, it should also be clarified that NumPs are not inherently incompatible with generic contexts, as cases like (39) are perfectly fine:

(39)   Yi-zhi mao you si-zhi   jiao.
       one-CL cat   have four-CL leg
       'A cat has four legs.'

However, such cases appear to be conditioned by the presence of multiple NumPs: (40), for instance, is ungrammatical.

(40)   * Yi-zhi mao you jiao.
         one-CL cat   have leg
         Intended: 'A cat has legs.'

The distinction between (39) and (40) should follow from something else than unselective binding; binding by the generic operator is not enough to make (40) grammatical. This is unexpected if Mandarin NumPs can serve as Heimian variables.

1.4.3 Negative contexts

There is yet another paradigm of Mandarin NumPs that will surprise those who believe they are bona fide indefinites: negative contexts. S.-F. Huang (1981) notices that there is some "oddity" in

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Mandarin object NumPs which are embedded under a negated VP, as in (41a), cf. (41b).[14]

(41) a. ? Ta mei-you xie yi-ge zi.   (Huang 1981: 228)
        he not-have write one-CL word
        Intended: 'He did not write a word.'

     b.   You yi-ge zi ta mei-you xie.
        have one-CL word he not-have write
        'There is a word that he did not write.'

According to Huang (1981: 229), "[(41a) is] acceptable on a direct denial interpretation, i.e., where the speaker is using [(41a)] to directly contradict the positive counterpart of [(41a)]. This reading, however, requires heavy contrastive stress on *mei-you*."[15] In other words, (41a) improves when the negation is interpreted meta-linguistically (i.e. taking scope over the entire proposition).

    Crucially, typical indefinites are not so interpreted: one can certainly utter *He did not write a word!* without this sentence being a direct denial of its positive counterpart. That is, there needs not be *He wrote a word!* in the discourse for *He did not write a word!* to be felicitous, and particularly so when *a word* is nonspecific. What (41a) reveals is that in a standard context where we expect to detect nonspecificity of the NumP, i.e., in the scope of negation, we do not.

    More examples are provided below (42). These sentences are all pretty awkward when the NumP is intended as a nonspecific indefinite (the actual referent of which is nonexistent)—in fact, they sound like the NumP has a *specific* referent, especially if some constituent in the sentence (usually the numeral expression) is stressed and contrastively focused in a more marked manner.

(42) a. ?? Ta conglai mei-you kan-guo yi-bu dianying.
        he ever not-have watch-EXP one-CL movie
        Intended: 'He has never watched a movie before.'

     b. ?? Wo mei-you gei ta yi-kuai qian.
        I not-have give he one-CL money
        Intended: 'I didn't give him a dollar.'

     c. ?? Lisi xiu-le zhe-men ke, danshi mei-you xie yi-pian baogao.
        Lisi take-PERF this-CL course but not-have xie one-CL report
        Intended: 'Lisi took this course (for credit), but didn't write a paper.'

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[14]The grammaticality judgment on (41a) is S.-F. Huang's (1981). I believe the awkwardness of examples like (41a) deserves more than one question mark; Huang (1987: 249) judges a similar sentence ungrammatical.

[15]The speakers I consulted and myself all share this judgment.

d. ??Ta mei-you kanjian yi-ge   ren.
   he not-have see   one-CL person
   Intended: 'He didn't see a person.'

e. ??Lisi conglai mei-you ting-guo yi-shou ge.
   Lisi ever   not-have hear-EXP one-CL song
   Intended: 'Lisi has never heard a song.'

To convey the intended meanings, these examples have to be syntactically reformed into the so-called "*(lian)… dou*" focus construction (Shyu 1995) wherein the nonspecific indefinite precedes the preverbal focus particle *dōu*, as in (43).

(43) a. Ta yi-bu   dianying dou mei-you kan-guo.
        he one-CL movie   DOU not-have watch-EXP
        'He has never watched a movie before.'

   b. Wo yi-kuai qian   dou mei-you gei ta.
      I   one-CL money DOU not-have give he
      'I didn't give him a dollar.'

With neutral intonation, the oddness of a NumP scoping below negation also surfaces with the other negative marker in Mandarin *bu*, as in (44). These sentences may also become acceptable if the numeral part is stressed and focused (e.g., "Lisi doesn't want ONE book—he wants TWO"), or, in the typical cases, if they appear in the form of a "*(lian)… dou*" construction.

(44) a. ??Lisi bu xihuan yi-ge   wulixuejia.
        Lisi not like   one-CL physicist
        Intended: 'Lisi doesn't like a physicist.'

   b. ??Lisi bu xiangyao yi-ben.
        Lisi not want   one-CL book
        Intended: 'Lisi doesn't want a book.'

   c. ??Lisi bu dong   yi-ge   yingwen zi.
        Lisi not understand one-CL English word
        Intended: 'Lisi doesn't know an English word.'

Again, these sentences become grammatical in the form of a "*(lian)… dou*" construction.

Let us finally note that the weak QP headed by *xuduo* 'many' is fine in the object position in affirmative contexts, but becomes degraded when the main predicate is negated (Jim Huang,

p.c.).[16] In contrast, another QP that also means 'many,' *henduo* (lit. 'very-many'), seems to be able to appear even under negation.

(45) a. Yuehan mai-le   **xuduo**/**henduo shu**.
          John   buy-PERF many/many   book
          'John bought many books.'

      b. Yuehan mei-you mai ***xuduo**/**henduo shu**.
          John   not-have buy many/many   book
          'John didn't buy many books.'

More will be said in subsequent chapters, but let me immediately point out two things based on the observations above: (i) the typical way for a NumP to express nonspecificity in negative contexts is through the construction in (43) where it scopes *above* negation with the addition of *dōu*; (ii) *dōu* is the same morpheme that we saw earlier that licensed universal/FC *wh*-phrases.

Here is the bigger generalization, which will be revisited in subsequent chapters:

(46) Universal/FC *wh*-phrases and nonspecific NumPs in Mandarin are only licensed in a configuration where they *precede dōu*.

Moreover, recall that existentially quantified *wh*-phrases occur in the scope of their licensors, and that NumPs with existential import must be embedded under an aspectual VP or the existential verb *yǒu*. These facts lead to the second generalization in (47):

(47) Existential *wh*-phrases and existential NumPs (the actual referents of which are existent) in Mandarin are only licensed when they are *c-commanded by* a licensor.

It seems unavoidable that *wh*-phrases and NumPs in Mandarin are intimately related and should receive a uniform treatment, though exactly how this can be achieved is not obvious at this point. It is clear, however, that (i) Mandarin NumPs do not behave the way we expect them to on the assumption that they are indefinites, and (ii) the presence and meaning of *wh*-phrases/NumPs in Mandarin are largely determined by VP-/IP-level syntactic elements such as *yǒu* and *dōu*. In this sense, they do act like variables of some kind, though not the same kind as, e.g., English indef-

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[16]The notion "weak" is in the sense of Milsark (1977): weak QPs are quantificational NPs that can appear in the object position of existential *there-be* construction.

inites. The theory we need is one that can more precisely capture these Mandarin-specific facts about *wh*-phrases, NumPs, and the interacting clausal elements with them.

1.4.4 Wide scope again

We have seen that Mandarin NumPs do not easily serve as nonspecific indefinites. Does this mean they are specific, then? For concreteness, let us define "specificity" as the interpretation of an indefinite where it outscopes another QP and scopes out of an island. If an indefinite can do both, then it is considered specific. English indefinites headed by *a(n)* are standard examples, which can be construed as either nonspecific or specific.

Huang (1982a) points out that (48), which contains a Complex NP Island, is ambiguous between two scope readings. One the (a)-reading, 'three people' takes wide scope over 'every book'; on the (b)-reading, it is the other way around. This indicates the 'three men' can be a specific indefinite that takes scope out of the relative clause.

(48) Wo mai-le   [NP [S san-ge   ren xie] de mei-ben shu].   (Huang 1982a: 214)
      I   buy-PERF   three-CL man write DE every-CL book
      a. 'There are three men x such that every book x wrote I bought.'
      b. 'I bought every book that three men wrote.'

Aoun and Li (1989: 146) raise the doubly quantified passive constructions in (49) and claim that they are both ambiguous in having two scope readings.

(49) a. Mei-ge   ren   dou bei yi-ge   nuren zhuazou le.   (Aoun and Li 1989: 146)
         every-CL person DOU by one-CL woman arrest   PERF
         'Everyone was arrested by a woman.'

      b. Yaoshi liang-ge xiansuo bei mei-ge   ren   zhaodao . . .
         if   two-CL   clue   by every-CL person found
         'If two clues were found by everyone. . . '

Li (2013: 99) also makes a similar claim that "[(50)] either means that everyone has a different letter about salary-raises to read or that there is a letter about salary-raises that everyone reads."

(50) Mei-ge   ren dou zai   kan [[yi-feng guanyu jia-xin]   de   xin].   (Li 2013: 99)
      every-CL man all PROG read   one-CL about   add-wage MOD letter
      'Everybody is reading a letter about raising salaries.'   ($\forall$ > 'letter' or 'letter' > $\forall$)

In her systematic study of cross-linguistic nominal expressions, Jiang (2012: Chapter 3) also argues that Mandarin NumPs behave similarly to those in English at the clausal level. She cites examples including (51) below to show that Mandarin NumPs can escape conditional islands. In particular, 'one girl' can take scope out of the *if*-clause and give rise to a specific reading.

(51) [Ruguo ni neng dai yi-ge nusheng lai wode party dehua], wo hui hen kaixin.
　　 if   you can bring one-CL girl   come my   party if   I   will very happy
　　 'If you can bring one girl to my party, I will be very happy.'　　 (Jiang 2012: 112–113)

　　 i. Wide scope ['one girl' > 'if']:

　　 'There is a *specific* girl, if you can bring this girl to my party, I will be very happy.'

　　 ii. Narrow scope ['if' > 'one girl']:

　　 'I will be very happy if you can bring *any* girl to my party.'

Thus, Jiang (2012) concludes that NumPs in both English and Mandarin allow the long-distance, island-insensitive construal, namely the specific interpretation, of indefinites.

However, there is one serious issue regarding the so-called "scope ambiguity" in these data.[17] Take the doubly quantified sentence (52) for example. According to May (1977, 1985) and the aforementioned authors, (52) is ambiguous between the two scope readings paraphrased in (52a) and (52b), respectively.

(52) Every girl likes a boy.

　　 a. Surface scope: 'For every girl, she likes a boy.'

　　 b. Inverse scope: 'There is a boy such that every girl likes.'

There is a problem in this reasoning, as pointed out by a number of researchers (Reinhart 1976, 1997, Ruys 1992, Abusch 1994, and Meyer and Sauerland 2009): the inverse scope reading (52b) *entails* the surface scope reading (52a), for if there is a boy that every girl likes, then it is necessarily true that every girl likes a boy, albeit the same one. This problem arises because as long as every girl has a boy she likes, the surface scope reading is true; whether the girls like different boys is immaterial. Since (52a) is entailed by (52b), one cannot tell whether (52b) is a true inverse scope

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reading distinct from (52a). The scenario in which five girls like the same one boy is compatible with both surface and inverse scope readings.[18]

Theoretically, it is possible to argue for the existence of inverse scope in (52), if this sentence can be judged *false* in the scenario where every girl likes a *different* boy. This is so because a speaker could only make such judgment in such scenario on the *inverse scope* interpretation, since the surface scope is true. However, it is practically difficult for a speaker to do so, for the reason that (52) has one reading that holds true of this scenario (i.e., the *Truth Dominance* constraint in Meyer and Sauerland 2009).

The situation is different with (53). Its surface scope reading (53a) does *not* entail the inverse scope (53b): if John likes Mary and Jane, and Peter likes Ann and Amy, (53a) is false and (53b) is true. (53) therefore showcases the existence of "inverse scope" reading, in addition to the surface scope one.

(53)   A boy likes every girl.

   a.   Surface scope: 'There is a boy such that he likes every girl.'

   b.   Inverse scope: 'For every girl, there is a boy who likes her.'

It should be fair to say that any doubly quantified sentence has to avoid this entailment problem in order to be considered a good testing ground for scope ambiguity. (49a) and (50) are of the same type of sentence as (52), and are therefore subject to the same entailment problem. (49b), on the other hand, may constitute evidence for inverse scope since the indefinite 'two clues' precedes the universal QP 'everyone.' It is nevertheless not clear whether (49b) is really ambiguous. Suppose there are five detectives in the relevant context. On the inverse scope reading of (49b), namely 'for every detective, there were two clues found by him,' there should be ten clues totally. But (54) sounds self-contradictory.[19]

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[18]This is not to deny that (52) cannot have inverse scope reading. The problem of "scope ambiguity" here is that the scope interpretations are not a reliable way to truth-conditionally distinguish inverse vs. surface scope reading of this particular sentence.

[19]There also appear to be variations among speakers with respect to the acceptability of (49b): for many, there must be the existential *yǒu* 'have' preceding the NumP 'two clues;' and when *yǒu* does show up, (49b) is not ambiguous.

(54) # Yaoshi liang-ge xiansuo bei mei-ge ren   zhaodao, women jiu you shi-ge xiansuo.
      if   two-CL clue   by every-CL person found   we   then have ten-CL clue
      'If two clues were found by everyone, we would have ten clues.'

The adjunct island case (51) also is not necessarily an argument for wide-scope indefinites, though for a slightly different reason, as follows. Suppose the speaker of (51) has no specific girl in mind; the narrow scope reading is true and wide scope false. Now suppose the speaker has one specific girl in mind. Is the wide (i.e. inverse) scope reading true? We actually do not know, because the narrow scope reading is also true in this second scenario. That is, the narrow scope will hold without regard to the existence of a specific girl; if the speaker has a particular one in mind, this just happens to be one of all situations where the inverse scope reading is true. To tease the two scope readings apart, we have to see if a hearer of (51) can judge this sentence *false* in the scenario where there is *no* specific girl. If so, we can safely conclude that inverse scope exists because in such scenario the wide scope reading stands true. However, as mentioned above it is very unlikely for a hearer to make this judgment due to the Truth Dominance constraint. It turns out that (51) cannot be taken as a convincing argument for inverse/wide scope of indefinites.

On the empirical front, there is also doubt on the wide scope interpretation. The observation is that (51) cannot be followed by "...*but unfortunately I know she can't come*," where *she* has coreference with 'one girl.' On the other hand, if 'one girl' is replaced by 'Mary,' then this continuation is possible, indicating that this NumP cannot be referential.

Let us finally examine the case of (48), repeated as (55). The scope reading we are concerned with here is (a), which Huang (1982a: 218) suggests to be resulting from QR of 'three men' out of the relative clause.

(55) Wo mai-le   [NP [S san-ge ren xie] de mei-ben shu].
      I   buy-PERF   three-CL man write DE every-CL book
      a. 'There are three men *x* such that every book *x* wrote I bought.'

      b. 'I bought every book that three men wrote.'

The issue with this example is that it seems to only have the (a)-reading.[20] Assume that there are three relevant books in the context and each book is written by three different authors; if I buy all

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[20]In contrast, the (b)-reading becomes the only reading if *mei-ben* 'every-CL' precedes the relative clause.

of them, I get a total of nine authors. This is predicted to be true on the (b)-reading. But in fact (55) cannot be parsed this way, as evidenced by the incoherency of (56).

(56)   # Wo mai-le   san-ge   zuojia xie   de mei-ben shu, suoyi zhexie shu   yigong you
        I   buy-PERF three-CL author write DE every-CL book so   these   book totally have
        jiu-ge   zuojia.
        nine-CL author
        'I bought every book that three authors wrote, so there is a total of nine authors in these
        books.'

This means (55) is not scopally ambiguous. In particular, the only reading it delivers, i.e. the (a)-reading, has 'three men' scoping over 'every book,' which is unexpected because the former does not c-command the latter—in fact, neither of them c-commands the other. Now, one may wonder if this constitutes direct evidence that the NumP is a specific indefinite because of the (a)-reading.[21] Note that if this is indeed the case, (55) would be a case where the NumP *must* be specific, because we have seen that the (b)-reading is nonexistent. And here is the problem: why does the NumP in (55) show wide scope only?

Maybe there is something special with the structure of (55) that forces the specificity of 'three men,' one could argue. But notice that in simple quantified sentences in Mandarin, a NumP do not show interaction with another QP. As Huang (1982a: 112–113) correctly observes, the sentence (57) below "can only mean that each of the students bought one book or another, but does not assert that they bought the same book. If it happened that they bought the same book, it would be a matter of coincidence, and not the message intended by the speaker." Huang (1982a: 113–114) further demonstrates that this remains true for more complicated quantified sentences involving an additional negation.

(57)   Mei-ge   xuesheng dou mai-le   yi-ben shu.   (Huang 1982a: 112)
        every-CL student   DOU buy-PERF one-CL book
        'For every student x, there is one book y such that x bought y.'

For the indefinite to obtain the specific interpretation, Huang notes that it must topicalize to the sentence-initial position and co-occur with *yǒu* 'have,' as in (58).

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[21]Huang's (1982a: 218) solution is that in this reading, 'three men' undergoes QR to the matrix clause. This analysis requires the stipulation that such covert QR is immune to island conditions.

(58) You yi-ben shu mei-ge   xuesheng dou mai-le.
     have one-CL book every-CL student   DOU buy-PERF
     'There is one book that every student bought.'

Here, then, is the puzzle we are facing: why cannot a NumP take scope over a universal QP and become "specific" in a simple transitive sentence, but (apparently) *must* do so when it is in an island as in (55) or when it is dislocated? It would be unsatisfactory to say that a NumP can be either specific or nonspecific, but only specific under certain structural conditions, which amounts to saying that specificity is *not* an intrinsic property to a NumP. It seems that something has gone wrong in the assumption that the NumP in (55) is an existential indefinite that shows scope interaction with another QP. The felt "wide scope" in this case may turn out to be a consequence of the NumP being something else than an indefinite with built-in existential quantification.

To fully work out the solution to this puzzle would take us too far afield as quantifier scope is not the main issue for this dissertation. In any rate, it suffices to say that robust evidence for the claim that Mandarin NumPs display genuine specific or wide-scope interpretation is still lacking. We have seen that previous tests building on scope interaction and island insensitivity are not reliable, due either to the entailment problem or to the peculiar situation of (55). In fact, many of the negative sentences discussed in Section 1.4.3 argue for the *nonexistence* of specific interpretation, such as those in (42). Importantly, it is not just that these examples do not allow specificity; rather, they are nearly ungrammatical, which is bewildering if a NumP can be a specific indefinite.

There are some other cases in which a NumP sounds odd in object position, even without negation or an overt adverb of quantification. Julie Jiang (p.c.) points out to me that (59a), when uttered out of the blue, is not good. For it to be perfectly acceptable, the object NumP has to be preposed and *yǒu* 'have' needs to appear, as in (59b).

(59) a. ?/?? Lisi hen xihuan yi-ben / san-ben shu.
              Lisi very like   one-CL   three-CL book
              Intended: 'Lisi likes one/three book(s).'

      b.   You yi-ben / san-ben shu Lisi hen xihuan.
               have one-CL   three-CL book Lisi very like
               'There is/are one/three book(s) that Lisi likes.'

I also find a NumP somewhat odd when it is the object of certain (non-aspectually marked) stative or attitude verbs such as 'know' or 'believe,' as shown in (60).[22]

(60)   a.   ? Ta {zhidao / jide   / tongyi / dong}   yi-jian shiqing.
              he know   remember agree   understand one-CL matter
              'He knows/remembers/agrees on/understands one thing.'

       b.   ?? Ta xiangxin yi-ge   ren.
              he believe   one-CL person
              'He believes one person.

       c.   ? Lisi hen danxin yi-ge   wenti.
              Lisi very worry one-CL problem
              'Lisi worries about one problem.

       d.   ? Lisi hen liaojie   yi-ge   xuesheng.
              Lisi very understand one-CL student
              'Lisi understands one student well.'

       e.   ?? Ta zhichi   yi-xiang jueding.
              he support one-CL   decision
              'He supports one decision.

While these examples are not horrendous, speakers show preference for using the existential *yǒu*-construction (with the object NumP immediately following *yǒu*) in, e.g., (61), to convey the same meaning.

(61)   You yi-jian shi   wo {zhidao / jide   / tongyi / dong}.   (cf. (60a))
       have one-CL matter I   know   remember agree   understand
       'There is one thing I know/remember/agree on/understand.'

While the difference between the two word orders can be subtle, a more salient contrast can be detected in the following pairs in (62) and (63): the (b)-sentence of each pair sounds infelicitous or even contradictory, whereas the (a)-sentence containing a *yǒu*-construction does not.

(62)   a.   Wo shenme shi   dou bu dong,   danshi you yi-jian shi   wo dong.
               I   what   thing DOU not understand but   have one-CL thing I   understand
               'I don't understand anything, but there is one thing I understand.'

       b.   # Wo shenme shi   dou bu dong,   danshi wo dong   yi-jian shi.
               I   what   thing DOU not understand but   I   understand one-CL thing
               'I don't understand anything, but I understand one thing.'

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[22]Note that the NumPs in these examples are intended as specific indefinites, and that they all become perfect if the numeral *yi* 'one' is replaced by a demonstrative.

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(63) a. Wo bu zhichi   zhanzheng, danshi you yi-zhong zhanzheng wo hui zhichi.
          I not support war   but   have one-type war   I   will support
          'I don't support wars, but there is one type of war I will support.'

    b. # Wo bu zhichi   zhanzheng, danshi wo hui zhichi   yi-zhong zhanzheng.
          I not support war   but   I   will support one-type war
          'I don't support wars, but I will support one type of war.'

Overall, it appears that the existential *yǒu*-construction is the most natural, unmarked way to express specificity of NumPs in Mandarin. Again, this is very different from English.

To sum up, if a Mandarin NumP could function as a specific indefinite, it is unclear why there exists such asymmetry and why speakers show uncertainty with regard to its *grammaticality* (not *interpretation*). The facts presented in this and previous sections are quite striking as Mandarin NumPs actually do not behave in the way usually thought. In particular, they exhibit a strong tendency of resisting *both* specific and nonspecific construal, and in this sense they are clearly different from English *a(n)*-indefinites.

1.5   A Hamblin perspective

I have presented many puzzles and questions on the distribution and interpretation of *wh*-phrases and NumPs in Mandarin. Resolving every problem that I raised is certainly beyond the scope of this dissertation. I will, however, try to argue that at least some of them can be given a (better) explanation if we look at the meaning of Mandarin interrogative and numeral phrases from a different perspective: Hamblin semantics.

In his seminal work, C. L. Hamblin (1973) makes the following remark on the syntax of English *wh*-questions:

> "Although standard English word-order places the interrogative word or phrase (or the main one, if there are more than one) first, with inversion of the verb, there is no real need for an order different from that appropriate to indicatives. So let us assume that no special rules about word-order are needed." (Hamblin 1973: 48)

On the same page, he writes the following on the semantics of English *wh*-questions:

> "So let us turn to semantics. Here we must make some departure, since although we are inclined to class 'who' and 'what' with proper names we cannot by any stretch regard them

as denoting individuals. But there is a simple alternative: they *can* be regarded as denoting *sets* of individuals, namely the set of humans and the set of non-humans respectively. [...] We shall need to regard 'who walks' as itself denoting a set, namely, the set whose members are the propositions denoted by 'Mary walks', 'John walks', ... and so on for all individuals. Pragmatically speaking a question sets up a choice-situation between a set of propositions, namely, those propositions that count as answers to it." (Hamblin 1973: 48, emphasis original)

According to this view, a *wh*-word denotes not an (existential) quantifier but *a set of individuals*, or in his terms a *denotation-set* (referred to as *alternative sets* in subsequent literature; see below). A *wh*-question will then denote *a set of propositions*. For Hamblin, no special syntactic rule is needed to derive the meaning of a question, the latter following from the proposed semantics of *wh*-words with the facilitation by appropriate syntactic-semantic rules.

Hamblin's theory, now deemed as the foundational work of Alternative Semantics, has been adopted/developed for focus (Rooth 1985, 1992), indefinites/indeterminates (Ramchand 1997, Hagstrom 1998, Kratzer and Shimoyama 2002), disjunction (Alonso-Ovalle 2006), (un)conditionals (Rawlins 2008, 2013), polarity items and scalar implicature (Chierchia et al. 2012, Chierchia 2013 and references therein). See Fălăuş (2013) for an overview of current alternative-based theories.

1.6 Kratzer and Shimoyama (2002)

Kratzer and Shimoyama (2002) (henceforth K&S 2002) extend Hamblin's (1973) theory to non-interrogative quantification, in particular to indeterminate pronouns in Japanese and the indefinite *irgendein* in German. They establish a set of compositional principles for alternatives and a set of quantifiers that operate on alternatives.

Traditionally, predicates such as *book* or *run* are taken to denote *properties* (of type $\langle e, t \rangle$), as in (64a), and a proper name like *John* denotes just the individual John (of type *e*). Quantificational determiners are two-place predicates that express relations between two properties (Barwise and Cooper 1981, Keenan and Stavi 1986, inter alia). For instance, *every* takes two arguments R and S and expresses the subset relation between R and S in (64b); *a(n)* is an intersection relation such that the intersection of R and S is not empty, as in (64c); and so on.

(64) a. $[\![book]\!] = \lambda x.\mathbf{book}(x)$

b. $[\![every(R)(S)]\!] = R \subseteq S$

c. $[\![a(n)(R)(S)]\!] = R \cap S \neq \varnothing$

These expressions are given different denotations under K&S's (2002) Hamblin-style theory of quantification. In particular, *John* is regarded as a singleton set that contains one individual, and indefinite phrases are treated as sets of individuals, just like *wh*-phrases. (K&S discuss Japanese *dare* 'who' and the German *irgendein*-indefinites in their work, not English.)

(65) a. $[\![John]\!] = \{\mathbf{J}\}$ (the singleton set containing one individual 'John')

b. $[\![a\ book]\!] = \{x : \mathbf{book}(x)(w)\}$ (the set of individuals that are books)

c. $[\![who]\!] = \{x : \mathbf{human}(x)(w)\}$ (the set of individuals that are human)

Verbal predicates such as *laughed* and *love* denote singleton sets of properties:

(66) a. $[\![laughed]\!] = \{\lambda x \lambda w.\mathbf{laughed}(x)(w)\}$

b. $[\![love]\!] = \{\lambda y \lambda x \lambda w.\mathbf{love}(y)(x)(w)\}$

In semantics, combing the predicate *laughed* with *John* is a matter of combining a set with another. Composition in such (simplest) cases can be achieved using the traditional Functional Application (FA) (Heim and Kratzer 1998) since both sets are singleton sets. However, traditional FA will not do if *laughed* is to apply to *who* because the latter is a (non-singleton) set of individuals. We have to do combine the denotation of *laughed* with each member in the set denoted by *who* one by one, in a *pointwise* fashion. This is the Hamblin Pointwise Functional Application (PFA), which is defined as in (67) (reproduced from K&S 2002: Section 3).

(67) If α is a branching node with daughters β and γ, and $[\![\beta]\!]^{w,g} \subseteq D_\sigma$ and $[\![\gamma]\!]^{w,g} \subseteq D_{\langle \sigma, \tau \rangle}$, then $[\![\alpha]\!]^{w,g} = \{a \in D_\tau : \exists b \exists c[b \in [\![\beta]\!]^{w,g} \& c \in [\![\gamma]\!]^{w,g} \& a = c(b)]\}$.

What (67) says is essentially that when β combines with γ, every object of the type $\langle \sigma, \tau \rangle$ will apply to every object of the type σ, and the result α is the set of the output of every application.

Let us assume a toy model that contains only three individuals a, b and c. The denotation of *who* in the question *Who laughed?* is the set consisting of these three individuals, as in (68a). Combining

who with *laughed* through PFA yields the set of propositions in (68b), which is the meaning of the question *Who laughed?* in the Hamblin semantics.

(68)   a. $[\![who]\!] = \{x : \mathbf{human}(x)(w)\} = \{a, b, c\}$

     b. $[\![who\ laughed]\!] = [\![\mathbf{laughed}]\!](\{a, b, c\}) = \{[\![\mathbf{laughed}]\!](a), [\![\mathbf{laughed}]\!](b), [\![\mathbf{laughed}]\!](c)\}$

        $= \{p : \exists x[\mathbf{human}(x)(w) \wedge p = \lambda w'[\mathbf{laughed}(x)(w')]]\}$

        $= \{\text{that a laughed, that b laughed, that c laughed}\}$

In effect, the set of individuals in (68a) "expands" to the set of propositions in (68b) via PFA.

Indeterminate or indefinite phrases therefore differ crucially from expressions like *John* in denoting a non-singleton set of individual alternatives. In addition, the meaning of a question is obtained without movement; the only operation involved here is the "expansion" of each individual alternative in (68a) to a proposition.

There are many consequences to the syntax of quantification under this alternative-based theory. K&S and Shimoyama (2006) show that, since *wh*-indeterminates do not move at all, the lack of Complex NP Island effects in Japanese *wh*-questions is just expected, because alternatives they introduce can expand across island boundaries. However, expansion will stop once the alternatives meet the closest relevant operator (e.g. *-ka/-mo*), hence the observed *Wh*-Island effects or intervention effects, as schematized in (69).

(69)   a.   *[... [... indeterminate ...]-ka/-mo ...] -ka/-mo   (Shimoyama 2006: 148)

     b.   [... [... indeterminate ...]$_{\text{CNP/Adjunct}}$ ...] -ka/-mo

K&S suggest that the operator the alternatives "associate with" can be existential, universal, interrogative, negative polarity or free choice. Importantly, such "association" between alternatives and a selecting operator is *not* identical to variable-binding relations (Kratzer 2005: 118). Alternatives are alternatives (which grow in the manner just mentioned); they do not represent variables bound by the associated operator.

K&S (2002: Sections 3 & 7) provide the entries of a set of propositional and generalized quantifiers as well as a set of modal operators (exemplified with German *kann* 'can' and *muss* 'have to') that are tailored to the computation of alternatives.

(70) Sentential quantifiers: For $[\![\alpha]\!]^{w,g} \subseteq D_{\langle s,t \rangle}$,

    a. $[\![\exists(\alpha)]\!]^{w,g} = \{\lambda w' \exists p[p \in [\![\alpha]\!]^{w,g} \wedge p(w') = 1]\}$

    b. $[\![\forall(\alpha)]\!]^{w,g} = \{\lambda w' \forall p[p \in [\![\alpha]\!]^{w,g} \rightarrow p(w') = 1]\}$

    c. $[\![\text{Neg}(\alpha)]\!]^{w,g} = \{\lambda w' \neg \exists p[p \in [\![\alpha]\!]^{w,g} \wedge p(w') = 1]\}$

    d. $[\![\text{Q}(\alpha)]\!]^{w,g} = [\![\alpha]\!]^{w,g}$ or

       $[\![\text{Q}(\alpha)]\!]^{w,g} = \{\lambda w' \forall p[p \in [\![\alpha]\!]^{w,g} \rightarrow [p(w) = 1 \leftrightarrow p(w') = 1]]\}$

<div align="right">(Groenendijk and Stokhof 1984)</div>

(71) Generalized quantifiers: For $[\![\alpha]\!]^{w,g} \subseteq D_e$,

    a. $[\![\exists(\alpha)]\!]^{w,g} = \{\lambda P \lambda w' \exists a[a \in [\![\alpha]\!]^{w,g} \wedge P(a)(w') = 1]\}$

    b. $[\![\forall(\alpha)]\!]^{w,g} = \{\lambda P \lambda w' \forall a[a \in [\![\alpha]\!]^{w,g} \rightarrow P(a)(w') = 1]\}$

(72) Possibility & necessity modals: For $[\![\alpha]\!]^{w,g} \subseteq D_{\langle s,t \rangle}$,

    a. $[\![\text{kann}(\alpha)]\!] = \{\lambda w' \exists w''[w'' \text{ is accessible from } w' \wedge \exists p[p \in [\![\alpha]\!]^{w,g} \wedge p(w'') = 1]]\}$

    b. $[\![\text{muss}(\alpha)]\!] = \{\lambda w' \forall w''[w'' \text{ is accessible from } w' \rightarrow \exists p[p \in [\![\alpha]\!]^{w,g} \wedge p(w'') = 1]]\}$

K&S extend the Hamblin-style analysis of Japanese indeterminates to German *irgendein*, an indefinite with ignorance/indifference and free choice effects (depending on the contexts). The contrast below illustrates the basic difference between a regular indefinite and *irgendein*: the question (73b) can follow the statement using *jemand* in (73a) but not the one using *irgendjemand*.

(73) a. Jemand   hat angerufen.
          somebody has called

     b. Wer war es?
         Who was it

     c. Irgendjemand hat angerufen.   (Ignorance or indifference)
          IRGEND-one   has called

     d. # Wer war es?
          Who was it

K&S point out that (73d) is inappropriate because the speaker of (73c) conveys that he doesn't know or care about who called, or thinks the identity of the speaker is irrelevant.

Central to K&S's discussion on *irgendein* is that it exhibits free choice effects when interacting with a modal. Consider (74a) where *irgendein* occurs below a necessity modal. This sentence can be felicitous if in every accessible world Mary marries a different doctor.

(74)   a.   Mary muss **irgendeinen** Arzt   heiraten.
            Mary has.to IRGEND-a   doctor marry
            'Mary has to marry a doctor, any doctor is a permitted option.'

       b.   In w_1 Mary marries Dr. Arzt; in w_2 Mary marries Dr. Betz; in w_3 Mary marries Dr. Curtz;

           in w_4 Mary marries Dr. Dietz; . . .

If, however, Mary has to marry one of only two doctors (Dr. Heintz or Dr. Dietz), and the universe
of discourse contains more than two men, (75a) but not (74a) is felicitous.

(75)   a.   Mary muss **einen** Arzt   heiraten.
            Mary has.to a   doctor marry
            'Mary has to marry a doctor.'

       b.   In w_1 Mary marries Dr. Heintz; in w_2 Mary marries Dr. Dietz; in w_3 Mary marries Dr.

           Heintz; in w_4 Mary marries Dr. Dietz; . . .

Note that the distinction of (74a) and (75a) is not due to the necessity modal itself: all *muss* 'have
to' requires is that in every accessible world Mary marries some doctor, and this can be true if
she marries the same doctor across every accessible world. What the above comparison shows
is that for every alternative doctor, there must exist an accessible world in which Mary marries
that doctor. K&S call this the *distribution requirement*: for every alternative denoted by *irgendein*
there must be a propositional alternative of the form [Mary marry *x*], and the set of propositional
alternatives are "distributed over" the accessible worlds introduced by the modal. This is the free
choice inference of *irgendein*. K&S formalize the distribution requirement as in (76) and propose
that it is derivable as an implicature.

(76)   *Distribution requirement*:

     $\{\lambda w'.\forall p[p \in [\![\alpha]\!]^{w',g} \rightarrow \exists w''[w'' \text{ is accessible from } w' \wedge p(w'') = 1]]\}$

    K&S (2002: Section 7) demonstrate how this result is obtained with Hamblin semantics. First
of all, they take the regular indefinite *ein Mann* to denote the a subset of the set of men (in the
evaluation world).

(77)   a. $g(D) \subseteq D$ (D = the set of possible individuals)

       b. $[\![ein_D \text{ Mann}(\alpha)]\!]^{w,g} = \{x : \textbf{man}(x)(w) \wedge x \in g(D)\}$ (a subset of the set of men)

In contrast, the presence of *irgendein* "widens" the domain of the indefinite, in the sense of Kadmon and Landman (1993) (cf. Chierchia 2004).

(78) For $\llbracket \alpha \rrbracket^{w,g} \subseteq D_e$,

    a. $\llbracket \text{irgend-}\alpha \rrbracket^{w,g} = \{x : \exists g'[x \in \llbracket \alpha \rrbracket^{w,g'}]\}$

    b. $\llbracket \text{irgend-}[\text{ein}_D \ \text{Mann}] \rrbracket^{w,g} = \{x : \exists g'[\mathbf{man}(x)(w) \wedge x \in g'(D)]\}$

       $= \{x : \mathbf{man}(x)(w)\}$ (the set of all men)

Hence, for modal sentences like (74a), we need to deal with the distribution requirement that for each of the alternatives in the widened domain there is an accessible world (introduced by the modal) in which it is true.

Kadmon and Landman (1993) have shown us that domain widening happens for a reason. For English *any*, the reason is to *strengthen* a statement: *I didn't see any student* is stronger than *I didn't see a student*. For *irgendein*, it has to be a different reason, because (74a) is a *weaker* statement than (75a). K&S suggest that "avoidance of false exhaustivity inferences" is also a reason for domain widening.[23] Below is a simple example of exhaustivity inference:

(79) *Context*: Two books are under discussion, an algebra book and a biology book.
    'You can borrow the algebra book.'

The utterance of (79) in this given context delivers the exhaustivity inference that you cannot borrow the biology book. It is *exhaustive* in the sense that my statement of (79) has exhausted your options. Crucially, the exhaustivity inference is triggered due to the created alternatives, which, in this simple case, consist of an algebra book and a biology book.

The distribution requirement of *irgendein* can then be explained with a similar reasoning.

(80) a. Du kannst dir   **irgendeins**   von diesen beiden Büchern leihen.
      you can   you.DAT IRGEND-one of   those two   books   borrow
      'You can borrow one of those two books, it doesn't matter which.'

    b. Alternative set chosen: {A, B}

    c. Truth-conditional content: P(A ∨ B)   (P = possibility modal)

---

[23]See Alonso-Ovalle 2006 and Fox 2007 for further discussions and revisions on this point.

The distribution requirement is derived as follows. First, the speaker says (80a) with a set of two alternatives {A, B}. Suppose P(A) is false (i.e., you cannot borrow A); then the speaker should have made the stronger claim P(B). But she didn't, and so we assume P(A) is true. Now if P(A) is true, but she nevertheless made the claim P(A ∨ B), we get the exhaustivity inference that ¬P(B) is false. Therefore, P(A) → P(B). The same reasoning can repeat for why she didn't make the stronger claim P(B). Thus P(B) → P(A). The overall inference is then P(A) ↔ P(B).

(81)   a. Truth-conditional content: P(A ∨ B)

     b. Implicature: P(A) ↔ P(B)

     c. Total meaning: P(A) ∧ P(B)

In effect, the total meaning of (80a) is that you can borrow A *and* you can borrow B. We arrive at this conclusion with the truth-conditional content (i.e., the meaning of the surface string) plus the implicature. See K&S 2002: Section 8 for demonstrations of how to derive the meaning of other modal sentences containing *irgendein*.

This is how we obtain the distribution requirement: the total meaning shown in (81c) amounts to saying that the alternatives introduced by *irgendein* are distributed over the accessible worlds. The propositional alternatives interact directly with the modal and the ∃-quantifier which the modal introduces. This is made possible by Hamblin semantics, which allows individual alternatives to grow and become propositional alternatives, which are in turn caught up by the ∃-quantifier associated with the modal.

Another important consequence of K&S's theory is a set of syntactic concord phenomena. The following examples show that *irgendein*-NPs are selective with respect to associated operators. (82), for instance, does not have the c-reading where *irgendeins* would associate with a ∀-quantifier.

(82)   **Irgendeins**   von diesen Kindern kann sprechen.
     IRGEND-one of   these   children can   talk
     a. 'One of those children can talk.' (the speaker doesn't know or care which one it is)
     b. 'One of those children is allowed to talk.' (any one is a permissible option)
     c. *'Any one of those children can talk.' (i.e., 'any of those children has the ability to talk')

(83a) and (83b) indicate that *irgendein*-NPs do not associate with sentential negation or the question Q-operator, either:

(83)   a.   * Ich hab' nicht **irgendwas**   gelesen.
            I   have not   IRGEND-what read
            'I didn't read anything.'

       b.   Der Lehrer hat gefragt, ob   Hans **irgendein**   Buch gelesen hat.
            the teacher has asked   whether Hans IRGEND-one book read   has.
            'The teacher asked whether Hans read any book.'
            <u>Impossible reading</u>: The teacher asked whether {Hans read book a, Hans read book

            b, Hans read book c, etc.}.

Therefore, the only operator that *irgendein*-NPs can associate with is the existential quantifier; it exhibits no quantificational variability. Kratzer (2005) further suggests that the relation between an *irgendein*-NP and the existential operator it associates with can be seen as a type of *Existential Concord*, which together with Negative Concord constitutes a sub-paradigm of concord phenomena. Multiple questions like *What did you give to whom?* can also be regarded as a case of *Interrogative Concord* from the Hamblin perspective (Kratzer 2005: 125–126).

In minimalist terms, K&S suggest that selective indeterminates/indefinites bear uninterpretable but pronounceable features [∃], [∀], [Neg], or [Q]. The interpretable versions are carried by inflectional categories such as aspect, negation and *wh*-complementizers. Kratzer (2005) takes the syntactic relation between the indeterminates/indefinites and their associate operators to be *agreement* of a matching feature. The existential force of an *irgendein*-NP is a consequence of agreement between it and an ∃-quantifier through the [∃] feature. On the other hand, Japanese-type indeterminates are unselective in the sense that they can agree with a full range of quantificational operators.

1.7   Mandarin *wh*-phrases in Hamblin semantics

A number of researchers have already suggested a Hamblin-semantics analysis for Mandarin *wh*-phrases, including Kim (2004), Dong (2009), and He (2011). Cheng and Huang (1996) and Lin (1996) also make a similar proposal on the so-called *wúlùn...dōu*-constructions where *wh*-expressions play a crucial role, although in their treatments Mandarin *wh*-phrases do not denote sets of alternatives across-the-board.

Just like Japanese indeterminates, the denotation of Mandarin *wh*-words in Hamblin semantics

is also a *set of individual alternatives*. For instance, *shei* 'who' has the meaning in (84) (intensional variables/indices are omitted throughout for simplicity):

(84) $[\![\text{shei}]\!] = \{x : \text{human}(x)\}$

In a toy situation where John, Bill and Peter are the only relevant individuals, (84) would denote the set in (85).

(85) $[\![\text{shei}]\!] = \{\text{John}, \text{Bill}, \text{Peter}\}$

In a simple question like *left*, the one-place predicate *likai* 'left' takes an individual (of type e) as its argument. Since the subject *wh*-phrase is no longer an individual but a set of individuals, Hamblin PFA is exploited to allow the composition of a set and a predicate that is itself a singleton set: the predicate combines with each alternative in the set in a pointwise manner, by which the size of the set "expands", as exemplified in (87).

(86) Shei likai le?
      Who left   INCH
      'Who left?'

(87) $[\![\text{likai-le}]\!]([\![\text{shei}]\!]) = \lambda x[\text{left}(x)]([\![\text{shei}]\!]) = \lambda x[\text{left}(x)](\{\text{John}, \text{Bill}, \text{Peter}\})$

      $= \{\lambda x[\text{left}(x)](\text{John}), \lambda x[\text{left}(x)](\text{Bill}), \lambda x[\text{left}(x)](\text{Peter})\}$

      $= \{\text{that John left}, \text{that Bill left}, \text{that Peter left}\}$

This mechanism plays a crucial role in the interpretation of *wh*-questions where the *wh*-phrase is embedded inside an island. As K&S and Shimoyama (2006) point out, the absence of island effects in such cases is a natural consequence of Hamblin semantics, since *wh*-expressions can keep "expanding" until they encounter an appropriate operator that selects an alternative set. Hence, for (88) *shei* can compose with the material all the way to the edge of the complex NP, giving rise to the impression that locality constraints disappear. (89) below illustrates the set "expansion" from a *wh*-word to a relative clause.

(88) Mali xihuan [_DP_ [_CP_ **shei** xie e_i] de shu$_i$]?
      Mary like   **who** write   REL book
      Lit. 'Mary likes the book that who wrote?'

(89)   a. $[\![\text{xie}]\!] = \lambda x \lambda y[\text{xie}(x)(y)]$ ('write')

b. $[\![_{\text{IP}}\text{ xie }e_i\text{ (de)}]\!]$ ('$[_{\text{IP}}$ write e_i (REL)]')

$$= \lambda x \lambda y[\text{xie}(x)(y)](x_i) = \lambda y[\text{xie}(x_i)(y)]$$

c. $[\![_{\text{CP}}\text{ shei xie }e_i\text{ (de)}]\!]$ ('$[_{\text{CP}}$ who write e_i (REL)]')

$$= \lambda y[\text{xie}(x_i)(y)](\{\text{John}, \text{Bill}, \text{Peter}\})$$

$$= \{\text{xie}(x_i)(\text{John}), \text{xie}(x_i)(\text{Bill}), \text{xie}(x_i)(\text{Peter})\}$$

$$= \{\lambda u[\text{xie}(u)(\text{John})], \lambda u[\text{xie}(u)(\text{Bill})], \lambda u[\text{xie}(u)(\text{Peter})]\} \quad \textit{by } \lambda\textit{-abstraction}^{24}$$

The result in (89c) is a set of entities that were written by John, Bill and Peter, respectively. This is the denotation of the relative clause containing *shei* 'who.' Before we proceed to the head NP *shu* 'book', let us assume, for the sake of simplicity, that the set of books is old/familiar information in the relevant context, which licenses definite interpretation on the bare noun *shu* 'book,' and further that each book is written by exactly one author. By adopting the standard view that a relative clause and its head NP combine by Predicate Modification (Heim and Kratzer 1998), the meaning of the whole complex NP is the set of (definite) books written by John, Bill and Peter, respectively, as shown as (90):

(90) $[\![[_{\text{CP}}\text{ shei xie }e_i\text{ de] shu}]\!]$ ('$[_{\text{CP}}$ who write e_i REL] book')

$$= \iota z[\text{book}(z) \wedge [\![\text{CP}]\!]]$$

$$= \iota z[\text{book}(z) \wedge \{\lambda u[\text{xie}(u)(\text{John})], \lambda u[\text{xie}(u)(\text{Bill})], \lambda u[\text{xie}(u)(\text{Peter})]\}]$$

$$= \{\iota z[\text{book}(z) \wedge \text{xie}(z)(\text{John})], \iota z[\text{book}(z) \wedge \text{xie}(z)(\text{Bill})], \iota z[\text{book}(z) \wedge \text{xie}(z)(\text{Peter})]\}$$

$$= \{\text{the book John wrote}, \text{the book Bill wrote}, \text{the book Peter wrote}\}$$

The question (88), then, is one that inquiries on which book in the set of (90) is such that Mary likes it. Note that to derive the complete question meaning of (88), we need to let the Q-operator associate with the whole complex NP, instead of the *wh*-word alone. Exactly how this should be implemented is a nontrivial task, and I will leave it for future investigation. Yatsushiro's (2009) proposal based on an existentially closed choice function variable over a set of alternatives may be a possible solution for similar cases in Mandarin as well.[25]

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[24]See Yatsushiro 2009: 154 for a formal characterization of such λ-abstraction rule.

[25]Alternatively, the complex NP may undergo covert pied-piping to a scope position in the sense of Nishigauchi (1990), though this approach has been criticized by von Stechow (1996).

This is just a very brief sketch of what Mandarin *wh*-quantification would look like in Hamblin semantics. There are many other issues and consequences in treating Mandarin *wh*-phrases as denoting sets of alternatives (as opposed to, e.g., existential quantifiers or Heimian variables), which have been discussed and explored by Kim (2004), Dong (2009) and He (2011), among others. The main mission of this dissertation is to explore the consequences of adopting a Hamblin semantics for non-interrogative quantification in Mandarin. In particular, we would like to know how the non-interrogative interpretations (both existential and universal) of *wh*-items are derived in a Hamblin semantics. As we have seen earlier, the distributions of non-question phrases like NumPs display similar restrictions to *wh*-phrases, and therefore whether the behaviors of these nominal phrases can be explained in a uniform manner is worth exploring.

Chapter 2

Logical relations and quantification: From morphology to alternatives

In the first chapter, I reviewed Kratzer and Shimoyama's (2002) theory of quantification based on Hamblin semantics. The purpose of this chapter is to demonstrate that one can actually see the expanded propositional alternatives in syntax, thus providing direct support for a Hamblin-style analysis of Mandarin quantification.

2.1 Prelude: Disjunction and conjunction in Hamblin semantics

In order to appreciate how the Mandarin data in the rest of this chapter correlate with Hamblin semantics, we need to see first how disjunction and conjunction are analyzed in this framework.

Alonso-Ovalle (2006) proposes that English *or* is not a logical disjunction connective, but an operator that introduces a set of propositional alternatives. For instance, the sentence (91a) denotes the set of propositions in (91b).

(91) a. Sandy ate ice cream or she ate cake.

   b. {Sandy ate ice cream, Sandy ate cake}

One of the cases that Alonso-Ovalle argues necessitate a Hamblin analysis of *or* is where a disjunction is embedded under a modal. Consider (92):

(92) Sandy may have cake or ice cream.

This sentence is naturally understood as Sandy has the right to have cake *and* she also has the right to have ice cream. The standard/traditional analysis of *or* together with that of *may*, however, fails to predict this. The reason is that if (92) is taken as the union of the set of worlds where Sandy has cake and the set of worlds where she has ice cream, as in (93), (92) would be predicted to be true if Sandy is permitted to have that cake but is not permitted to have ice cream. The truth-condition based on *or* as a disjunction connective is too weak and does not reflect the meaning of (92).

(93)   ⟦Sandy has cake⟧ ∪ ⟦Sandy has ice cream⟧

What we need to have is a semantics that allows the disjunction to scope over the modal, so that in *each* of the propositions in (93) there is a permitted world.

Alonso-Ovalle (2006) adopts K&S's (2002) theory and proposes that the function of *or* is to introduce a set of alternatives, which are existentially closed under the propositional ∃-quantifier (see (70a)). The following example illustrate how the semantic composition goes.

(94)   a. Sandy may eat this cake or that apple.   (modified from Alonso-Ovalle 2006: 154)

   b.
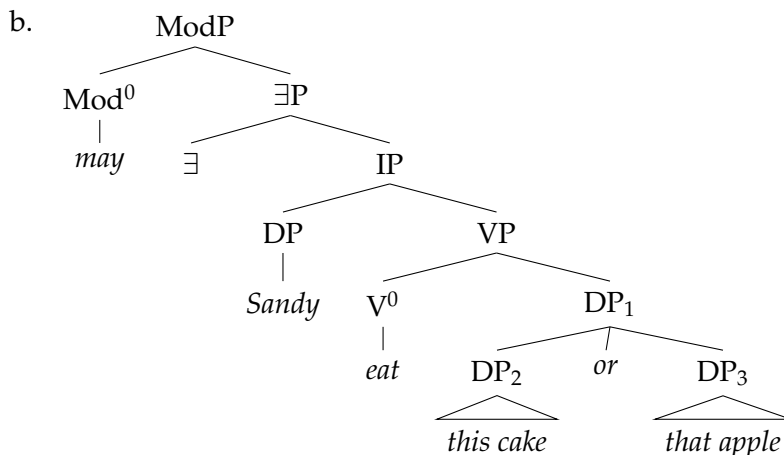
In the Hamblin system, DPs such as *Sandy*, *this cake* and *that apple* denote singleton sets, call them $\{\mathbf{s}\}$, $\{\mathbf{c}\}$ and $\{\mathbf{a}\}$, respectively. The denotation of the DP-disjunction DP_1 will then be the set of individual alternatives $\{\mathbf{c}, \mathbf{a}\}$. Each alternative expands via Hamblin PFA (see (67)) and turns into a proposition, as in (95a) (cf. Alonso-Ovalle 2006: 156). Closure of this set of propositions by the ∃-quantifier yields the proposition that one alternative in (95a) is true.

(95)   a. $\llbracket IP \rrbracket = \{\lambda w.\mathbf{eat}(\mathbf{s}, \mathbf{c}), \lambda w.\mathbf{eat}(\mathbf{s}, \mathbf{a})\}$

   b. $\llbracket \exists P \rrbracket = \{\lambda w' \exists p[p \in \{\mathbf{eat}(\mathbf{s}, \mathbf{c}), \lambda w.\mathbf{eat}(\mathbf{s}, \mathbf{a})\} \wedge p(w') = 1]\}$ (Existential Closure)

The proposition (95b) is then combined with the modal *may*.[1] Finally, the inference of (94a) that Sandy may eat this cake *and* she may eat that apple is derived through implicature associated with domain widening under ∃-Closure.

Agafonova (2011) extends this Hamblin treatment of disjunction to the conjunction marker *and* in English and Russian. Her analysis is fully parallel to Alonso-Ovalle's (2006) of *or*: *and* is not a conjunction connective but introduces a set of alternatives into semantics. Unlike *or*, however, *and* triggers "Universal Closure" on the alternatives it introduces.[2]

(96) *Universal Closure*   (Agafonova 2011: 55)
      Where $[\![A]\!] \subseteq D_{\langle s,t\rangle}$, $[\![\forall P]\!] = \{\lambda w \forall p[p \in [\![A]\!] \rightarrow p(w)]\}$

Hence, the meaning of *Bill saw Mary and John* is derived by Universal Closure over the set of propositions {Bill saw Mary, Bill saw John}.

Under Alonso-Ovalle's (2006) and Agafonova's (2011) proposals, the basic function of both *and* and *or* is to introduce a set of alternatives, which are expressed by their conjuncts and disjuncts, respectively. They differ in the type of operator that comes in to close the alternatives.

2.2 *Háishì*-disjunctive questions

Huang (1991) demonstrates that the complex expression *háishì*, which consists of the focus particle *hái* and the copula *shì* 'be,' functions as a question operator that connects two (partially elided) constituents to form a *disjunctive question*, as shown in (97a)–(97c).[3]

(97) a. Ni   xihuan Zhangsan **haishi** Lisi?   (Huang 1991)
          you like   Zhangsan or   Lisi
          'Do you like Zhangsan or Lisi?'

      b. Ni gen ta **haishi** bu gen ta   shuo hua?
          you with him or   not with him say   words
          'Do you talk to him or not?'

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[1]Alonso-Ovalle (2006) uses slightly different entries for modals from those suggested by K&S (2002), a difference that does not concern us here.

[2]The meaning of this ∀-quantifier in (96) is identical to the sentential ∀-quantifier introduced by K&S (2002) (see (70b)).

[3]When *hái* is used alone, it can interpreted, in different contexts, as 'still,' 'more,' 'also,' or 'moderately.' It also translates to the aspectual polarity item '(not) yet' if followed by negation.

c. Ni   xihuan **haishi** bu xihuan zhe-ben shu?
you like   or   not like   this-CL book
'Do you like this book or not?'

There are at number of noteworthy properties about *háishì*. First, it is not a simple disjunctive connective like *or* in English; each example in (97) must be understood as a question which asks the hearer to pick out one of the disjuncts as the answer. Thus, *háishì* carries some "interrogative feature" on its own.

But a sentence with a *háishì*-disjunction is not always a question. It has been noted that in a number of environments, *háishì* is not interpreted a disjunctive question. The examples in (98) are due to Lin (2008), also cited in Huang 2010: 130.

(98) a. *Epistemic modal contexts*

Ta keneg xihuan Zhangsan **haishi** Lisi.
he might like   Zhangsan or   Lisi
'He might like Zhangsan or Lisi.'

b. *Yes-no questions*

Ta xihuan Zhangsan **haishi** Lisi ma?
he like   Zhangsan or   Lisi Q
'Is it that he likes Zhangsan or Lisi?'

c. *Negative contexts*[4]

Ta mei-you xihuan Zhangsan **haishi** Lisi.
he not-have like   Zhangsan or   Lisi
'He does not like Zhangsan or Lisi.'

d. If-*conditionals*

Zhiyao   Laowang **haishi** Xiaoli yuanyi canjia . . .
as.long.as Laowang or   Xiaoli willing join
'As long as Laowang or Xiaoli is willing to join. . . '

The interrogative interpretation can also be "wiped out" if *háishì* occurs in the scope of nonfactive verbs, in the complement of 'want' (though still requiring a classifier) and in consequent clauses, as shown in (99).

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[4]*Háishì*-disjunction in the scope of negation appears to require certain contextual conditions; (98c), for instance, is most natural as a "direct denial" of its affirmative counterpart.

(99) a. *Nonfactive verbs*:

        Wo yiwei Mali **haishi** Yuehan keyi bang ni.
        I   think Mary or   John   can help you
        'I thought Mary or John could help you.'

    b. *Verb complements of 'want'*:

        Wo xiang chi *(dian) shuiguo **haishi** qingcai.
        I   want eat CL   fruit   or   vegetable
        'I want to eat some fruit or vegetables.'

    c. *Consequent clauses*:

        Ni yaoshi bu fangxin, jiu jiao Mali **haishi** Yuehan pei   ta yiqi   qu.
        you if   not relax   then ask Mary or   John   accompany him together go
        'If you have concerns, ask Mary or John to accompany him.'

It is striking that the environments in (98) are precisely the ones where a Mandarin *wh*-phrase can be interpreted existentially, as we have seen in Section 1.3.1. In other words, *háishì*-disjunctive expressions behave like *wh*-items (Lin 2008): when they occur in the scope of an appropriate licensing operator, they receive non-interrogative existential quantification.[5]

Moreover, just like *wh*-phrases, non-interrogative readings of *háishì*-disjunctive expressions cannot be licensed by deontic or dynamic modals. (100a) and (100b) are both awkward with the intended modal interpretation (but they allow interrogative interpretation).

(100) a. % Lisi keyi/bixu mai zhe-ben shu **haishi** na-ben shu.   cf. (19a)
        Lisi can/must buy this-CL book or   that-CL book
        Intended: 'Lisi can$_{deo}$/must$_{deo}$ buy this book or that book.'

    b. % Lisi neng/ken   ban   zhe-ge xiangzi **haishi** na-ge   xiangzi.   cf. (19b)
        Lisi can/willing move this-CL box   or   that-CL box
        Intended: 'Lisi can$_{dyn}$/is willing to move this box or that box.'

Note that (100a) is grammatical on the non-interrogative reading where the speaker is informed that Lisi has the permission/obligation to buy one of the two books but he is not sure which one. On this reading the uncertainty comes from the addition of an implicit epistemic modal such as *haoxiang* or *sihu*, both meaning 'seem,' on top of the entire sentence, and thus (100a) on this reading is similar to the case of (98a). That is, this non-interrogative reading is not licensed by the deontic

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[5]This behavior of *háishì* is somewhat similar to Polish *czy* which may serve as a disjunction marker in alternative questions or a question marker that can be translated as *whether* (Mayr 2014).

modals per se. The same holds for (100b). The following imperative sentences show a much clearer contrast:

(101) a. Mai zhe-ben shu!
           buy this-CL book
           'Buy this book!'

       b. * Mai zhe-ben shu **haishi** na-ben shu!
           buy this-CL book or   that-CL book
           Intended: 'Buy this book or that book!'

Overall, *háishì*-disjunctions are parallel to *wh*-phrases in terms of the licensing conditions of non-interrogative interpretations.

It should not be surprising by now to see that the particle *dōu*, which enforces universal quantification on a preceding *wh*-phrase, imposes the same effect on a *háishì* disjunction, as (102) shows.

(102) Wulun   shi Zhangsan **haishi** Lisi dou keyi lai.   (Lin 2008: 34)
       no.matter be Zhangsan or   Lisi DOU can come
       'No matter it is Zhangsan or Lisi, they can come.'

Note that in this case the disjunctive meaning is interpreted as *conjunctive*: (102) conveys that Zhangsan can come *and* Lisi can come. We will return to this observation momentarily.

Third, the disjunctive scope of interrogative *háishì* can reach outside a Complex NP Island, as shown in (103).[6]

(103) [Wo qu Meiguo **haishi** bu qu] bijiao hao?   (Huang 1991: 313)
       I   go America or   not go more good
       'Is it better that I go to America or that I do not?'

However, Erlewine (2014) observes that a *háishì*-disjunction is sensitive to *Wh*-Island effects. (104a) shows that 'Lisi or Wangwu' can occur in an embedded clause of 'think.' In contrast, when the matrix verb is 'wonder' which selects an interrogative complement clause, the sentence becomes ungrammatical, as in (104b).

(104) a. Ni juede [Zhangsan xihuan Lisi **haishi** Wangwu] (ne)?
           you think Zhangsan like   Lisi or   Wangwu Q
           'Do you think Zhangsan likes Lisi or Wangwu?'

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[6]*Háishì*-questions differ from other (morpho-syntactically distinct) types of "A-not-A" questions in that the latter exhibit locality effects (Huang 1982a, 1991).

b. * Ni   xiang-zhidao [shei xihuan Lisi **haishi** Wangwu] (ne)?
    you want-know   who like   Lisi or   Wangwu Q
    Intended: 'Is it Lisi or Wangwu that you wonder who likes __?'

In his analysis of *háishì*, Erlewine (2014) adopts Rooth's (1985) multidimensional theory and proposes that the focus value ($\llbracket . \rrbracket^f$) of the disjunction that *háishì* creates is a set of alternatives, whereas its ordinary value ($\llbracket . \rrbracket^o$) is undefined.

(105) $\llbracket$X *háishì* Y$\rrbracket^f = \{X, Y\}$; $\llbracket$X *háishì* Y$\rrbracket^o$ undefined

A simple disjunction "X *háishì* Y" can grow via Hamblin PFA in the same way as Japanese indeterminates do in K&S's system. For instance, (106a) would denote the set of propositions in (106b) (instead of a logical disjunction), which is expanded from the set of individual alternatives {Zhangsan, Lisi}. The set in (106b) is then selected by a question Q-operator proposed by Beck and Kim (2006).

(106) a. Ni   xihuan Zhangsan **haishi** Lisi?   = (97a)
        you like   Zhangsan or   Lisi
        'Do you like Zhangsan or Lisi?'

      b. $\llbracket$(106a)$\rrbracket^f = \{$you like Zhangsan, you like Lisi$\}$

Erlewine (2014) demonstrates that this alternative-based analysis accounts for the non-interrogative uses of *háishì*, sensitivity to *Wh*-Islands, as well as intervention effects. Crucially, all these properties associated with *háishì* are predicted by K&S's (2002) theory for Japanese.

Huang's (1991) syntactic account that *háishì* disjunctive questions involve deletion together with Erlewine's (2014) semantic account that they denote sets of alternatives sheds new lights on how we could, and should, reexamine Mandarin (*wh-*)quantification from the perspective of *háishì*-disjunctive questions. As mentioned, *háishì* is not a logical disjunction operator; when it is not embedded under modals/negation/etc. it will necessarily project disjunctive question meaning. In other words, it should have an inherent [+Q] feature like that in interrogative pronouns, where [+Q] should be understood as a feature that signals the presence of alternatives.

A closer look at the morphological make-up of *háishì* provides a rationale of where the [+Q] feature may come from. First of all, *háishì* can be decomposed as the focus particle *hái* plus the copula *shì*. According to Liu (1996), *hái* has undergone the following grammaticalization process:

(107)   The grammaticalization path of *hái*:   (Liu 1996: 134)
         motion verb --→ time (simultaneity duration/additive focus) --→ contrast/concession

Note that (107) is meant to explain/capture, from the view of grammaticalization, the multi-functionality of *hái* in modern Mandarin, and does not imply that the uses in earlier stages have fallen out of use. *Hái* can still serve as a motion verb meaning 'to return' in modern Mandarin though with a different vowel form (*huán*), and the "additive focus" meaning in the second stage is possibly what is observed in the case of disjunctive *háishì*.

Liu's (1996) proposal that focus *hái* began as the verb 'return' is quite appealing in the context of disjunctive questions. The correlation is that motion verbs like *return* carry an *additive presupposition* in their lexicon: if you returned, you must have returned *from somewhere else*. In this light, *hái* being recruited as a lexical component of a disjunctive question operator becomes sensible, because motion verbs and disjunctive questions share one core property, namely the requirement that at least two alternatives be relevant/involved at the level of interpretation.

With regard to the copula *shì*, many researchers have suggested that it is historically developed from a demonstrative pronoun in ancient Chinese (e.g. Wang 1958, Li and Thompson 1977, Feng 1993, Peyraube and Wiebusch 1994, among others). In modern Mandarin, *shì* is a copula 'be' that can be construed as an identificational focus marker. In the focus use, when it is associated with an object, it must be *preverbal*; however, the matrix verb in the contrastive clause can be elided, which gives rise to the impression that *shì* can sometimes be adjacent to an object, as shown in (108b).[7]

(108)   a. Lisi **shi** Hafo   de xuesheng.   (*shì* as a copula)
             Lisi be   Harvard DE student
             'Lisi is a student at Harvard.'

         b. Lisi **shi** renshi (*shi) Mali, bu **shi** ~~renshi~~ Yuehan.   (*shì* as a focus marker)
             Lisi be know   be Mary not be   know John
             'Lisi knows Mary$_F$, not John.'

Given that *háishì*-questions do not involve a copular structure (at least not obviously so), we are left with the option that *shì* in the *háishì* complex is the very same one as the focus *shì*. It is a functional head that selects for a clausal/propositional complement and semantically imposes

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[7]See Section 2.6 for more discussions on the syntax of *shì*.

exhaustive identificational focus (à la É. Kiss 1998) on the complement, e.g. the VP 'know Mary' in (108b).

Based on the discussions above, I would like to pursue the idea that *háishì* carries an inherent [+Q] question feature because it is essentially the combination of the additive particle *hái* and the exhaustive identificational focus marker *shì*. The contribution of *hái* is the additive presupposition of a non-singleton set of alternatives, and that of *shì* is to introduce/identify an exclusive propositional alternative. Putting these two together yields a set of "mutually exclusive" propositional alternatives (e.g. 'Lisi knows Mary' and 'Lisi knows John').

Further support for decomposing *háishì* into *hái + shì* is an observation by Erlewine (2014) that a second instance of *shì* can optionally precede the first disjunct of a *háishì*-question and, as in (108b) above, it only occurs preverbally if the associated phrase is an object, as evidenced by (109).

(109) Ni   (**shi**) xihuan (*shi) [NP Zhangsan] **haishi** [NP Lisi]?
　　　 you be   like   be   Zhangsan or   Lisi
　　　 'Do you like Zhangsan or Lisi?'

The fact that *shì* cannot occur inside VP implies that *háishì* does not, either, and therefore the underlying complement of *háishì* in (109) is actually an IP/VP rather than an NP, as in (110), along the lines of Huang's (1991) deletion analysis.[8]

(110)　 a.　Ni   (**shi**) [IP xihuan Zhangsan] **haishi** [IP ~~xihuan~~ Lisi]?
　　　　　 you be   like   Zhangsan or   like   Lisi
　　　　　 'Do you like Zhangsan or (do you like) Lisi?'

　　　 b.　Ni   (**shi**) [IP chi-le   fan] **haishi** [IP ~~chi-le~~   mian]?
　　　　　 you be   eat-PERF rice or   eat-PERF noodle
　　　　　 'Did you eat rice or (did you eat) noodles?'

This way, we are able to map the syntax of (109) directly to its semantics.

(111)　 a.　Syntax: IP$_1$ *háishì* IP$_2$

　　　 b.　Semantics: $\{ [\![IP_1]\!], [\![IP_2]\!] \}$

Our final task is to determine whether *háishì* is itself the disjunctive question operator. I take the fact that both disjuncts can be preceded by *shì* to be indication that *háishì* by itself is *not* the

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[8]It is conceivable that the first instance of *shì* in (109) may actually be *háishì* with *hái* obligatorily deleted, in which case the two clausal disjuncts would be even more parallel.

Q-operator, otherwise the *shì* attached to the first disjunct would be purely accidental. I propose that both *shì* and *háishì* are *concord* elements with the invisible Q-operator.

(112)   Q . . . . . .   [(*shì*_[Q]) [_{IP₁} . . .]] [*háishì*_[Q] [_{IP₂} . . .]] . . .   *Interrogative Concord*

In formal terms, *shì* carries the uninterpretable [Q] feature that agrees with the interpretable [Q] feature on the Q-operator.[9] Such agreement relation, which surfaces as concord phenomenon on a par with Negative Concord, is cross-clausal, because *háishì*-disjunctive questions are now analyzed as having a clausal coordination structure uniformly. The concord relation in (112) may well be regarded as a subtype of "Interrogative Concord" in the sense of Kratzer (2005).

Hái, as mentioned, is associated with additivity. I argue that it is best analyzed as a prefix that marks plurality of alternatives. In some sense, *hái* is on a par with the prefix *al-* in English, which appears such quantificational expressions as *also*, *already*, *almost*, and *always*, all of which can be taken to involve plurality in some domain. The presence of *hái* therefore does not entail question interpretation, but does entail quantification over a set of alternatives.

In this analysis, that *háishì*-disjunctions can obtain non-interrogative interpretations is a result of Existential Closure by K&S's propositional ∃-quantifier. When the alternatives denoted by a *háishì*-disjunction meet the ∃-quantifier, they are "closed" and never reach to the Q-operator, hence the absence of interrogative interpretation.

(113)   Q . . . ∃ . . .   [(*shì*) [_{IP₁} . . .]] [*háishì* [_{IP₂} . . .]] . . .   *intervention*

Exactly what brings out the ∃-quantifier in (311) is not easy to answer. The reason is that Existential Closure of *háishì*-disjunctions (as well as *wh*-phrases) does *not* come for free, otherwise they would receive non-interrogative readings even when not licensed. I will address this issue later.

In short, *háishì* in Mandarin expresses a disjunctive question but *háishì* itself is not a marker of "logical disjunction" in semantics. The meaning of a *háishì*-question is simply a set of propositional

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[9]There are several ways to characterize the Q-operator, depending on which alternative-based theory one's analysis relies on. As I am not adopting Rooth's (1985) multidimensional theory that distinguishes ordinary values from focus values, it is not necessary (and possibly not correct) for me to assume the kind of Q-operator in Erlewine 2014. I will assume either of K&S's entries of the Q-operator in (70d) will suffice, though nothing in this dissertation hinges on this.

alternatives. What is important about *háishì* is that it allows for a transparent way to read off Hamblin semantics from its syntactic structure via the schema in (114) (even more so than English *or*, because *or* does not entail question interpretation), by which we can derive the meaning of a disjunctive question without additional operations.

(114) $[\![(shì) \text{ X } háishì \text{ Y}]\!] = Q\{X, Y\}$ ('Is X true or is Y true?')

2.3   The *wh*-morphology of Mandarin

It has been observed by researchers in Chinese historical linguistics that the *wh*-word *shenme* 'what' in modern Mandarin is evolved from the copula *shì* as a focus marker that attached to a nominal *wu* 'thing' in ancient Chinese (see Lien 2014 and references therein, and Lien 2009 for parallel phenomena in Southern Min, a southern Chinese language).

(115)   The historical development of *shenme* 'what':

  shì 'be' + *wu* 'thing' (ancient Chinese) $--\rightarrow$ *shen-me* (modern Mandarin)

The fact that both *háishì* and the historical predecessor of *shenme* morphologically contain the focus marker *shì* is an initial indication that disjunctive questions and *wh*-questions in Mandarin are interrelated. Assuming (115) is the correct historical analysis of the *wh*-word *shenme*, I take it as an argument for the claim that a *wh*-question expanded from *shenme* is underlying a set of alternatives just like a *háishì*-question is, and the only difference between them is that while the cardinality of alternatives in *háishì*-questions is syntactically specified, that of *shenme* is not and must be determined by the context.

(116) $[\![P(shenme)]\!] = [\![P(a) \ háishì \ P(b) \ háishì \ P(c) \ háishì \ldots]\!] = \{P(a), P(b), P(c), \ldots\}$

More concretely, the meanings of the disjunctive question (117a) and *wh*-question in (118a) can both be represented as sets of alternatives.

(117)   *Disjunctive questions*

  a. Ni   xihuan Zhangsan haishi Lisi?   (cardinality of alternatives = 2)
      you like   Zhangsan or   Lisi
      'Do you like Zhangsan or Lisi?'

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b. Semantics: {you like Zhangsan, you like Lisi}

(118) Wh-*questions*

    a. Ni xihuan shenme?   (cardinality of alternatives unspecified)
       you like   what
       'What do you like?'

    b. Semantics: {you like a, you like b, you like c, . . . }

Of course, the parallel treatment of the two types of questions is just what is expected from the perspective of Hamblin semantics, where questions denote sets of alternatives. What is interesting and important about the Mandarin data is that the existence of a set of alternatives is transparently marked by *háishì*, which is reduced to a focus marker *shì* in *shenme*.

Typologically, there are many languages that utilize the same morpheme for disjunctions and questions. Japanese *-ka* is a well known case: it surfaces in yes-no questions and disjunctions. Jayaseelan (2001) shows that the disjunction marker *-oo* in Malayalam can also form yes-no questions:[10]

(119)   a. ñaan John-ine-**(y)oo** Bill-ine-**(y)oo** kaNDu.   (Jayaseelan 2001: 70)
        I   John-ACC-DISJ Bill-ACC-DISJ saw
        'I saw John or Bill.'

    b. John wannu-**(w)oo**?   (Jayaseelan 2001: 67)
        John came-DISJ
        'Did John come?'

    c. John wannu-**(w)oo**, illa-**(y)oo**?
        John came-DISJ   not-DISJ
        'Did John come, or not?'

Unlike Japanese *-ka* and Malayalam *-oo*, however, Mandarin *háishì* is a disjunctive marker that must project a disjunctive/yes-no question unless under some "licensing" environments. Moreover, *háishì* shares one core morpheme with the *wh*-word *shenme*, i.e., a focus marker, which is a pattern not observed for Japanese and Malayalam.

Notice that *shenme* can precede common nouns such as 'thing' or 'person,' and therefore behaves like an NP-internal *modifier* rather than a head NP. The table in (120) shows two main series

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[10]Note that Jayaseelan treats the two instances of *-oo* in (119a) as disjunction markers but that in (119b) and (119c) as a disjunction operator that takes scope.

of *wh*-expressions in Mandarin, one containing *shneme* and the other *nǎ* 'which,' the latter being historically derived from the demonstrative *nà* 'that/there' (Wang 1958).

(120)   The (non-exhaustive) paradigm of *wh*-phrases in Mandarin

wh-series ⟍ class	"shen-me" (origin: 'be-thing')	"nǎ" (origin: 'that')
thing	*shenme dongxi* 'what thing'	*na-yi-ge dongxi* 'which thing'
person	*shenme ren* 'what person'	*na-yi-ge ren* 'which person'
time	*shenme shihou* 'what time'	*na-shihou* 'when'
place	*shenme difang* 'what place'	*na-li/na-yi-ge difang* 'where'
reason	*wei-shenme* 'for-what'	- -

It should be easy to see that both *shenme* and *nǎ* represent the "*wh*-morphology" in Mandarin interrogative expressions, although strictly speaking they compose with the common noun at the phrasal, not morphological, level.[11] The impression that *shenme* is itself an independent NP is due to the fact that the common noun is generally optional. What the paradigm in (120) suggests is that we need to consider the meaning of *shenme* something more abstract than "*wh* + thing."

As mentioned, like *shenme*, the other productively used *wh*-morpheme *nǎ* is also historically related to a demonstrative pronoun, i.e., *nà* 'that/there' (which is still alive in modern Mandarin). In other words, as far as these two *wh*-series are concerned, Mandarin *wh*-morphology is derivative from demonstrative morphology, from the historical perspective. Furthermore, *nǎ* is in complementary distribution to *shenme* in that only the former can attach to a numeral-classifier phrase (e.g. *yi-ge ren* 'one person').[12]

I propose the following phrasal structures for the two series of *wh*-expressions:[13]

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[11] The origin of the person *wh*-pronoun *shei* 'who' is not clear to me.

[12] While both *shenme* and *nǎ* can combine directly with *shihou* 'time,' a classifier can be inserted in the latter (*na-ge shihou*) but not the former. Thus the complementary distribution of *shenme* and *nǎ* is likely across-the-board.

[13] The internal structure of the numeral-classifier phrase in (122) follows Cheng and Sybesma (1999) but nothing hinges on this analysis. What is important for present purposes is the parallel status of *shenme* and *nǎ*.

(121) *Shenme*-series

$$
\begin{array}{c}
\text{DP} \\
\diagup\ \diagdown \\
\text{D}^0 \qquad \text{NP} \\
| \qquad\qquad | \\
\textit{shenme} \quad \text{'thing/person/etc.'}
\end{array}
$$

(122) *Nǎ*-series

$$
\begin{array}{c}
\text{DP} \\
\diagup\quad\diagdown \\
\text{D}^0 \qquad\qquad \text{NumP} \\
| \qquad \diagup\qquad\diagdown \\
\textit{nǎ} \quad \text{Num}^0 \qquad \text{ClP} \\
\qquad\qquad\quad \diagup\qquad\diagdown \\
\qquad\qquad\quad \text{Cl}^0 \qquad\quad \text{NP} \\
\qquad\qquad\qquad\qquad\qquad | \\
\qquad\qquad\qquad\quad \text{'thing/person/etc.'}
\end{array}
$$
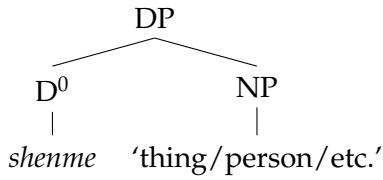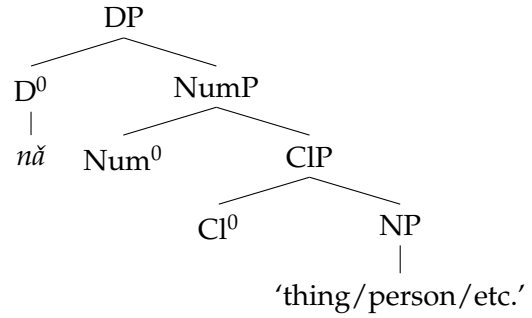
The above structures will feed the alternative-based semantics of *wh*-phrases as depicted in Section 1.7. Specifically, I take both *shenme* and *nǎ* to denote a set of "restriction-less" individual alternatives, as in (404a) and (124a). Merging the NP-/NumP-complement with *shenme*/*nǎ* is interpreted as adding property restriction on the set of alternatives they denote. The alternatives denoted by *nǎ* have an additional number property due to the morpho-syntactic restriction of *nǎ* (but not *shenme*) that it selects for a NumP (*nali* 'where' being an exception).

(123) a. $[\![\text{shenme}]\!] = \{x : x \in D_e\}$ ('what')

  b. $[\![\text{shenme dongxi}]\!] = \{x : \textbf{thing}(x)\}$ ('what thing')

  c. $[\![\text{shenme difang}]\!] = \{x : \textbf{place}(x)\}$ ('what place')

(124) a. $[\![\text{nǎ}]\!] = \{x : x \in D_e\}$ ('which')

  b. $[\![\text{nǎ-yi-ge dongxi}]\!] = \{x : \textbf{thing}(x) \wedge |x| = 1\}$ ('which thing')

  c. $[\![\text{nǎ-liang-ge dongxi}]\!] = \{x : \textbf{thing}(x) \wedge |x| = 2\}$ ('which two things')

To conclude, both *háishì* and *shenme* 'what' incorporate in their morphology a focus marker *shì* that used to be a demonstrative pronoun in ancient Chinese, and the *wh*-morpheme *nǎ*, which has a complementary distribution to *shenme*, is also evolved from a demonstrative pronoun. On the basis of such morphological correlations, I argue that the alternative-based analysis for *háishì*-disjunctive questions can be straightforwardly carried over to these *wh*-morphemes, modulo their morpho-syntactic differences including whether the cardinality of alternatives is specified. The following schemata summarize this proposal.

(125) a. $[\![(\textit{shì})\ \text{X}\ \textit{háishì}\ \text{Y}]\!] = Q\{X, Y\}$ (disjunctive questions)

b. ⟦*shenme*⟧ = ⟦*nǎ*⟧ = Q...{*x* : *x* ∈ *D_e*}   (*wh*-questions)

That both *háishì*-disjunctions and *wh*-phrases are interpreted non-interrogatively under almost the same range of environments falls out very naturally from the proposed analysis.

2.4 *Hùoshì*-disjunction

Logical disjunction in Mandarin is marked by one of the three expressions: *hùoshì*, *hùozhě*, or the reduced form *hùo*.

(126)   a.   (Wo xiwang) Zhangsan {**huoshi** / **huozhe** / **huo**} Lisi keyi lai.
            I   hope   Zhangsan or   or   or   Lisi can come
            '(I hope) Zhangsan or Lisi can_deo come.'

        b.   Ta haoxiang renshi Zhangsan {**huoshi** / **huozhe** / **huo**} Lisi.
            he seem   know Zhangsan or   or   or   Lisi
            'He seems to know Zhangsan or Lisi.'

        c.   Ni keyi lai   wo jia   {**huoshi** / **huozhe** / **huo**} qu ta jia.
            you can come I   home or   or   or   go he home
            'You can come to my place, or go to his place.'

Morphologically, all these disjunctive markers contain *hùo*, which is well known to originate from the indefinite pronoun *hùo* in ancient Chinese (Ma 1898, inter alia), which is akin to indefinite *some*-NPs in English. *Shì* in *hùoshì* is the very same morpheme in the disjunctive question marker *háishì*, which is unlikely a coincident. Like *shì*, *zhě* in *hùozhě* also used to be a pronominal in ancient Chinese (Wang 1958), though not an indefinite. It was mostly used as a modified pronominal, somewhat similar to *(the) one that* (cf. Ma 1898). Such use of *zhě* is no longer productive and only exists in idiomatic or archaic expressions in modern Mandarin.

From the historical point of view, then, all the Mandarin disjunctive markers are inherently pronominals, the core of which is the indefinite *hùo*. I will illustrate the following examples with *hùoshì*, but the three markers are interchangeable in most (if not all) cases.

One property of *hùoshì*-disjunction as exemplified by (126a)/(126b) is that it is semantically equivalent to clausal disjunction. Thus (126a) is synonymous to (127a) and (126b) to (127b).

(127)   a.   (Wo xiwang) [Zhangsan keyi lai] **huoshi** [Lisi keyi lai].   ≈ (126a)
            I   hope   Zhangsan can come or   Lisi can come
            '(I hope) Zhangsan can come or Lisi can come.'

b. Ta haoxiang [renshi Zhangsan] **huoshi** [renshi Lisi].   ≈ (126b)
   he seem   know Zhangsan or   know Lisi
   'He seems to know Zhangsan or knows Lisi.'

The analysis for *háishì* in the previous section can be straightforwardly adopted here: *hùoshì* introduces a set of propositional alternatives into semantics, but, unlike *háishì*, it obligatorily triggers Existential Closure by a propositional ∃-quantifier, as in (128).

(128) $[\![$X *hùoshì* Y$]\!] = ∃\{X, Y\} = X ∨ Y$ ('X is true or Y is true')

From the historical perspective, this analysis is an intuitive one given that *hùo* used to be an indefinite pronoun. The schema in (128) is a direct reflection of the existential characteristic of this morpheme.

In syntax, it would be desirable if the "Interrogative Concord" analysis of *háishì* (see (112)) can be applied to this case. For the latter, the only change to make is to say that (*hùo*)*shì* establishes an "Existential Concord" relation with the ∃-quantifier in (128), along the lines of Kratzer (2005). However, *hùoshì*-disjunctions differ from *háishì*-disjunctive questions in that their first disjunct cannot be preceded by a second instance of *shì* (cf. (110)):[14]

(129)   * Ta **shi** renshi Zhangsan **huoshi** Lisi.
         he be know Zhangsan or   Lisi
         Intended: 'He knows Zhangsan or Lisi.'

On the other hand, *hùoshì* has a somewhat limited and archaic disjunction-like use in the following constructions:

(130)   a. Zuotian   de yenhui, dajia   **huoshi** changge, **huoshi** tiaowu.
           yesterday DE banquet, everyone or   sing   or   dance
           'At yesterday's banquet, some sang and some danced.'

        b. Wo zhi   xiang zhao ge difang, **huoshi** shuijiao, **huoshi** kanshu.
           I   only want find CL place or   sleep   or   read
           'I just want to find some place to sometimes sleep and sometimes read.'

"Disjunction-like" because these examples do not really express disjunction meaning. What (130a) conveys is more like the English translation, and *hùoshì* seems to be interpreted as an indefinite

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[14]This example is grammatical on the reading 'it is the case that he knows Zhangsan or Lisi.'

'some (people).' It does not mean that everyone did one of the two things: singing or dancing. (130b) also does not mean I want to find some place to either sleeping or reading; its meaning is something like "I want to find some place so that I can sometimes sleep and sometimes read." It is likely that *hùoshì* in this use still preserves the original meaning of *hùo* as an indefinite pronoun in Old Chinese.

What is important to our present discussion is that in such uses, *hùoshì* is necessarily repeated in each "disjunct." If the first instance of *hùoshì* in (130a) and (130b) is dropped, the interpretation of *hùoshì* changes to true disjunction.

I propose we can still maintain the concord-style analysis for *hùoshì*, i.e., that it agrees with the propositional ∃-quantifier, if we accept the stipulation that the first instance of *shì* in cases like (129) is obligatorily deleted at the PF level. This may not be entirely ad hoc, in view of the fact that when an epistemic modal is present, *shì* is permitted in a preverbal position preceding the first disjunct.

(131)   Ta keneng/yiding/yinggai   (**shi**) renshi Zhangsan **huoshi** Lisi.
       he possible/necessary/should be   know   Zhangsan or   Lisi
       'He possibly/must/should know(s) Zhangsan or Lisi.'

An Existential Concord analysis for *hùoshì* as schematized in (132) is therefore plausible, where *shì* carries an [∃] feature that agrees with the ∃-operator at the sentential level (cf. (112)).

(132)   ∃ . . . . . . [(*shì*$_{[∃]}$) [$_{IP_1}$ . . .]] [*hùoshì*$_{[∃]}$ [$_{IP_2}$ . . .]] . . .   *Existential Concord*
          └ *–Concord–* ┘
          └ – – – – *–Concord–* – – – – ┘

Unlike *háishì*, Existential Closure of the alternatives introduced by *hùoshì* will necessarily come for free, because the [∃] feature is part of the lexicon of *hùoshì*. The scope of *hùoshì*-disjunction is therefore the scope of the ∃-operator (Alonso-Ovalle 2006).

However, when the epistemic modal predicate *haoxiang* 'seem' is included in both disjuncts, (127b) sounds unnatural:

(133)   ?? Ta [haoxiang renshi Zhangsan] **huoshi** [haoxiang renshi Lisi].
       he seem   know Zhangsan or   seem   know Lisi
       'He seems to know Zhangsan or seems to know Lisi.'

This pattern is also observed when the deontic modal *bixu* 'must,' the epistemic modal *yiding* 'necessary' or negation *bu* occurs in both disjuncts. In the following pairs, the a-examples containing DP-disjunction are fine but the b-examples with IP-disjunction are odd.[15]

(134) a. Ta bixu gen Zhangsan **huoshi** Lisi jie   qian.
           he must with Zhangsan or   Lisi borrow money
           'He must$_{\text{deo}}$ borrow money from Zhangsan or Lisi.'

       b. ?? Ta [bixu gen Zhangsan jie   qian] **huoshi** [bixu gen Lisi jie   qian].
           he must with Zhangsan borrow money or   must with Lisi borrow money
           'He must$_{\text{deo}}$ borrow money from Zhangsan or must$_{\text{deo}}$ borrow money from Lisi.'

(135) a. Ta yiding   renshi Zhangsan **huoshi** Lisi.
           he necessary know Zhangsan or   Lisi
           'He must$_{\text{epi}}$ know Zhangsan or Lisi.'

       b. ?? Ta [yiding   renshi Zhangsan] **huoshi** [yiding   renshi Lisi].
           he necessary know Zhangsan or   necessary know Lisi
           'He must$_{\text{epi}}$ know Zhangsan or must$_{\text{epi}}$ know Lisi.'

(136) a. Ta bu renshi Zhangsan **huoshi** Lisi.
           he not know Zhangsan or   Lisi
           'He doesn't know Zhangsan or Lisi.'

       b. ?? Ta [bu renshi Zhangsan] **huoshi** [bu renshi Lisi].
           he not know Zhangsan or   not know Lisi
           'He doesn't know Zhangsan or doesn't know Lisi.'

What the b-examples intend to convey is interpretation where the disjunctive takes "wide-scope" over modals or negation. The fact that they are degraded indicates that *hùoshì* in the a-examples cannot be understood as disjoining two IPs containing the modal/negation.

The generalization is that *hùoshì*-disjunction has to (or strongly tends to) take narrow scope with respect to a scope-bearing unit like modal or negation. This indeed seems to be right: (126b), for instance, can only mean 'it seems that A or B" and cannot mean "it seems A or it seems B." The latter interpretation, where the disjunction scopes out of the modal, is not available. This generalization is fully in line with the data in (98) where a *háishì*-disjunction is interpreted non-interrogatively in the scope of certain operators.

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[15]There are variations in speakers' judgments as to how degraded the b-examples are, but the contrast in the a- vs. the b-examples seems quite robust.

By contrast, disjunction in English seems to be more liberated scope-wise. The scope ambiguity of examples such as (137) is explored in great depth by Simons (2005).

(137)   Jane must sing or dance.   (Simons 2005: 272–273)

    a. <u>Narrow-scope *or* reading:</u>[16] Jane has an obligation which is fulfilled by her doing either of singing or dancing, but which does not require both.

    b. <u>Wide-scope *or* reading</u>: Jane has (at least) one of two obligations: to sing or to dance. (serve as an uncertain report as to Jane's obligations)

Simons points out that while (137) entails that both singing and reading are permissible activities for Jane on the narrow-scope reading (137a), this is not the case on the wide-scope reading (137b). (137b) entails that at least one of these activities is obligatory for Jane, but does not entail that both are, and also does not entail both activities are permissible. The two scope readings can be further distinguished by the continuation test shown in (138a) and (138b).

(138)   a. Jane must sing or dance, <u>whichever she prefers</u>.   (narrow-scope *or*)

    b. Jane must sing or dance, <u>but I don't know which</u>.   (wide-scope *or*)

Using the "but I don't know which" test reveals the narrow-scope character of *hùoshì*-disjunctions: (139) sounds odd (cf. (134a)).

(139)   ?? Ta bixu gen Zhangsan **huoshi** Lisi jie   qian,   dan wo bu zhidao shi na-yi-ge.
       he must with Zhangsan or   Lisi borrow money but I   not know be which-one-CL
       'He must$_{\text{deo}}$ borrow money from Zhangsan or Lisi, but I don't know which.'

This again suggests the clausal constituents disjoined by *hùoshì* cannot embed the modals and negation mentioned above.

    That *hùoshì*-disjunctions cannot embed a modal/negation inside each disjunct, as shown earlier in this section, can be attributed to the constraint that the $\exists$-quantifier (*hùo*)*shì* associates with must scope below a modal/negation. The reason why this is so is, I suggest, that modals and negation incorporate Existential Closure of their nuclear scope, following K&S (2002) (see (70)). That is, they always come with an $\exists$-operator of their own. A *hùoshì*-disjunction inside the scope

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[16]The narrow-scope reading is also referred to as the *free choice* reading (Kamp 1973).

of a modal/negation will be "captured" by this ∃-operator and unable to reach a higher one above the modal/negation. This is a similar intervention effect to (311).

(140) ∃ ... Modal/Neg + ∃... [(*shì*$_{[∃]}$) [$_{IP_1}$ ...]] [*hùoshì*$_{[∃]}$ [$_{IP_2}$ ...]] ...   *Intervention*

Apparent exceptions such as (127a), repeated as (141) below, can be handled by assuming that each clausal disjunct as a whole is a nominalized proposition selected by (*hùo*)*shì*. There is no intervention in such cases because (*hùo*)*shì* is base-generated at a position higher than the modal/negation.

(141)   (Wo xiwang) [Zhangsan keyi lai] **huoshi** [Lisi keyi lai].   = (127a)
        I   hope   Zhangsan can come or   Lisi can come
        '(I hope) Zhangsan can come or Lisi can come.'

To sum up, I have argued that *hùoshì* introduces a set of propositional alternatives. It differs minimally from *háishì* in the additional Existential Closure operation over alternatives, as in (142b). Generally, *hùoshì* is quite similar to English *or*, but unlike *or* it is sensitive to the intervention effect described in (140).

(142)   a. ⟦(*shì*) X *háishì* Y⟧ = Q{X, Y}   ('Is X true or is Y true?')

        b. ⟦(*shì*) X *hùoshì* Y⟧ = ∃{X, Y} = X ∨ Y   ('X is true or Y is true')

2.5 *Háiyǒu*-conjunction and "distributivity"

I have shown an argument, based partially on morphology, that *háishì*-disjunctive questions and *wh*-questions in Mandarin are correlated, and proposed to interpret *háishì*-disjunctions as sets of Hamblin alternatives. In this section I will demonstrate a similar paradigm in conjunction.

There are several conjunction markers in Mandarin, all of which serve to conjoin different types of constituents. Li (2001) shows that for individual-denoting expressions, e.g., DPs, the conjunction marker is *he/gen*; for properties/activities performed by an individual, the right marker is *jian*; and finally for clauses, adjectival phrases or VPs not expressing properties/activities by an individual, it is *erqie*. They are not interchangeable.

(143)   a. Wo xiang zhao [yi-ge mishu] **he/*jian/*erqie** [yi-ge daziyuan].   (Li 2001)
            I   want find one-CL secretary and/and/and   one-CL typist
            'I want to find a secretary and a typist.'

65

b. Ta shi [mishu]   ***he**/**jian**/***erqie** [daziyuan].
   he is   secretary and/and/and   typist
   'He is a secretary and typist.'

c. [Lisi jian-guo Zhangsan], ***he**/***jian**/**erqie** [gen ta shuo-guo hua].
   Lisi see-EXP Zhangsan   and/and/and   with he speak-EXP word
   'Lisi met Zhangsan before and talked to him.'

Now observe that the complex expression *háiyǒu*, which comprises *hái* (the same morpheme as the one in *háishì*) and the existential verb *yǒu* 'have,' can also conjoin two regular NPs, as in (144).

(144)   a. [Zhangsan] **haiyou** [Lisi] mei lai.
        Zhangsan and   Lisi not come
        'Zhangsan and Lisi didn't come.'

        b. Lisi kan-le   [GB] **haiyou** [MP].
           Lisi read-PERF GB   and   MP
           'Lisi read GB and MP.'

Curiously, *háiyǒu* can also conjoin two VPs or IPs:

(145)   a. Zhangsan [chi-le   wancan], **haiyou** [kan-le   yi-bu   dianying].
        Zhangsan eat-PERF dinner   and   watch-PERF one-CL movie
        'Zhangsan ate dinner and watched a movie.'

        b. [Zhangsan hui bang ta xi   wan], **haiyou** [Lisi hui bang ta xi   yifu].
           Zhangsan will help he wash bowl and   Lisi will help he wash clothes
           'Zhangsan will help him wash dishes and Lisi will help him wash clothes.'

The behavior of *háiyǒu* that it can conjoin two NPs as well as two VPs/IPs makes it a peculiar member in the family of conjunction markers in Mandarin.

It would not look that peculiar if we take the Hamblin perspective. We have seen that *hái* is also employed in *háishì*, the disjunctive question marker that semantically introduces a set of alternatives. The alternatives, if start out as a set of individuals, will grow to a set of propositions. *Háiyǒu* may be taken to be indicative of the presence of a Hamblin universal quantifier over propositional alternatives (K&S 2002: Section 3; see (70b)). When it is applied to a set of alternatives, the result is the statement that every member in this set is true. In effect, *háiyǒu* functions like a "Hamblin conjunction" marker that serves to conjoin two alternatives. The semantic representation of *háiyǒu* under this view would be (146).

(146) $[\![\text{X } \text{\textit{háiyǒu} Y}]\!] = \forall \{X, Y\} = X \land Y$ ('X is true and Y is true')

Cases where *háiyǒu* appears as an DP-conjunction marker, e.g. (147a), are analyzed as "reduced" forms of clausal conjunctions, e.g. (147b), in the same way as we did in *háishì*-disjunctive questions or *huòshì*-disjunctions. The semantics of (147b) is the conjunction of each alternative, as in (147c).

(147)   a.   Lisi kan-le   [$_{NP}$ GB] **haiyou** [$_{NP}$ MP].
             Lisi read-PERF   GB and   MP
             'Lisi read GB and MP.'

        b.   [$_{IP}$ Lisi kan-le   GB] **haiyou** [$_{IP}$ ~~Lisi kan-le~~   MP].
                 Lisi read-PERF GB and   Lisi read-PERF MP
             'Lisi read GB and (he read) MP.'

        c. $\forall \{\text{Lisi read GB}, \text{Lisi read MP}\} = \text{Lisi read GB} \land \text{Lisi read MP}$

This explains why *háiyǒu* looks "unselective" with respect to the category of its conjuncts: alternatives keep expanding (via Hamblin PFA) until they meet an operator that selects them. The $\forall$-operator enters the computation only at the propositional level.

It seems straightforward that *háiyǒu* itself should be the Hamblin $\forall$-quantifier in (147c). However, recall from the discussion of disjunctive questions that we treated the sibling of *háiyǒu*, *háishì*, as a syntactic head that selects just one clausal complement, in light of the fact that the disjunct that precedes *háishì* can also take another instance of *shì*:

(148)   Ni   **shi** [$_{IP}$ xihuan Zhangsan] **haishi** [$_{IP}$ ~~xihuan~~ Lisi]?
        you be   like   Zhangsan or   like   Lisi
        'Do you like Zhangsan or (do you like) Lisi?'

Interestingly, the first conjunct of the *háiyǒu*-conjunction in (149) can be preceded by *zhǐyǒu* 'only,' a morphologically complex focus expression that also contains the existential verb *yǒu* 'have.'

(149)   Lisi bu shi **zhiyou** kan-le   GB, ta **haiyou** kan-le   MP.
        Lisi not be only   read-PERF GB he and   read-PERF MP
        'Lisi not only read GB but he also read MP.'

That is, both conjuncts in (149) follow some focus predicate of the form "X-*yǒu*," which supports the argument that *háiyǒu* only takes one complement at a time, just like *háishì*, even though most of the time it surfaces as a conjunction marker that conjoins two constituents. The co-occurrence of *zhǐyǒu* and *háiyǒu* is rather similar to the complex additive expression *not only. . . but also* in English. Unlike English, Mandarin makes use of the existential verb *yǒu*, possibly to provide a

syntactic "host" for the focus operators *zhǐ* 'only' and *hái* which are inherently bound morphemes. The same can be said for the copula *shì* in *háishì* or *hùoshì*: it "*be*-supports" *hái* or *hùo*.

I therefore propose that *háiyǒu* is not the overt form of the Hamblin ∀-operator; instead, *háiyǒu* (as well as the optional *zhǐyǒu* 'only') is in a *Universal Concord* relation with the ∀-operator, the latter being invisible.[17]

(150) ∀ . . . [('not' *zhǐyǒu*$_{[∀]}$) [$_{IP_1}$ . . .]] [*háiyǒu*$_{[∀]}$ [[$_{IP_2}$ . . .]] . . .   (*Universal Concord*)
         └ −*Concord*− ┘   │
         └ − − − − − −*Concord*− − − − − − ┘

More specifically, I suggest that *háiyǒu* as well as the negative complex *bu shi zhǐyǒu* 'not only' carries the uninterpretable [∀] feature that agrees with the Hamblin ∀-operator. The syntactic structure of Universal Concord is essentially parallel to that of Interrogative Concord in the case of *háishì* and Existential Concord in the case of *hùoshì*.[18]

This treatment readily accounts for one property of *háiyǒu*, which would remain mysterious otherwise. Unlike the DP-conjunction marker *he*, *háiyǒu* imposes a strict *distributivity* effect in the sense that the VP-predicate in the following sentences in (151) must hold true of each DP-conjunct:[19]

(151) a. Zhangsan **he** Lisi mai-le   yi-dong fangzi.
           Zhangsan and Lisi buy-PERF one-CL house
           'Zhangsan and Lisi bought one house.'

           (collective reading preferred, distributive reading dispreferred)

       b. Zhangsan **haiyou** Lisi mai-le   yi-dong fangzi.
           Zhangsan and   Lisi buy-PERF one-CL house
           'Zhangsan and Lisi bought one house.'

           (collective reading impossible, distributive reading only)

Distributivity is standardly characterized as the quantificational phenomenon where a plural subject interacts with an operator such as the floating quantifier *each* or a covert VP-level distributivity operator (Link 1983, Roberts 1987, Schwarzschild 1996). The distinction of the minimal pair (151a)

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[17]Dong (2009: Chapter 4) also proposes a Universal Concord analysis for the universal *mei. . . dōu*-construction.

[18]K&S (2002: Section 9) speculate that the [∀] feature contributes to generic interpretation.

[19]Such sentences as (151a) have been claimed to have collective reading only, e.g. Lin (1998a). Liao (2011: Chapter 4) shows that collective reading is in fact allowed if these sentences are interpreted against appropriate contexts.

and (151b) is nevertheless caused by the different conjunction markers inside the subjects. That *háiyǒu* forces strictly distributive reading is further shown by the contrast of the pair in (152), modeled on Lin's (1998a) ex. 48a.

(152) a. Zhangsan **he** Lisi shi tongxue.
           Zhangsan and Lisi be classmate
           'Zhangsan and Lisi are classmates.'

       b. * Zhangsan **haiyou** Lisi shi tongxue.
           Zhangsan and   Lisi be classmate
           Intended: 'Zhangsan and Lisi are classmates.'

The symmetric predicate 'be classmates' subcategorizes for a plural individual, and this rules (152b) out because the *háiyǒu*-conjunction permits distributive reading only.

Under the Hamblin-style analysis, the "distributivity" of *háiyǒu* is a side-effect of universal quantification over propositional alternatives. The LF of (151b), for instance, is (153), where the domain of the Hamblin ∀-operator includes two propositions.

(153) ∀{Zhangsan bought one house, Lisi bought one house}

Applying the ∀-operator to this two-member set yields the proposition that both alternatives are true, which is the strict distributive interpretation perceived. "Distributivity" then is a misnomer— there is nothing being distributed, nor is there a distribution operator in the traditional sense. The distributivity illusion is due to the semantics of a *háiyǒu*-conjunction involving a set of alternatives.

To recap, the NP-internal positioning of *háiyǒu* in (147a) is a syntactic illusion: at the level of interpretation, it is the Hamblin universal quantifier on top of every propositional alternatives. We resolve the syntax-semantics mismatch by assigning each conjunct a fully clausal/propositional structure that may undergo partial deletion, even when *háiyǒu* is adjacent to an NP. Such clausal conjunction is translated into Hamblin semantics in a straightforward manner.

2.6 The syntax of *shì* 'be' and *yǒu* 'have': Huang 1988

In previous sections I have demonstrated the following:

(154) a. $[\![(shì) \text{ X } háishì \text{ Y}]\!] = Q\{X, Y\}$ ('Is X true or is Y true?')

b. $[\![(\textit{shì}) \text{ X } \textit{hùoshì} \text{ Y}]\!] = \exists\{X, Y\} = X \vee Y$ ('X is true or Y is true')

c. $[\![(\textit{yǒu}) \text{ X } \textit{háiyǒu} \text{ Y}]\!] = \forall\{X, Y\} = X \wedge Y$ ('X is true and Y is true')

It is obvious that the morpho-syntax of these three logical operators *háishì*, *hùoshì* and *háiyǒu* bears heavily on the two auxiliary-like functional heads, *shì* 'be' and *yǒu* 'have.' There are many complications in the relevant data, as discussed, but the schemata shown in (154) are essentially correct, the consequences of which are worth pursuing.

Huang (1988) has the classic argument that both *shì* and *yǒu* are syntactically on a par with IP-level auxiliaries. Observe the following paradigm:

(155) Shì-*sentences*:

    a.   Wo de   laoshi **shi** Lisi/Meiguo ren.
            I   POSS teacher be   Lisi/America person
            'My teacher is Lisi/an American.'

    b.   **Shi** Lisi zuotian   mai-le   yi-ben shu.
            be   Lisi yesterday buy-PERF one-CL book
            'It is Lisi who bought one book yesterday.'

    c.   Lisi **shi** zuotian   mai-le   yi-ben shu.
            Lisi be   yesterday buy-PERF one-CL book
            'It was yesterday that Lisi bought one book.'

    d.   Lisi zuotian   **shi** mai-le   yi-ben shu.
            Lisi yesterday be   buy-PERF one-CL book
            'It is buying one book that Lisi did yesterday.'

    e.   * Lisi zuotian   mai-le   **shi** yi-ben shu.
            Lisi yesterday buy-PERF be   one-CL book
            Intended: 'It is one book that Lisi bought yesterday.'

    f.   * Lisi fan-le   yi-ben shu   **shi** zai zhuo-shang.
            Lisi put-PERF one-CL book be   at   table-top
            Intended: 'It is on the table where Lisi put one book.'

These examples show two main functions of *shì*: it is a run-of-the-mill copula in (155a) and a "focus marker" in the other examples, all of which are parallel to clefts semantically. Huang (1988) proposes that in syntax *shì* in (155a) is a *transitive* verb with two nominal arguments, while that in other sentences is an *intransitive* predicate akin to raising predicates.

In particular, this latter type of *shì* is an auxiliary, an I^0, which selects a clausal complement. The underlying structure of the *shì*-initial sentence (155b) is then (156).

(156)

```
              IP₁
          ┌────┴────┐
          Ø         I′
                ┌────┴────┐
                I⁰        IP₂
                │     ┌────┴────┐
               shì   'Lisi yesterday bought one book'
```
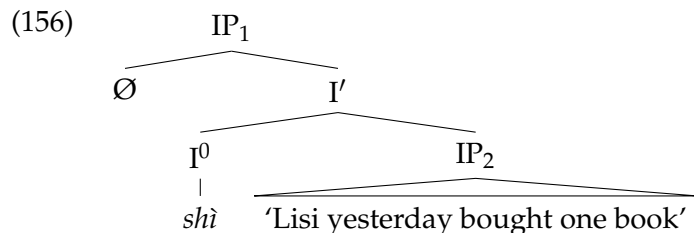
The distribution of *shì* in (155b)–(159e) is derived by raising the subject to the Spec of *shì* and locating the temporal adverb 'yesterday' in different IPs, as shown in (157) and (158).

(157)

```
                IP₁
          ┌──────┴──────┐
        DP₁            I′
         │        ┌─────┴─────┐
       'Lisi'    I⁰          IP₂
                 │       ┌────┴────┐
                shì    't₁ yesterday bought one book'
```

(158)

```
                  IP₁
            ┌──────┴──────┐
          DP₁            I′
           │        ┌─────┴─────┐
         'Lisi'  'yesterday'   I′
                          ┌─────┴─────┐
                         I⁰          IP₂
                         │       ┌────┴────┐
                        shì    't₁ bought one book'
```
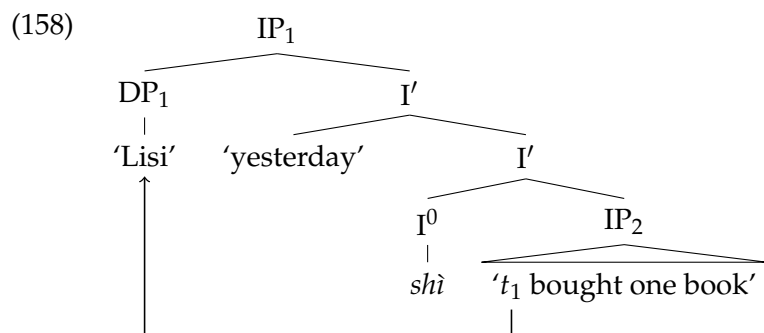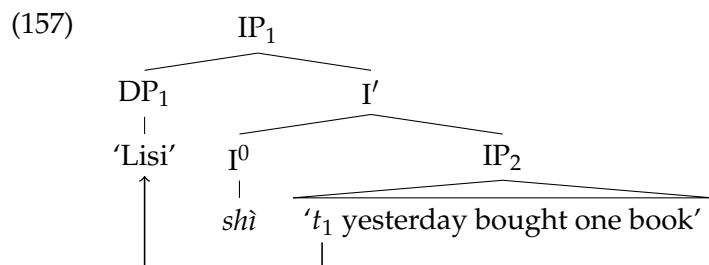
This auxiliary analysis explains why *shì* cannot follow a verb, a preposition-like functional head, or in some "VP-internal" position as in (155f), while still capturing the fact that *shì* semantically and syntactically marks a focus.

Huang (1988) further shows that there is a very similar paradigm in the case of *yǒu* 'have.' Like *shì*, *yǒu* can also serve as a transitive main verb (i.e. a verb of possession) or an intransitive auxiliary head that takes an IP-complement. Both types of *yǒu* observe the same distributional restriction as *shì*. The I⁰-type *yǒu* is further divided into two subtypes: an existential auxiliary and a perfective aspect marker, as in (159b)/(159c) and (159d), respectively.[20]

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[20]In the perfective aspect use, it is restricted to some non-affirmative contexts (negative or interrogative) in Beijing Mandarin, but in certain southern Mandarin dialects or Chinese languages this restriction is relaxed.

(159) Yǒu-*sentences*:

    a.   Wo **you** zhe-ben shu.
         I   have one-CL book
         'I have this book.'

    b.   You san-ge   ren   kanjian-le Lisi.   (*yǒu* = existential auxiliary)
         have three-CL person see-PERF   Lisi
         'There are three people who saw Lisi.'

    c.   **You** yi-ben shu zai zhuo-shang.   (*yǒu* = existential auxiliary)
         have one-CL book at   table-top
         'There is one book on the table.'

    d.   Lisi mei-**you** kanjian Zhangsan.   (*yǒu* = aspectual marker)
         Lisi not-have see   Zhangsan
         'Lisi didn't see Zhangsan.'

    e.   * Lisi mai-le   **you** yi-ben shu.
         Lisi buy-PERF have one-CL book
         Intended: 'There is one book that Lisi bought.'

    f.   * Lisi fang-le   yi-ben shu **you** zai yi-zhang zhuo-shang.
         Lisi put-PERF one-CL book have at   one-CL   table-top
         Intended: 'There is one table on which Lisi put one book.'

Huang (1988) suggests to treat *yǒu*-sentences in the same way as we did for *shì*. The underlying structure of (159d), for instance, is analyzed as (161). The surface word order is derived through raising the subject to the Spec of *yǒu*, assuming the latter is a raising predicate.

(160)
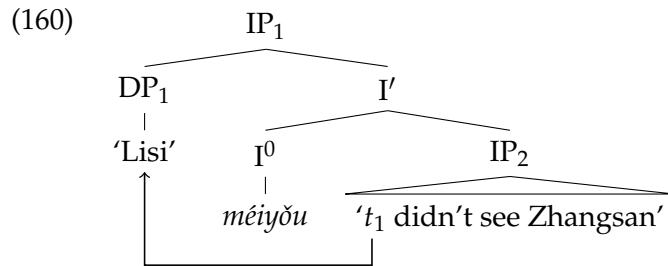
The existential sentence (159c) differs from (159d) in that the subject in the former case does not raise, thus giving rise to the *yǒu*-initial word order.

(161)

```
            IP₁
           /    \
          Ø      I′
               /    \
             I⁰      IP₂
             |      /    \
            yǒu   'one book on the table'
```
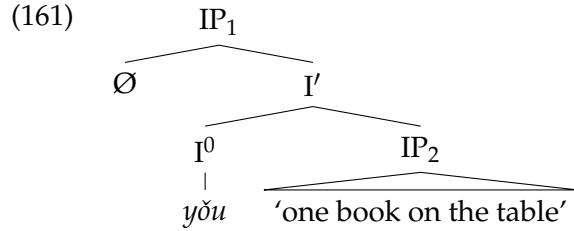
In a nutshell, the similar syntactic properties of the two auxiliary elements *shì* 'be' and *yǒu* 'have' in Mandarin can be summarized as follows:

(162)　*Shì*-sentences:

    a. *Shì* as a transitive V^0 expressing identification/identity relation

    b. *Shì* as an intransitive raising I^0 expressing focus

(163)　*Yǒu*-sentences:

    a. *Yǒu* as a transitive V^0 expressing possession

    b. *Yǒu* as an intransitive raising I^0 expressing existence/perfective aspect

Huang's (1988) view on these two items provides a solid ground for the Hamblin-style analysis of logical operators in Mandarin proposed in previous sections. It explains why *háishì*, *huòshì*, and *háiyǒu* can be analyzed as functional heads (with the bound morpheme *hái/huò*) that precede propositional alternatives: as auxiliaries, *shì* and *yǒu* always subcategorize for a clausal unit, i.e. a proposition. They may surface as coordinators of DPs in syntax, but their semantics always involves quantification over propositional alternatives.

In other words, the three logical operators in Mandarin have an "IP-syntax" or "VP-syntax," depending on whether the I^0-type *shì/yǒu* can be analyzed as a verb. In either case, that alternatives are manipulated by propositional operators can be said to be directly observable in Mandarin syntax.

Chapter 3

Previous theories of *dōu*-quantification

3.1 Mandarin *dōu*-constructions: An overview

The quantificational/focus particle *dōu* is one of the most heavily discussed topics in the syntax/semantics of Mandarin. Syntactically, *dōu* occurs at some IP-level functional layer that is associated with a *preceding* expression in one way or another. A classic example is (164a), in which *dōu* follows a a full-fledged *wh*-clause that is much like an *unconditional* clause, and the initial element *wúlùn* 'no matter' is by and large optional.[1] (164b) shows that an alternative question can also serve as the associate clause of *dōu*.

(164) UNCONDITIONAL DOU-CONSTRUCTION

    a. (Wulun) ni   mai shenme dongxi, Lisi *(**dou**) hui xihuan.
        no.matter you buy what   thing   Lisi   DOU will like
        'No matter what you buy, Lisi will like (it).'

    b. (Wulun) ni   mai LGB haishi MP, Lisi *(**dou**) hui xihuan.
        no.matter you buy LGB or   MP Lisi   DOU will like
        'No matter whether you buy LGB or MP, Lisi will like (it).'

As *dōu* is located above VP, it seems intuitively plausible to assume that it is categorically a universal modal or adverbial quantifier which quantifies over the propositions (or the set of possible worlds) denoted by the preceding *wh*-clause. The peculiarity of *dōu*, however, is that it exercises

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[1]The term "unconditional" is coined by Zaefferer (1990, 1991) for English sentences like *Whether you like it or not, I won't permit smoking here.* In the literature this and related constructions have been given several other names, e.g., "universal/alternative concessive conditionals" (König 1986, Haspelmath and König 1998, Gawron 2001). The Mandarin *dōu*-constructions represented by (164a) and (164b) have been called "*dōu*-conditionals" by Cheng and Huang (1996) and "*wúlùn*-constructions" by Lin (1996).

quantification over something to its left, that is, something *outside* its scope (Lee 1986, Cheng 1995). We follow the literature and call this (quite puzzling) property the LEFTNESS property.

Note that the constituent following *wúlùn* need not be a full clause; it can be a nominal *wh*-phrase like *shenme* 'what' as in the "reduced" unconditional *dōu*-construction exemplified by (165a).[2] As in the previous case, this *wh*-phrase must precede *dōu*. (165b) indicates that it cannot occur inside the scope of *dōu*.

(165)   REDUCED UNCONDITIONAL DOU-CONSTRUCTION

    a.   (Wulun)   shenme dongxi Lisi *(**dou**) xihuan.
          no.matter what   thing   Lisi   DOU like
          'Lisi likes everything.'

    b.   * Lisi **dou** xihuan shenme dongxi.
          Lisi DOU like   what   thing
          Intended: as above

A number of authors have suggested that the *wh*-phrase in (165a) resembles a polarity item (PI) or a variable in the sense of Heim (1982). It obtains universal quantificational force from *dōu*, the latter being either a licensor, a binder, or both.[3] But how does *dōu* quantify over a variable *outside* its c-commanding domain? What kind of quantifier is *dōu* such that it behaves in this peculiar way, when Mandarin quantifier phrases (QPs) generally behave the other way around (Huang 1982a)? And how does an NP-external quantifier associate with a nominal variable?

One may opt for the alternative idea that the *wh*-phrase is not a *phrase* but a *wh*-clause in disguise (Cheng and Huang 1996, Lin 1996), by which we can maintain that *dōu* never quantifies over individuals (directly or indirectly). But the following examples in (166), which show that *dōu* also co-occurs with (preverbal) QPs headed by such determiner-like expressions as 'every,' 'all,' 'most' and 'any,' appear to be evidence that *dōu* is involved in nominal quantification.[4]

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[2]There are good reasons, which however will not be explicated until Chapter 4, to think that cases like (165a) are actually "reduced" or "elliptical" variants of the unconditional *dōu*-construction. I will use this term *reduced unconditional* dou-*construction* presently only for descriptive purposes, without immediate justification of this terminology.

[3]Huang (1982a), Cheng (1991, 1995), Li (1992), Tsai (1994), Cheng and Huang (1996), Lin (1996, 1998b) and many others. See Liao 2011 for a different semantic analysis.

[4]See Zhang 1997, Lin 1998a, Wu 1999, Chen 2008 and Cheng and Giannakidou 2013 for different explanations on these data. Notice that all the determiner-like expressions in (166b) can take the particle *de* which is generally considered a marker of NP *modification*, rather than quantification.

(166) STRONG-QUANTIFICATIONAL DOU-CONSTRUCTION

    a. Mei-yi-yang dongxi Lisi *(**dou**) xihuan.
       every-one-CL thing Lisi DOU like
       'Lisi likes everything.'

    b. {Suoyou-de / Quanbu-de / Dabufen-de} dongxi Lisi *(**dou**) xihuan.
        all-DE   all-DE   most-DE   thing Lisi DOU like
       'Lisi likes all/all/most things.'

    c. Renhe (yi-yang) dongxi Lisi *(**dou**) xihuan.
       any   one-CL thing Lisi DOU like
       'Lisi likes anything.'

Moreover, it has recently been brought to our attention by Cheng (2009) that *dōu* can contribute *definiteness* to the interpretation of a numeral phrase (NumP), as evidenced by (167).[5]

(167) San-ge xuesheng *(**dou**) lai   le.
     three-CL student   DOU come ASP
     'The three students all came.'

Note that NumPs in Mandarin generally cannot occupy subject position in episodic (non-generic) sentences. This implies that *dōu* in (167) is doing double duty, namely contributing to definiteness and licensing subject NumPs.

    All in all, *dōu* seems to be able to quantify over individuals, however that is achieved, and we are forced by the data to accept that *dōu* must be a cross-categorical quantifier of either CPs (denoting propositions) or NPs (denoting individuals). Let us call this the CATEGORY property.

    On the other hand, it has now become less clear whether we can still assume *dōu* is a *universal* quantifier as we encounter (166a) or (166a): why do these QPs ever co-occur with *dōu* if they are themselves universal? The PI/variable analysis on *wh*-phrases mentioned above cannot be implemented here because these QPs are not PIs/variables in any obvious sense, and yet *dōu* is mandatory throughout these cases. Let us therefore dub this the DOUBLING property.

    I call the fourth property of *dōu* the POLYSEMY property, which refers to the fact that *dōu* appears to contribute to different meanings in different *dōu*-constructions. While the *dōu* in previous examples generally has to do with universal quantificational expression at its left, in some other

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[5]Cheng (2009) suggests that *dōu* is on a par with a definite determiner but one that is *external* to the nominal domain. Exactly how this idea can be formalized is not clear.

cases it does not seem to. A paradigm example is the concessive conditional *dōu*-construction shown in (168a) (a.k.a. "*lián…dōu*focus construction"), in which the (focus) associate of *dōu* is not a QP/*wh*-phrase but instead a NumP, and *dōu* seems to quantify over some implicit, contextually relevant set of individuals.[6] Again, the NumP cannot scope below *dōu*, as in (168b).

(168)   CONCESSIVE CONDITIONAL DOU-CONSTRUCTION

   a.   (Lian) yi-ge   ren   Lisi *(**dou**) mei-you kanjian.
         LIAN one-CL person Lisi DOU not-have see
        'Lisi didn't see one person.'

   b.   * Lisi **dou** mei-you kanjian yi-ge   ren.
          Lisi DOU not-have see   one-CL person
          Intended: as above

Notice that although it is possible to analyze *even* as a universal quantifier (Lycan 1991) at some level of interpretation, the quantification in this scalar *dōu*-construction is apparently of a different character from that previously observed, for its associate can be a singular NumP. It would be misleading to lump the *dōu* in (166a) and the one in (168a) together: how does an operator both *assert* and *presuppose/implicate* universal quantification?

The fifth property concerns what we have seen from all the examples cited, namely *dōu* is *obligatory* to the preceding associate quite generally. Why does a strong QP, a *no matter*-unconditional clause, or an *even*-focus phrase require *dōu*? This is the OBLIGATORINESS property.

The last property of *dōu* has to do with the so-called "distributivity" interpretation when it is preceded by a (semantically) plural NP.[7] According to Lin (1998a), while (169a) only permits a collective reading due to the collective predicate *heyong* 'share,' (169b) may mean either that all of us share a kitchen (in which case we are a group of three or more), or that each of us shares a kitchen with someone else, the latter being the distributive reading not available for (169a).

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[6] There is a respectable amount of literature on this single construction (Paris 1979, Shyu 1995, Portner 2002, Hole 2004, Tsai 2004, Badan 2008, Chen 2008, Xiang 2008, Constant and Gu 2010 and Cheng and Vicente 2013, among others). The reason why I resort to the term "concessive conditional" for this *dōu*-construction will be made clear as we go on.

[7] This semantic property of *dōu* has been noted by Lee (1986), Liu (1990) and Cheng (1995), and is given a more detailed analysis by Lin (1996, 1998a) who adopts the theory developed in Schwarzschild 1996. The seminal works of Lin (1996, 1998a) are followed by a number of researchers (Li 1997, Wu 1999, Tomioka and Tsai 2005, Tsai 2009 and Chen 2008, inter alia).

(169) a. Women heyong yi-ge   chufang.   (Lin 1998a: 202)
           we   share   one-CL kitchen
           'We share a kitchen.'

       b. Women **dou** heyong yi-ge   chufang.
           we   DOU share   one-CL kitchen
           'We each share a kitchen with someone else.' / 'All of us share a kitchen.'

In some cases when the preceding NP has a singular form, the distributive use of *dōu* is possible if it can semantically "pluralize" the NP. For instance, (170) readily conveys that I finished reading all the subparts (e.g. paragraphs, chapters) of that book.

(170) Na-ben shu, wo **dou** kan-wan   le.   (Lin 1998a: 202)
       that-CL book I   DOU read-finish ASP
       'I finished reading all of that book.'

Some authors, including Lin, regard the quantification in (166a), (169b) and (170) as actually distributive quantification. In this line of thought, *dōu* is the source of distributivity; it "distributes over" a set denoted by a preceding expression.

   Let me quickly summarize the six properties of *dōu* in (171):

(171) a. The LEFTNESS property: *Dōu* is associated with a preceding expression.

       b. The CATEGORY property: The associate of *dou* can be nominal or propositional.

       c. The DOUBLING property: *Dōu* is obligatory to a universal that already manifests universal quantification morphologically.

       d. The POLYSEMY property: The meaning of *dōu* varies in different constructions.

       e. The OBLIGATORINESS property: *Dōu* is obligatory to the preceding associate.

       f. The DISTRIBUTIVITY property: *Dōu* licenses distributivity on a preceding plural NP.

Note that one *dōu* construction may be pertinent to multiple properties listed above, and one property may also cross-apply to more than one *dōu* construction. For instance, all demonstrate the LEFTWARD property; in the scalar *dōu*-construction the focused expression can also be a clause, hence the CATEGORY property, and in addition *dōu* and the initial element *lián* 'connect, include' in this construction both seem to indicate some extreme point of an unlikelihood scale, hence the

DOUBLING property.[8] And so on, and so forth.

As the footnotes have shown, each of these *dōu*-constructions has engaged different degrees of attention from previous studies, due to their complicated and intricate nature. To the best of my knowledge, there has not been any attempt to account for all these puzzling properties, though several researchers have claimed unification of a subset of the *dōu*-constructions, e.g., Lin (1996), Zhang (1997), Wu (1999), Hole (2004) and Liao (2011). The reasons are not hard to see: one does not find an even nearly comparable counterpart of *dōu* in English, and it occurs in a wide range of quantificational environments which appear to be interrelated but at the same time are sufficiently distinct from each other. And more importantly, it is quite unclear what the role *dōu* plays in the grammatical system of Mandarin quantification. Since it generally has to do with focus and quantification, the most intuitive idea is to parallel it with focus adverbs like *even*, adverbs of quantification or determiners. But apparently none of them well suits all of the *dōu*-constructions.

3.2 The focus-based theory of *dou*

Another influential approach to *dōu* is developed by Shyu (1995), who, in contrast to Lin (1996), analyzes the syntax of "*lián…dōu*" *even*-focus construction in great detail and takes focus (as opposed to distributivity) as the basic function of *dōu*, which can be further related to other uses of *dōu*.

3.2.1 Three aspects of Shyu's (1995) focus-based theory of *dou*

Shyu's (1995) proposal can be summarized as follows.[9] First, *dōu* is the head of F(ocus)P(rojection) that is located between IP and AspP/M(odal)P. Second, the focused *lián*-phrase overtly moves to Spec-FP, which is an instance of A-movement that is triggered by the strong [+Focus] feature of the Focus head *dōu* (à la Chomsky 1995), as diagrammed in (172).

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[8]This can be further complicated by the fact that the overt focus adverb *shenzhi* 'even' can co-occur with *lián* and *dōu*.

[9]Shyu (1995) discusses separately *lián…dōu* constructions in which the *lián*-NP precedes and follows a referential subject. Here I restrict myself to cases where the *lián*-NP follows the subject, namely the cases which Shyu (1995) takes to unambiguously be configurations involving focus movement.

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(172)
(Shyu 1995: 52)

```
                IP
          ┌─────┴─────┐
        NP₁           I′
                 ┌─────┴─────┐
                 I          FP
                      ┌──────┴──────┐
                  [lián-NP₂]        F′
                             ┌───────┴───────┐
                            dōu          AspP/MP
                                    ┌────────┴────────┐
                                   e₁            Asp′/M′
                                           ┌────────┴────────┐
                                        Asp/M              VP
                                                      ┌─────┴─────┐
                                                     e₁          V′
                                                            ┌─────┴─────┐
                                                            V        [t₂]
```
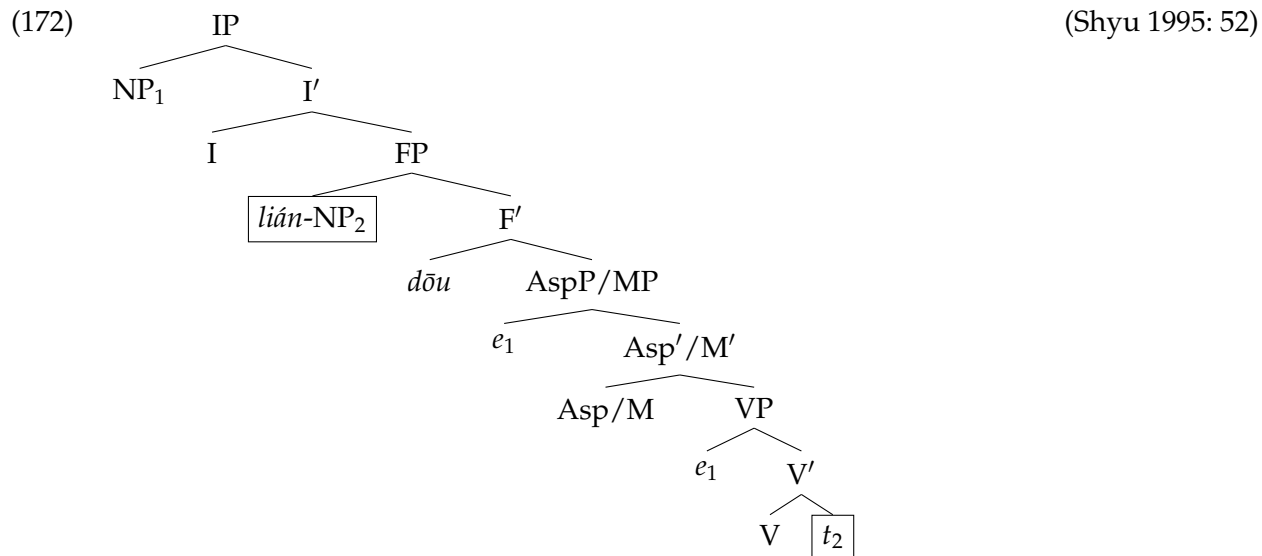
Third, the fronted focused *lián*-phrase resembles universal QPs both syntactically and semantically. We review these three aspects of *lián...dōu* focus constructions individually.

The syntactic position of *dōu*

Shyu identifies the structural position of *dōu* based on the following criteria. First, *dōu* can precede the perfective aspectual marker *le* and can occur between deontic and epistemic modals, as shown in (173) and (174), respectively.[10]

(173) Lisi lian zhe-ben shu **dou** mai **le**.   (Shyu 1995: 56)
      Lisi LIAN this-CL   book DOU buy PERF
      'Lisi bought even this book.'

(174) Lisi **keneng/hui** lian huangse-xiaoshuo **dou gan/yao**   mai.   (Shyu 1995: 57)
      Lisi possible/will LIAN pornography-novel DOU dare/want buy
      'Lisi possibly will dare to buy even pornographic novels.'

Meanwhile, *dōu* cannot scope below deontic modals, as shown by the contrast below:

(175) a. * Lisi **gan/ken/yao**   lian gui-gushi **dou** ting.   (Shyu 1995: 59)
            Lisi dare/willing/want LIAN ghost-story DOU listen
            Intended: 'Lisi dares/is willing/wants to listen to even a ghost story.'

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[10]Shyu (1995: 57–58) adopts the analysis that epistemic modals in Mandarin are raising verbs in I^0 which select another IP (Huang 1988, Li 1990).

b. Lisi lian gui-gushi **dou gan/ken/yao** ting.
    Lisi LIAN ghost-story DOU dare/willing/want listen
    'Lisi dares/is willing/wants to listen to even a ghost story.'

A similar pattern can be observed with respect to negation and adverbs: *dōu* can precede, but cannot follow, negation/manner adverbs.

(176) a. Zhangsan lian kewen **dou meiyou** kan-wan.   (Shyu 1995: 60)
           Zhangsan LIAN text DOU not-have read-finish
           'Zhangsan didn't finish reading even texts.'

       b. * Zhangsan **meiyou** lian kewen **dou** kan-wan.
           Zhangsan not-have LIAN text DOU read-finish
           Intended: 'Zhangsan didn't finish reading even texts.'

(177) a. Xiaoying lian Lisi **dou henhende** ma le.   (Shyu 1995: 62)
           Xiaoying LIAN Lisi DOU harshly scold PERF
           'Xiaoying scolded even Lisi harshly.'

       b. * Xiaoying **henhende** lian Lisi **dou** ma le.
           Xiaoying harshly LIAN Lisi DOU scold PERF
           Intended: 'Xiaoying scolded even Lisi harshly.'

On the other hand, *dōu* cannot scope below certain speaker-oriented adverbs:

(178) a. **(Qishi/xianran)** Zhangsan **(qishi/xianran)** lian dianying **dou** bu kan.
           actually/obviously Zhangsan actually/obviously LIAN movie DOU not see
           'Zhangsan actually/obviously doesn't see even movies.'   (Shyu 1995: 61)

       b. ?* Zhangsan lian dianying **dou qishi/xianran** bu kan.
           Zhangsan LIAN movie DOU actually/obviously not see
           Intended: 'Zhangsan actually/obviously doesn't see even movies.'

Given that *dōu* cannot stay lower than negation, deontic modals or manner adverbs, and cannot occur higher than certain speaker-oriented adverbs, which are presumably in CP, it seems reasonable to locate *dōu* (and the *lián*-phrase) between IP and AspP/ModP, as Shyu suggests.

Note however that *dōu* can actually precede epistemic modals, as in (179).

(179) Lisi$_1$ lian zhe-ben shu$_2$ **dou keneng/yinggai** [$_{IP}$ t_1 kan-le san-bian t_2].
       Lisi LIAN this-CL book DOU possibly/should read-ASP three-time
       'Lisi possibly/ should have read even this book three times.'   (Shyu 1995: 58)

In a footnote, Shyu (1995: 58) makes the assumption that (179) has a biclausal structure on a par with (180) below (recall fn. 10).

(180) Lisi lian   zhe-ben shu$_1$ dou bi   [$_{IP}$ Zhangsan kan t_1].   (Shyu 1995: 58)
       Lisi LIAN this-CL book DOU force   Zhangsan read
       'Lisi forces Zhangsan to read even this book.'

Nevertheless, it is rather unclear how to reconcile the hierarchical order between *dōu* and IP, as shown in (172), with the fact in (179): if epistemic modals in Mandarin are raising verbs in I^0, then *dōu* in (179) must be higher than both the embedded and matrix IPs, as schematized in (181).

(181)   [$_{IP}$ Lisi$_1$ LIAN this book$_2$ $\boxed{\text{DOU}}$ [$_{IP2}$ possibly/should [$_{IP3}$ t_1 read t_2 three times]]]

The position of Mandarin epistemic modals is still a matter under debate (e.g. Lin and Tang 1995, Tsai 2010, Lin 2012), and it is not my intention to take a stand here. What is relevant to the current discussion is that *dōu* (and the *lián*-phrase) can appear above the lowest IP, contra the hierarchy in (172). I take (179) to be evidence that *dōu* is actually higher than IP (but still lower than speaker-oriented adverbs).

A final word on the subject position: in (178a) and (179), the referential subject can appear in a sentence-initial position that is higher than both *dōu* and high modals/adverbs. For such cases, we would have to assume that the subject has undergone topicalization all the way to (the Spec of) the highest layer, perhaps a Topic Phrase.

3.2.2   Arguments for overt (A-)movement

Shyu argues that the word order of *lián…dōu/yě*-constructions is derived by overtly moving the focalized *lián*-phrase to Spec-FP, based on evidence from island conditions, DO/IO movement asymmetry, idiom chunks, clause-boundedness, the lack of reconstruction effects, and remedy of weak crossover.

Island conditions

If the *lián*-phrase in a *lián…dōu/yě*-construction undergoes overtly movement, we expect to detect island effects when it is separated from its original position across an island boundary. Shyu demonstrates that this is indeed the case, as shown in (182b) and (183b).

(182) *Complex NP island* (Shyu 1995: 70)

    a.   Zhangsan taoyan [$_{NP}$ [$_{CP}$ t_1 kuajiang $\boxed{\text{Mali}}$ de] ren$_1$].
        Zhangsan dislike   praise Mary REL person
        'Zhangsan dislikes the person who praises Mary.'

    b.   * Zhangsan $\boxed{\text{lian Mali}_2}$ dou taoyan [$_{NP}$ [$_{CP}$ t_1 kuajiang t_2 de] ren$_1$].
        Zhangsan LIAN Mary DOU dislike   praise   REL person

(183) *Adjunct island* (Shyu 1995: 71)

    a.   Zhangsan [$_{CP}$ suiran   lian $\boxed{\text{fan}_1}$ dou mei chi t_1] hai neng zhuanxin.
        Zhangsan   although LIAN rice DOU not eat   yet able concentrate
        'Zhangsan although not having even eaten, still can work.'

    b.   * Zhangsan $\boxed{\text{lian fan}_1}$ dou [$_{CP}$ suiran   mei chi t_1] hai neng zhuanxin.
        Zhangsan LIAN rice DOU   although not eat   yet able concentrate
        Inteded: 'Zhangsan although not having eaten is still able to work.'

DO/IO movement asymmetry

In Mandarin, direct objects (DOs) can undergo passivization/A′-movement whereas indirect objects (IOs) cannot (Li 1990), for instance in (184). The focused *lián*-phrase appears to show the same pattern, as (185) suggests. Shyu takes (185b) to be an indication that the *lián*-phrase has moved.

(184) a. $\boxed{\text{Naben shu}_1}$ bei wo song tamen $\boxed{t_1}$ le.   (Li 1990: 85)
        that book   PASS me send them   ASP
        'That book was sent to them by me.'

    b.   * $\boxed{\text{Tamen}_1}$ bei wo song $\boxed{t_1}$ naben shu le.
        they   PASS me send   that book ASP

(185) a.   Zhangsan $\boxed{\text{lian shu}_1}$ dou bu songgei Mali $\boxed{t_1}$.   (Shyu 1995: 74)
        Zhangsan LIAN book DOU not give   Mary
        'Zhangsan does not give Mary even books.'

    b.   * Zhangsan $\boxed{\text{lian Mali}_1}$ dou bu songgei $\boxed{\text{ta}_1/t_1}$ shu.
        Zhangsan LIAN Mary DOU not give   she/*t* book
        Intended: 'Zhangsan does not give books even to Mary.'

Idiom chunks

The third argument of Shyu's has to do with idioms: idioms chunks such as *zhan pianyi* 'take advantage (of)' are born as a non-decomposable constituent. Therefore, the preverbal *lián*-phrase in (186b) must have been moved out from the object position of *zhan* 'take.'

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(186) a. Mali zhan le | Yuehan de pianyi |.   (Shyu 1995: 77)
          Mary take ASP John POSS advantage
          'Mary took advantage of John.'

      b. Mali | lian Yuehan de pianyi$_1$ | dou yao zhan | t_1 |.
          Mary LIAN John POSS advantage DOU want take
          'Mary wants to take advantage of even John.'

Clause-boundedness

Shyu takes the fact that the *lián*-phrase cannot move across a finite clause (Lee 1986, Wu 1999) to be evidence of A-movement of the *lián*-phrase. (187b) is ungrammatical because the *lián*-NP is not within the embedded clause.[11] Shyu attributes the grammaticality of (187c) to a different topic structure where the *lián*-NP is base-generated in the initial position, thus not violating clause-boundedness.

(187) a.   Zhangsan renwei [$_{CP}$ Lisi hen xihuan | Mali |].   (Shyu 1995: 80)
           Zhangsan think   Lisi very like   Mary
           'Zhangsan think Lisi likes Mary.'

       b. * Zhangsan | lian Mali$_1$ | dou renwei [$_{CP}$ Lisi hen xihuan | (ta$_1$) |].
           Zhangsan LIAN Mary DOU think   Lisi very like   she
           Intended: 'Zhangsan think Lisi likes even Mary.'

       c. | Lian Mali$_1$ | Zhangsan renwei [$_{CP}$ Lisi dou bu   xihuan | t_1 |].
           LIAN Mary   Zhangsan think   Lisi DOU very like
           'Even Mary, Zhangsan thinks that Lisi also doesn't like (her).'

In contrast, focus movement can cross an infinitival clause, as indicated in (188b) (cf. (187b)). This is expected if a *lián*-NP undergoes A-movement, which is finite-clause bounded.

(188) a. Lisi bi   [$_{IP}$ Zhangsan kan | zhe-ben shu |].   (Shyu 1995: 81)
          Lisi force   Zhangsan read this-CL book
          'Lisi forces Zhangsan to read this book.'

      b. Lisi | lian zhe-ben shu$_1$ | dou bi   [$_{IP}$ Zhangsan kan | t_1 |].
          Lisi LIAN this-CL book DOU force   Zhangsan read
          'Lisi forces Zhangsan to read even this book.'

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[11]Placing *dōu* in the embedded clause does not make (187b) better.

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No reconstruction effects

Unlike Ā-movement, A-movement generally does not display obligatory reconstruction effects. Shyu (1995) provides the following examples to show that movement in *lián…dōu/yě*-constructions parallels with A-movement in this respect. In (189b), the anaphor *taziji* 'himself' seems unable to refer to *Zhangsan*, in contrast to (189a).

(189) a.   Wo bei   Zhangsan$_1$ qiang-zou le | yi-ben guanyu taziji$_1$ de shu |.   (Shyu 1995: 83)
           I   PASS Zhangsan rob-away ASP one-CL about himself POSS book
           '(lit.) I was robbed by Zhangsan of a book about himself.'

       b.   ?? Wo | lian [yi-ben guanyu taziji$_1$ de shu]$_2$ | dou bei   Zhangsan$_1$ qiang-zou le | t_2 |.
           I   LIAN one-CL about himself POSS book DOU PASS Zhangsan rob-away ASP
           Intended: '(lit.) I was robbed of [even a book about himself] by Zhangsan.'

The same is observed for Binding Condition C type reconstruction. As shown in (190b), the pronoun *ta* can be coindexed with *Zhangsan*, which is not possible if reconstruction takes place (due to Condition C), as in (190a).

(190) a.   * Wo bei   ta$_1$ qiang-zou le   [yi-ben Zhangsan$_1$ de   shu].   (Shyu 1995: 83–84)
           I   PASS him rob-away ASP one-CL Zhangsan PASS book
           '(lit.) I was robbed by him of a book of John.'

       b.   ? Wo | lian [Zhangsan$_1$ de shu]$_2$ | dou bei   ta$_1$ qiang-zou le | t_2 |.
           I   LIAN Zhangsan POSS book DOU PASS he rob-away ASP
           '(lit.) I was robbed of [even Zhangsan's book] by him.'

Remedy of weak crossover effects

Shyu's last argument for A-movement comes from the remedy of weak crossover (WCO) effects. As indicated by (191), the pronoun *ta* can be conindexed with *meimei* 'sister,' suggesting that movement of the *lián*-NP is an instance of A-movement (cf. *John$_1$ seems to his$_1$ teacher t_1 to be smart*).

(191) Wo | lian meimei$_1$ | dou bei   [xihuan ta$_1$ de   ren]   qiang-zou le | t_1 |.
       I   LIAN sister   DOU PASS like   she REL person rob-away ASP
       '(lit.) I was robbed of even my sister$_1$ by the person that likes her$_1$.'   (Shyu 1995: 84)

3.2.3 The semantics of *lián...dōu*-constructions

In addition to *even*-focus meaning, Shyu (1995: Section 2.1.4) points out that focal *lián*-phrases have similar properties to universal QPs with respect to their relation to *dōu*, and thus *dōu* in these two cases should receive a uniform treatment.[12] In particular, she adopts Lycan's (1991) semantic analysis according to which *even* denotes 'every/any...including,' and adds to the proposition in which it occurs (i) implicit reference to a contextually specified events, and (ii) universal quantification over the members of such events. Hence, for instance, *Even Grannie put on her coat* bears reference to a group of individuals and entails that everyone in this group put on his/her coat.

In the case of Mandarin *lián...dōu*-constructions, Shyu (1995) maintains that *lián*, which literally means 'including, connecting,' exhaustively quantifiers all members of some understood domain, whereas *dōu* (or *yě*) relates relevant events in discussion with the *lián*-phrase. It is in this connection with Lycan 1991 that a *lián*-NP can be deemed as behaving like a universal QP. The only difference between them is the presupposed pragmatic likelihood scale that is associated with *lián*-NPs but not universal QPs. Finally, Shyu (1995: 40–42) draws data to show that *lián*-NPs pattern together with universal QPs in their syntactic distributions and properties as well.

3.2.4 Reassessing the F-theory of *dōu*

It should be obvious that Shyu 1995 is a detailed account of the *lián...dōu* focus construction that is lacking in Lin's (1996) D-theory. Specifically, the former pinpoints the exact location of *dōu*, explicates the movement type of the *lián*-NP, and to certain extent unifies the instances of *dōu* in the universal/distributive use and the focus use.

Nevertheless, I believe there are a few reasons that Shyu's approach should be reevaluated.

The status of *lián*

The first reason is that Shyu implicitly assumes, throughout her dissertation, that the word *lián* 'include, connect' is always attached to the focused phrase even when it is an object. But as she acknowledges herself (Shyu 1995: 40), NPs with *lián* attached *never* occur postverbally.

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[12]See Zhang 1997: Chapter 5 and Hole 2004: Section 4.3 for some discussions.

(192)   * Wo xihuan lian   Lisi.
          I   like   LIAN Lisi

This should not be surprising if *lián*, as its literal meaning suggests, retains a [+V]/[+P] status that prevents it from occurring in argument position. In fact, *lián* can indeed be used as a non-scalar additive marker, which may be analyzed as either a verb or a preposition, as in (193). Note that the *lián*-NP is not the direct object of 'buy,' which is an unpronounced referential expression (as the translation suggests).

(193)   Wo lian   (tong) na-ben   shu (dou) yiqi   mai le.
         I   LIAN with that-LIAN book DOU together buy ASP
         'I bought (it) together with that book.'

The example (194) further shows such additive use of *lián* can take the durative aspectual morpheme *zhe*. This can be seen as a strong indication of its verbal nature.

(194)   Ta lian-zhe   niurou yiqi   tun-xiaqu.
         he LIAN-ASP LGB   together swallow-down
         'He swallowed (it) together with LGB.'

From this perspective, it seems quite natural to treat *lián* as a verb, or a "co-verb," that appears above the main VP and takes a nominal complement in the data seen so far. For Shyu, however, it would have to be stipulated that *lián* is attached to the focused NP in this particular *lián...dōu/yě*-construction, but not otherwise. This is a stipulation because we do not know why the presence of *dōu* makes it possible for *lián* to occur in argument position, as the latter normally does not.

Shyu (1995: 10) is aware of such data as (193) and argues that *lián* in this case should be treated separately from that in *lián...dōu/yě*-constructions, for two reasons. First, *dōu* is optional in (193) while it is obligatory in the *lián...dōu/yě*-construction. Second, the 'together'-type *lián* does not seem to be able to be followed by clauses, unlike the other *lián*, as (195) indicates below.

(195)   * Zhangsan lian   [S Lisi kan dianying] tong [S Mali kan shu] kanjian le.
          Zhangsan LIAN   Lisi see movie   with Mali read book see   ASP
          Intended: 'Zhangsan saw Lisi saw movies together with Mary read books.'

However, since Shyu herself considers *dōu* a Focus head, there is no reason to expect *dōu* should be obligatory if (193) is not a type of *even*-focus construction. Further, (195) is still bad even if the S-constituents are substituted by NPs:

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(196)   * Zhangsan lian   [NP Lisi] tong [NP Mali] kanjian le.
         Zhangsan LIAN   Lisi with   Mary see   ASP
         Intended: 'Zhangsan saw Lisi together with Mary.'

The problem here is that (195) is not the right example to test with. In fact, the 'together'-type *lián* can be followed by a clause, just like it can in *lián...dōu/yě*-constructions.

(197)   Wo lian   [S Lisi mei lai]   (dou) yiqi   gaosu-le Mali.
        I   LIAN   Lisi not come   DOU together tell-ASP Mary
        'I told Mary (it) together with (the fact that) Lisi didn't come.'

I conclude that it is more plausible to treat these two instances of *lián* uniformly as one and the same additive co-verb, both syntactically and semantically.

Case and A- vs. Ā-movement

A-movement is known as case-driven movement. In the examples in (198), the subject *John* has to raise to the main clause in order to get nominative case.

(198)   a. John$_1$ seems to Mary [t_1 to have eaten].

         b. John$_1$ was taken t_1 to the hospital.

However, in many of the examples discussed by Shyu (1995), the *lián*-NP is moved from an object position where case is presumably already assigned. Moreover, if *lián* is indeed a V/P as speculated above, the NP-complement of *lián* can also receive case from it. For Shyu, what drives focus movement is the strong [+Focus] feature on *dōu* (not case), which is rather similar to the strong [+*wh*] feature that triggers *wh*-movement, a type of Ā-movement. It is therefore unclear in what sense the landing site of a *lián*-NP (i.e. Spec-FP) is an A-position in Mandarin, since F (i.e. *dōu*) is not analyzed as a case assigner, nor is it associated with tense/agreement, in the framework of Shyu 1995.

Certain *lián*-NPs are not born in-situ

There are also cases where a *lián*-NP cannot be born in-situ. The clearest examples are those like (199a) in which a numeral phrase (NumP) cannot stay in object position of a negative predicate,

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unless the numeral is read with a quite marked contrastive/corrective intonation. On the other hand, (199b) is perfectly fine.

(199) a. # Wo mei kan $\boxed{\text{yi-ben shu}}$.   (okay only if 'one' is contrastive/corrective)
           I   not read $\underset{\text{one-CL book}}{}$
           Intended: 'I didn't read a book.'

       b. Wo (lian) $\boxed{\text{yi-ben shu}}$ dou mei kan.
           I   LIAN $\underset{\text{one-CL book}}{}$ DOU not read
           'I even didn't read one book.

Some problems of the arguments for overt (A-)movement

Recall that Shyu lists six sets of data in support for the overt A-movement analysis of the *lián*-NP.

Consider first island sensitivity. We saw earlier in (182b) and (183) that a *lián*-NP cannot move across an island, which according to Shyu is because it undergoes overt movement. However, the presence of island effects is only a *necessary*, not sufficient, condition for overt movement of the *lián*-NP. It is possible that island violation is instead induced by a null operator that moves across an island. This possibility is shown in (200).

(200) [*lián*-XP *dōu* [... Op_1 ... [$_{\text{island}}$ ... t_1 ...]]]

Since sensitivity to island conditions is compatible with both overt movement and null operator movement analyses, the data in (182b) and (183b) may argue for one or the other. Notice that the absence of reconstruction and remedy of WCO effects, both of which are taken by Shyu as evidence for A-movement, would also be explained away if what is really moved is a null operator, rather than the *lián*-phrase per se.

Consider next the DO/IO movement asymmetry, where DOs but not IOs can undergo passivization/A′-movement. Notice that, for unknown reasons, the [V DO] sequence without IO is just bad in Mandarin, even in cases where no movement is involved, e.g., in ellipsis. For example, in response to the question in (201a), (201b) is grammatical with DO elided (indicated by a strikeout) while (201c) is ungrammatical with IO elided (see also Liu 2014: 145–146).

(201) a. Yuehan songgei Mali zhe-ben shu le   ma?
           John   give   Mary this-CL book ASP Q
           'Did John give Mary this book?'

b. Dui, Yuehan songgei Mali ~~zhe-ben shu~~ le.   ✓eliding DO
    right John give   Mary this-CL book ASP
    'Yes, John gave her (this book).'

c. *Dui, Yuehan songgei ~~Mali~~ zhe-ben shu le.   *eliding IO
    right John give   Mary this-CL book ASP
    Intended: 'Yes, John gave (her) this book.'

Thus, (184b) and (185b) can be said to be ruled out by this surface constraint (whatever its nature is), which is independent of movement.

Recall also that the *lián*-NP can be part of an idiom chunk (e.g. *pianyi* 'advantage'), which Shyu considers supporting the A-movement analysis. Nonetheless, it turns out that the idiom chunk *zhan pianyi* 'take advantage of' can actually be broken up across island boundaries, as evidenced by (202).

(202)   a. *Adjunct island:*

        $\boxed{\text{Zhe-ge pianyi}_1}$ [ruguo ni bu zhan e_1], jiu tai chi-kui le.
        this-CL advantage if   you not take   then too eat-loss ASP
        'This advantage, if you don't take (it), (you) would suffer a loss.'

        b. *Subject island:*

        $\boxed{\text{Zhe-ge pianyi}_1}$ [ni zhan-bu-zhan e_1] dou keyi.
        this-CL advantage you take-not-take   DOU fine
        'This advantage, whether you take (it) or not does not matter.'

Given that part of the idiom is outside an island, the empty category e_1 in the examples above cannot be a trace. Thus, *zhan pianyi* isn't really an idiom for our purposes, and (186b) does not necessarily justify the existence of focus movement.[13]

Among the six arguments, I find clause-boundedness the strongest one, namely that the *lián*-NP can move out of a nonfinite clause but not a finite one. But even this argument should be reassessed. First, it is actually possible for a *lián*-NP to move out of a finite clause, as the examples in (203) demonstrate. In particular, (203b) and (203c) have the same main predicate *renwei* 'think' as (187b) but are nevertheless grammatical.

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[13]I thank Shigeru Miyagawa for discussions on this point.

(203) a. Wo │lian zhe-ben shu$_1$│ dou xiang zhidao [$_{CP}$│t_1│ mai duoshao]].
       I   LIAN this-CL book   DOU want know   sell how.much
       'Even this book, I wonder how much (it) costs.'

   b. Lisi │lian shuxue$_1$│ dou renwei [$_{CP}$│t_1│ shi hen-jiandan de kemu].
      Lisi LIAN math   DOU think   be very-easy   DE subject
      'Even math, Lisi thinks (it) is an easy subject.'

   c. Lisi │lian huangjin$_1$│ dou bu renwei [$_{CP}$│t_1│ shi zhongyao de dongxi].
      Lisi LIAN gold   DOU not think   be important DE thing
      'Even gold, Lisi doesn't think (it) is an important thing.'

   d. *After being in the U.S. for over 20 years...*

      Lisi │lian zhongwen$_1$│ dou juede [$_{CP}$ bu hui xie   │t_1│ le].
      Lisi LIAN Chinese   DOU feel   not able write   ASP
      'Even Chinese, Lisi feels that (he) can't write.'

What distinguishes the examples in (203) from (187b) is not entirely clear to me. One possible explanation is something like an intervention effect, where 'Mary' in (187b) intervenes the association of the verb 'think' and the matrix subject 'Zhangsan.' Note that as long as 'Mary' gets out of the way or is substituted with an inanimate noun phrase, the sentence improves, as in (204) and those in (203), respectively.

(204) │Lian Mali$_1$│ Zhangsan dou renwei [$_{CP}$ Lisi bu xihuan │(ta$_1$)│].   (Shyu 1995: 143)
       LIAN Mary   Zhangsan DOU think   Lisi not like   she
       'Even Mali, Zhangsan thinks that Lisi doesn't like.'

Hence, it is possible that (187b) is degraded not because of the grammatical structure but because of the wrong parsing. In any rate, it seems to be the case that under appropriate contexts and correct parsing or intonation, a *lián*-NP can felicitously raise out of a finite CP.

Second, it is also possible that (187b) is ruled out due to violation of locality conditions of a null operator (rather than of the *lián*-NP per se), and that (188b) is fine because such conditions are not violated. As Shyu (1995: 81) points out, nonfinite complements are subject to clause union phenomena, which may be relevant to the well-formedness of (188b) if clause union takes place before the *lián*-NP moves. One can easily adopt the same idea and maintain that a null operator raises to the matrix clause in (188b) without inducing locality effects, thanks to clause union. This way, the facts in (187)–(188) can be accounted for as well without assuming overt movement of the *lián*-NP.

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Overall, we see that there certainly is some room for an alternative analysis to Shyu's (1995) overt A-movement account, which may be able to handle the facts discussed above equally well (or even better).

3.3   The distributivity-based theory of *dou*

This section examines closely the analysis and consequences of the distributivity-based of *dōu*. In what follows I will give some arguments from this theory, show its merits, and discuss why, contra much of the literature, it is not as desirable as it seems to be.

3.3.1   Three aspects of Lin's (1996) D-theory

There are three major aspects in the distributivity-based theory developed by Lin (1996, 1998a), some of which are adopted by a number of authors (Li 1997, Wu 1999, Tomioka and Tsai 2005 and Chen 2008, inter alia): (i) the hierarchical syntactic model in Beghelli and Stowell 1997, (ii) the notion of *covers* as part of the lexical meaning of *dou*, and (iii) the uniform treatment of "*wh...dou* constructions" as distributive constructions.

The syntax of *dōu* as the head of DistP

The first aspect of this D-theory includes two common proposals adopted in many earlier studies: (i) *dōu* is an overt marker of a VP-level distributivity operator, such as that in Link 1987; (ii) *dōu* bears a strong feature of some sort that must be checked off by a phrase through Spec-Head relation, in early Minimalist terms (Chomsky 1995). These two proposals together provide an explanation for the leftward quantification property of *dou*, i.e. *dōu* is associated with a preceding phrase.

In particular, Lin (1996, 1998a) adopts the framework of Beghelli and Stowell 1997 (henceforth B&S) and suggests that the distributed plural NP must occur in the specifier position of *dou* (and may undergo topicalization afterwards), which is itself the head of the Dist(ributive) Phrase in the diagram (205).[14]

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[14]Lin (1998a: 218–219) incorporates the idea of feature checking in Chomsky 1995 into this theory, so that movement of quantificational phrases to the left of *dōu* is a matter of syntax, as assumed by B&S. Non-quantificational NPs, on the

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(Beghelli and Stowell 1997: 76)

```
                        RefP
                  ┌──────┴──────┐
                Spec            CP
                  │        ┌─────┴─────┐
                GQP       Spec        AgrSP
                           │      ┌─────┴─────┐
                          WhQP  Spec         DistP
                                 │       ┌─────┴─────┐
                                CQP     Spec        ShareP
                                         │      ┌─────┴─────┐
                                        DQP    Spec        NegP
                                                │      ┌─────┴─────┐
                                               GQP    Spec        AgrOP
                                                       │       ┌────┴────┐
                                                      NQP     Spec       VP
                                                               │        △
                                                              CQP      ···
```
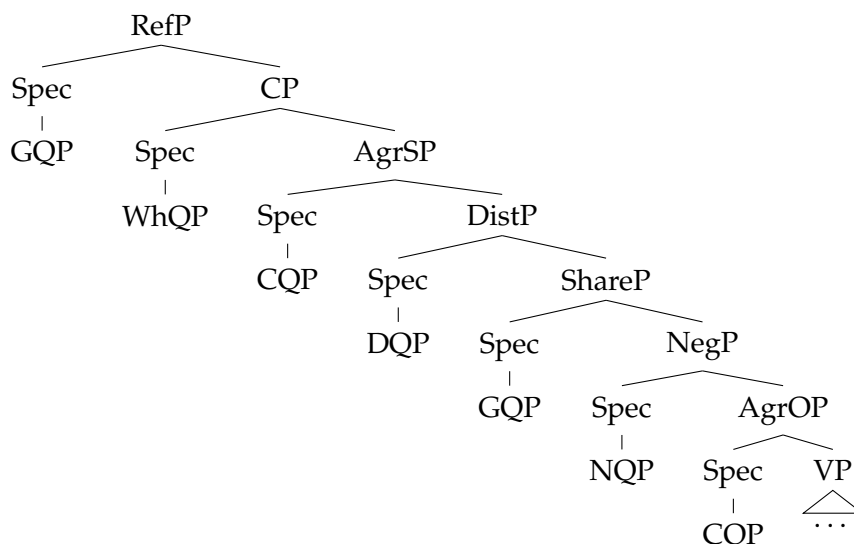
Lin's argument for this connection is based on the observation that Mandarin quantified NPs containing *mei* 'every' and *dabufende* 'most' must move overtly to a position preceding *dou*, as demonstrated by the a- and b-examples in (206) and (207). His reasoning goes like this: since *every*- and *most*-NPs must move to Spec-DistP, DistP must be projected; and if DistP is to be projected, *dōu* must be present, which explains why it is obligatory in (206) and (207) (Lin 1998a: 218).[15] The c-examples indicate that *dōu* (hence DistP) is projected and the associated object phrase is fronted, which can topicalize to a sentence-initial position as shown in the d-examples.[16]

(206) a. ?? Wo kan-le   mei-yi-ben   shu.   (Lin 1998a: 217)
             I   read-ASP every-one-CL book
             'I read every book.'

       b. * Wo dou kan-le   mei-yi-ben   shu.
             I   DOU read-ASP every-one-CL book
             Intended: 'I read every book.'

       c.   Wo mei-yi-ben   shu dou kan-le.
             I   every-one-CL book DOU read-ASP

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other hand, only optionally bear the [+distributive] feature.

[15]Notice, however, that (206) and (207) do not really justify the obligatoriness of *dou*. What they show is only that when *dōu* is present, the quantificational object must move. The crucial ungrammatical examples, which are missing in (206) and (207), are those where the object is fronted in the absence of *dou*.

[16]I should point out that B&S do not categorize *most* as a distributive quantifier phrase. In fact, *most* is not discussed at all in their work.

'I read every book.'

d.   Mei-yi-ben   shu wo dou kan-le.
     every-one-CL book I   DOU read-ASP
     'I read every book.'

(207) a. ?? Wo qu-guo dabufende guojia.   (Lin 1998a: 218)
           I   go-ASP most   country
           'I have been to most countries.'

       b.   * Wo dou qu-guo dabufende guojia.
            I   DOU go-ASP most   country
            Intended: 'I have been to most countries.'

       c.   Wo dabufende guojia   dou qu-guo.
            I   most   country DOU go-ASP
            'I have been to most countries.'

       d.   Dabufende guojia   wo dou qu-guo.
            most   country I   DOU go-ASP
            'I have been to most countries.'

Similar proposals that *dōu* heads a Distributive Phrase and is semantically a distributive operator in universal *dou*-sentences include Li 1997, Wu 1999, Tomioka and Tsai 2005, and Tsai 2009. Other proposals in which at least some instances of *dōu* are regarded as contributing distributivity can be found in Lee 1986, Liu 1990, Cheng 1995, Anand and Tang 2004, and Chen 2008.

Relevance to "cover"

The second aspect of the D-theory concerns *dou*-sentences with symmetric predicates and the like. Consider (208) and (209). Predicates like '(be) couples' and '(be) classmates' can be true only of plural individuals, because a single individual cannot form a couple or be a classmate (in the relational sense). This means *dōu* in these cases cannot distribute down to singularities but must distribute over plural individuals.

(208) Naxie ren   dou shi fuqi.   (Lin 1998a: 227)
       those people DOU be couple
       'Those people are all couples.'

(209) Tamen san-ge   dou shi tongxue.   (Lin 1998a: 228)
       they   three-CL DOU be classmate
       'Those three are all classmates.'

To account for this problem, Lin suggests, following Schwarzschild (1996), that *dōu* is a generalized D(istribution)-operator that involves a *cover* function. To understand what a cover is and why it is related to (208) and (209), consider first the example in (210), from Gillon 1987: 211.

(210)   The men wrote operas.

Gillon (1987: 211) notes that this sentence has an "intermediate" construal between a collective and a distributive reading. Suppose "the men" denotes Mozart, Handel, Gilbert, and Sullivan. (210) can be true in this scenario, but neither on the collective reading (because they did not collaborate on any opera) nor on the distributive reading (because neither Gilbert nor Sullivan ever solely wrote an opera).

The "vegetable" example by Schwarzschild (1996: 67) illustrates a similar point. Consider the scenario in (211).

(211)   Imagine a situation in which two merchants are attempting to price some vegetables. The vegetables are sitting before the merchant, piled up in several baskets. To determine their price, the vegetables need to be weighed. Unfortunately, our merchants do not have an appropriate scale. Their grey retail scale is very fine and is meant to weigh only a few vegetables at a time. Their black wholesale scale is coarse, meant to weigh small truckloads.

Realizing this situation, one of the merchant can truthfully utter (212).

(212)   The vegetables are too heavy for the grey scale and too light for the black scale.

The first conjunct of (212) is false on the distributive reading (which distributes down to singularities) and is true on the collective reading, but this is not what the merchant meant. The second conjunct, on the other hand, is false on the collective reading and is true on the distributive reading, but again this is not what was intended. What allows (212) to be true, then, is the intermediate reading where vegetables are measured (or distributed) by baskets.

Schwarzschild (1996: 67) suggests the following principle in (213) (cf. Langendoen 1978, Higginbotham 1981) to capture such context-dependent intermediate reading. A formal definition of a cover C is given in (214) (ibid.: 64).

(213) [S NP_plural VP] is true in some context Q iff there is a cover C of the plurality P denoted by NP which is salient in Q and VP is true for every element in C.

(214) C is a cover of P if and only if:

    a. C is a set of subsets of P.

    b. Every member of P belongs to some set in C.

    c. $\varnothing$ is not in C.

A cover is similar to a partition of the denotation of NP_plural but allows overlap and, more importantly, is interpreted with reference to the context, as noted above. This context-dependency can be formally represented by a free variable, *Cov*, the actual interpretation (i.e. assignment) of which is determined by pragmatic factors. *Cov* is now added to the lexical meaning of the distributivity of *dou*, as shown in (215) ("D" is the D-operator and "α" a metavariable over predicates).

(215) $x \in [\![D(Cov)(\alpha)]\!]$ iff $\forall y[(y \in [\![Cov]\!] \wedge y \subseteq x) \rightarrow y \in [\![\alpha]\!]]$ (Schwarzschild 1996: 70)

According to Lin (1996, 1998a), the fact that (208) and (209) are grammatical is evidence for *dōu* being the generalized D-operator in (215).

A uniform treatment of *wh*...*dou* constructions

Lin (1996) proposes that the so-called *wh*...*dou* constructions can receive a unified analysis based on distributivity. Specifically, he maintains the following:

  I. In a *wh*...*dou* construction, the *wh*-nominal or interrogative clause denotes a set of individuals or propositions (a set of situations), respectively, along the lines of Hamblin 1973 (see also Cheng and Huang 1996).

  II. *Wh*...*dou* constructions contain a possibly null element *wulun* 'no matter,' whose function is to form a generalized union over the set denoted by the interrogative expression.

  III. The role of *dōu* in *wh*...*dou* constructions is to distribute over the situations or individuals in the generalized union denoted by the *wúlùn*-constituent.

Lin further suggests that clausal *wh…dou* constructions have the following conditional seman-
tics in (216) (based on Berman 1987, Heim 1990 and von Fintel 1994) and terms them "*wúlùn*-
conditionals."

(216)   [[*wúlùn α*] *dou-β*] is true in a situation *s* if and only if the following holds:

$\forall \min_s [s \in \cup[\![\alpha]\!] \rightarrow \exists s'[s \leq s' \& s' \in [\![\beta]\!]]]$ (Lin 1996: 103)

The (obligatory) presence of *dōu* in *wh…dou* constructions thus makes perfect sense: it is a
distributor just like it is in ordinary universal contexts, the only difference being that in the former
distributivity operates on the set expressed by a *wh*-constituent rather than a plural NP. A unifying
analysis over universal *dou*-sentences and *wh…dou* constructions is also claimed by Li (1997) and
Wu (1999) (but see Chen 2008).

3.3.2   Predictions and consequences

That *dōu* is an incarnation of the generalized D-operator offers a straightforward and intuitive
rationale for why sentences with *dōu* display distributive readings and why intermediate inter-
pretations are possible. Below we continue to review a few other predictions and consequences
that follow from this D-theory.

Locality

It has been observed that *dōu* and the phrase (XP) it is associated with is subject to the clause-
boundedness constraint (Lee 1986, Wu 1999): they cannot be intervened by a clausal boundary.
(217), in which *dōu* is intended to distribute over the matrix subject, is ruled out accordingly. On
the other hand, the sentence is fine as long as they originate in the same clause, even if the XP
further raises to a topic position, as in (218) (Chiu 1993).

(217)   * Tamen shuo [zhe-ge laoshi   dou likai-le].
          they   say   this-CL teacher DOU leave-ASP
          'They all said that this teacher had left.'

(218)   Naxie shu$_1$, Akiu shuo [Lisi dou du-guo t_1].
          those books Akiu say   Lisi DOU read-ASP
          'Those books, Akiu said that Lisi read them all.'

The D-theory of *dōu* captures this generalization: (217) is bad because the trace of the matrix subject is too high for *dōu* to bind; (217) has no problem since the topic does leave a trace that *dōu* can bind.

The Plurality Condition

Recall that the Plurality Condition states that the associate XP with *dōu* must be semantically plural. Under the D-theory, one can plausibly attribute this condition to the hypothesis that *dōu* is a D-operator, assuming that a singleton set cannot be distributed. Apparent counterexamples, e.g. (170), can presumably be accounted for by resorting to the notion of cover as well (though Lin (1996, 1998a) does not make this claim).

Leftward quantification and object movement

The puzzling leftward quantification restriction of *dōu* which correlates with object movement (when the object is the associated XP) is due to feature checking requirement: phrases that bear a strong quantificational/distributive feature must be checked off via a Spec-Head configuration in the system of B&S, assuming *dōu* is the head of DistP.

Co-occurrence with strong quantifiers

As mentioned in Section 3.3.3, *every*- and *most*-NPs can co-occur with *dou*. In fact, such quantifier phrases *demand* the co-occurrence of *dou*, as evidenced by (247).[17] This is problematic because a standard generalized quantifier (GQ) meaning of, e.g. *every*, combined with *dōu* would yield distributivity operating on atomic individuals (Lin 1998a: 221).

(219) Wo { mei-yi-ben   / dabufende } shu   *(dou) kan-le.
       I   every-one-CL   most   book   DOU read-ASP
       'I read {every/most} book(s).'

Lin (1998a: 223) suggests to adopt the translation in (220) for *dabufende* 'most,' following Yabushita's (1989: 306) account for *most* (*P* stands for the denotation of the NP argument of *most*, *Q* the denotation of VP, and the capital letters *X*, *Y* and *Z* are variables over groups or individual sums). In this semantics, *most* designates a relation between two sets of individuals *P* and *Q* (hence a GQ

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[17]Other quantificational expressions, e.g. *many*, *some* or *more than two-thirds*, either are compatible with but do not require *dōu* or are incompatible with it.

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determiner) such that they share a group Z, the cardinality of which is greater than the number of the members of P that are not Q.

(220) $\lambda P.\lambda Q.\exists Z.\exists X[P(X) \ \& \ \forall Y(P(Y) \to Y \subseteq X) \ \& \ Z \subseteq X \ \& \ Q(Z) \ \& \ |Z| > |X| - |Z|]$

As a result, the distributive meaning of *dōu* is compatible with this semantics of *dabufende*.[18] The translation of (247) with 'most' can then be given as (221). The underlined part indicates the result of *dōu* combined with the adjacent VP and the variable Z.

(221) $\exists Z.\exists X[*\text{book}(X) \ \& \ \forall Y(*\text{book}(Y) \to Y \subseteq X) \ \& \ Z \subseteq X \ \& \ \underline{\forall y[y \in Z \to \text{buy}(\text{I}, y)]} \ \& \ |Z| > |X| - |Z|]$

3.3.3 Reassessing the D-theory of *dōu*

Despite the soundness of the D-theory advanced in Lin 1996, 1998a, I would like to point out that there are good reasons to reconsider it.

Is *dōu* is a DistP head?

My response to this question is simply that *dōu* may not be the head of DistP, at least not in B&S's sense.

The theory developed by B&S has a wide coverage over different types of quantifier phrases (QPs); not only those headed by distributive determiners but also indefinites, complex modifying determiners, *wh*-phrases and negation fall under their treatment in a general way. More importantly, B&S base their analysis on *scope interaction*, rather than the surface position of the QPs under discussion. It is the absence/presence of scope ambiguity in quantified sentences with two QPs that determines the hierarchy in (205). The D-theory of *dou*, on the other hand, establishes a connection to B&S's theory mainly on the basis of the distribution of the relevant QPs and without examining scope interaction.

It is quite doubtful, in fact, that Mandarin would turn out to be a language that resonates with B&S's proposal. Huang (1982a) and much subsequent work have argued that doubly quantified sentences such as (222) below do not display scope ambiguity as do their English counterparts.

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[18]Lin (1998a: 238), however, suggests a non-GQ interpretation for *mei* 'every'; see section 3.3.3.

(222) Mei-yi-ge   xuesheng dou kanjian-le liang-wei jiaoshou.
      every-one-CL student   DOU see-ASP   two-CL   professor
      'Every student saw two professors.'

B&S's theory, like May's (1985) QR-based treatment, correctly predicts the ambiguity in such English sentences because there are two landing sites for the GQP 'two professors,' one c-commanding, and the other c-commanded by, the LF-position of the DQP 'every student.' The Mandarin facts of scope interpretation that have been studied, however, are not readily captured by either approach.

If we compare the pattern in (206) and (207) observed by Lin (1998a) with the distribution of other QPs in Mandarin, we find that the former is actually an "outlier." The reason is that there are no known QPs in Mandarin that must move overtly to a preverbal position in any environment other than *dou*-constructions, for instance *wh*-elements in this language stay in-situ in *wh*-questions.[19] The theory we need for (206) and (207) is one that can specifically explain the outlier behavior of the QPs in *dou*-sentences while *also* conforming to the generality of the Mandarin system. But the D-theory based on B&S's functional hierarchy doesn't seem to serve this purpose: it accounts for the movement associated with *dōu* but is otherwise at odds with other facts in Mandarin.

Perhaps a more crucial observation is that obligatory XP-movement in *dou*-sentences is not limited to *every*- and *most*-NPs, as revealed by the distribution of the referential NP in (223).

(223) a.   Wo kan-le   na-san-ben   shu.
            I   read-ASP those-three-CL book
            'I read those three books.'

       b.   *Wo dou kan-le   na-san-ben   shu.
            I   DOU read-ASP those-three-CL book
            Intended: 'I read those three books.'

       c.   Wo na-san-ben   shu dou kan-le.
            I   those-three-CL book DOU read-ASP
            'I read those three books.'

       d.   Na-san-ben   shu wo dou kan-le.
            those-three-CL book I   DOU read-ASP
            'I read those three books.'

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[19]*Dou*-sentences are also the only licensing environment where non-interrogative, polarity *wh*-phrases must c-command their licensor on the surface structure (see Cheng 1991 and Li 1992, among others).

This suggests that the object movement in (206), (207) and (223) is due to the presence of *dōu*, rather than to the distributive feature [+Dist] of the object per se since a demonstrative phrase is not inherently distributive like an *every*-NP and therefore should not contain [+Dist] as part of its lexical meaning. Relating the syntax of *dōu* to B&S's theory thus overlooks the fact that *dōu* enforces movement of non-quantificational expressions as well.

Let me finally note that in B&S's system, *every* and *each* are the two determiners in English that are attributed with [+Dist] and are considered strong distributors. Mandarin *mei* 'every' in Lin's (1998a: 238) analysis, in contrast, is not a distributive determiner but a definite-like maximal sum operator, formalized in (224).

(224) $[\![mei]\!]$ = that function f such that for all $P \in D_{\langle e,t \rangle}, f(P) = \cup [\![P]\!]$

If the closest counterpart of English *every/each* in Mandarin is not even inherently distributive, it is not quite clear to what extent is B&S's theory related to *every*-NPs in Mandarin, since the latter may not be true distributors to begin with in the D-theory.

I therefore conclude that despite a wide acceptance in the literature, there is no compelling argument for the connection between obligatory XP-movement in *dou*-constructions and B&S's scope-based syntactic theory of English QPs. That *dōu* is the Dist^0 head of the DistP whose Spec position hosts a [+Dist] phrase in B&S's sense is an unfounded claim that has not been justified by the D-theory of *dou*.

Dou, distributivity, and covers

As mentioned above, the D-theory (particularly the version of Lin 1996, 1998a) maintains that *dōu* is semantically a D-operator which distributes over the plurality denoted by an NP preceding it. A standard example is given in (225) (repeated from (169)). The distributivity effect of *dōu* is revealed by the fact that (225a) and (225b) are not identical in their truth-conditions: while (225a) is felicitous when the speaker shares a kitchen with another person, (225b) is not.

(225)   a.   Women heyong yi-ge   chufang.
             we   share   one-CL kitchen
             'We share a kitchen.'

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b. Women dou heyong yi-ge   chufang.
   we   DOU share   one-CL kitchen
   'We each share a kitchen with someone else.' / 'All of us share a kitchen.'

Lin (1996, 1998a) takes a step further by analyzing *dōu* as a generalized D-operator in the sense of Schwarzschild 1996. Key evidence for his claim comes from data like (340) (repeated from (208)): since a single individual cannot constitute a couple and not any random female-male pair can be a couple, Lin argues that the interpretation of (340) must make use of a cover, which ranges over real couples salient in the context.

(226)   Naxie ren   dou shi fuqi.
        those people DOU be couple
        'Those people are all couples.'

However, it is not clear whether cases like (340) really instantiate the use of covers originally proposed by Schwarzschild. First, sentences with (symmetric) predicates such as "(be) couples" or "(be) classmates" are *not* the motivating data for Schwarzschild's proposal on the generalized D-operator. Second, the requirement that only paired individuals qualify as subjects is a *grammatical*, not *pragmatic*, property of such predicates. This means (340) and examples alike do not exhibit context-sensitive "intermediate" interpretations, unlike the examples discussed in Gillon 1987 and Schwarzschild 1996, e.g. (227) (repeated from (210)).

(227)   The men wrote operas.

For (227), the "intermediate" reading refers to one according to which Mozart and Handel each wrote operas independently, while Gilbert and Sullivan collaborated to write operas but never wrote any without the other. Thus the VP "wrote operas" can be true of both singular and plural subjects in the intended scenario, given that the cover associated with the D-operator can be context-dependent. By contrast, (340) doesn't have the intermediate reading; the VP of this sentence can be true of only paired individuals and is false otherwise, due not to pragmatics but to the *lexical presupposition* of *fuqi* 'couple,' namely that it predicates of pairs of people. It turns out that there is actually no way to tell whether (340) involves a cover or not, because it is not context-dependent at all in the same way as (227) is.

The other aspect of (340) that should be taken as pertaining to pragmatics, as noted by Lin (1998a: 228), is that the denotation of the VP must be a set of real couples, rather than random

pairs of people. But this interpretation is not what the context-sensitivity of covers is about: (340) by itself does not assert that the contextually salient group of people must consist of pairs that are actual couples. Rather, the felicity of it results from the hearer's ability to understand that the VP should hold true only of actual couples, assuming the speaker of (340) has knowledge of what *fuqi* 'couple' means. In other words, the hearer knows who *fuqi* should refer to simply because s/he has the knowledge of the meaning of this lexical item, and this is irrelevant to pragmatics. In short, this aspect of meaning of (340) is not what covers are designed to capture.

The D-theory of *dōu* which incorporates the idea of covers also seems to make a wrong prediction regarding the interpretation of examples such as (228).

(228) Zhangsan, Lisi han Wangwu dou tai-qi-le yi-jia gangqin.
Zhangsan Lisi and Wangwu DOU lift-up-ASP one-CL piano
'Zhangsan, Lisi and Wangwu all lifted a piano.'

For (228) to be true, each of Zhangsan, Lisi and Wangwu must have lifted a piano, which is the strictly distributive reading. The cover-based D-theory, however, predicts that (228), on one intermediate reading, should be compatible with a scenario in which Zhangsan and Lisi lifted a piano together and Wangwu did that alone, due to the cover variable carried by *dōu* (cf. (227)). But (228) is clearly false in such scenario: the presence of *dōu* appears to ban any reading other than the strictly distributive one (see Xiang 2008 for similar remarks).

Finally, it is unclear how the D-theory of *dōu* handles the following minimal pair in (229).

(229)   a. Tamen shui le.
they sleep ASP
'They slept.'

b. Tamen dou shui le.
they DOU sleep ASP
'They all slept.'

Although they have identical truth-conditions, (229a) and (229b) differ in that the latter conveys an additional emphatic sense contributed by *dou*. This emphatic meaning nevertheless cannot be made equivalent to distributivity: since *shui* 'sleep' is an inherently distributive predicate, (229a) and (229b) are necessarily both interpreted distributively, hence the incapability of the D-theory to account for their difference. Moreover, it is unhelpful to simply assume a covert counterpart of

dōu for (229a) because this doesn't explain why covert and overt instances of *dōu* differ in such manner.

One possible way to maintain the D-theory is to introduce the idea of *good fitting* (as opposed to *ill-fitting*) covers by Brisson (1998). The basic observation of Brisson's is that (230a) and (230b) below differs in the following way: (230a) allows a pragmatically weakened, "nonmaximal" interpretation according to which the definite plural does not have to refer to every boy in the relevant context, that is, it tolerates exceptions. On the other hand, (230b) is a stronger statement that has a "maximizing" effect such that the VP must be true of each boy without exceptions.

(230) a. The boys jumped in the lake.

       b. The boys all jumped in the lake.

To derive the contrast above, Brisson's modifies Schwarzschild's (1996) theory of generalized distributivity by making the floating quantifier *all* a marker of a "good-fitting" cover, where a cover is a good fit if every element of the set denoted by a definite DP is in a cell of the cover that is a subset of that set. Without going into the technical details, the intuition behind this proposal is clear: the addition of *all* in (230b) requires a maximizing reading of the definite subject. And it seems plausible that the difference of (229a) ('They slept.') and (229b) ('They DOU slept.') can be ascribed to Brisson's (1998) proposal of *all*, by saying that (229b) involves a good-fitting cover while (229a) allows an ill-fitting one.

Unfortunately, analogizing the pair in (229) to that in (230) is a misunderstanding. The floating *all* is entirely optional even in distributive sentences; on the contrary, we have seen that *dōu* is obligatory to at least preverbal *every-* and *most*-NPs, which presents the opposite pattern to the floating *all* (c.f. **Most boys all left*). More importantly, the major claim of the D-theory is that *dōu* itself is the generalized D-operator, but *all* in Brisson's account is a *modifier* of this (null) operator. Hence, while (229b) does appear to display a similar maximizing effect to that in (230b), assimilating *dōu* to the floating *all* would lose the original insight of the D-theory.[20]

The problem that (229) poses for the D-theory of *dōu* is therefore twofold: (i) it doesn't explain why (229a) allows a distributive reading without *dōu* (given that *dōu* is *obligatory* to many *dou-*

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[20]This criticism doesn't apply to Tomioka and Tsai (2005), who propose instead that the universal expression *quan* 'all' is an overt good-fitting cover modifier.

sentences that are considered to involve distributivity), and (ii) *dōu* brings about an additional meaning other than distributivity in (229b). Consequently, the arguments for *dōu* as a (generalized) D-operator are weakened by the above considerations. The question, then, is whether there is a way to account for the intuitively distributive interpretation of *dōu* without making it a D-operator.

Let us finally reexamine the "*wh...dou* constructions," which have been argued to be a close species of distributive *dou*-constructions.

Distributivity and *wh...dōu*constructions

There are reasons to cast doubt on the claim that *wh...dou* constructions involve distributive quantification. Simple sentences with a plural subject, e.g. (228) and (229a), do not require *dou*, the addition of which forces either a strictly distributive reading or an emphatic interpretation. On the other hand, *dōu* is generally obligatory to *wh...dou* constructions, as evidenced by (231). Without it, (231a) would be ungrammatical and (231b) would be interpreted as an interrogative only.

(231)   a. Wulun   ni   mai shenme gei ta,   ta *(dou) hui hen-gaoxing.
            no.matter you buy what   give him he   DOU will very-happy
            'No matter what you buy for him, he will be happy.'

        b. Wo shenme *(dou) hui chi.
            I   what   DOU will eat
            'I will eat anything/everything.'

Thus, taking *dōu* to be a D-operator in both constructions fails to capture this distinction. It is not clear, on the D-theory, why *dōu* cannot be dropped in (231) to validate a collective interpretation like that in (169a). In other words, it is not clear why the set denoted by the *wúlùn*-constituent in *wh...dou* constructions *must* be distributively quantified.

A more fundamental issue is that theories of distributivity are developed for plurality and nominal quantification, not for conditionals and propositions; the incorporation of distributivity into the semantics of (un)conditionals requires empirical justification. Distributivity is contrasted with collectivity, and they lead to different truth-conditions for a given sentence. For instance, *John and Bill ate a cake* is true on the distributive reading if there were two cakes eaten but false if there was only one, and is true on the collective reading if there was a cake eaten, rather than two. If the propositions corresponding to the interrogative component of *wh...dōu* constructions show

distributivity, we expect them to show collectivity as well.

Suppose now that A, B and C are the relevant entities to be bought by you. On the distributive reading (in Lin's (1996) sense), (231a) states that the consequent clause 'he will be happy' is true of each proposition of the form 'if you buy x for him,' in which x is any of A, B and C. What then is the collective reading of (231a)?[21] It seems that if there is one, it would be something like "if you buy A and if you buy B and if you buy C, he will be happy," which is intuitively equivalent to "if you buy A, B and C, he will be happy." Thus, we predict that on the *distributive* reading (231a) should be judged *false* in this scenario where you bought all of A, B and C and he is happy. The problem is there is no reading of (231a) that is judged incompatible with such scenario.

Conversely, we predict that (231a) will be judged false on the *collective* reading (if there is one) in the scenario in which you bought A only and he is happy. But again, this is not borne out: there is no reading of (231a) that is incompatible with this scenario. It is not at all clear why we cannot identify collectivity for *wh...dou* constructions, if we assume with Lin (1996) and Li (1997) that the notion of distributivity is relevant and applicable to propositions.

3.4   The maximality-based theory of *dou*

A recent observation by Giannakidou and Cheng (2006) (henceforth G&C), Cheng (2009) and Cheng and Giannakidou (2013) is that certain *dōu*-sentences exhibit *maximality* that is otherwise lacking in those without *dōu*, hence *dōu* semantically functions as a *maximality operator* like that in free relatives (see Xiang 2008 and Constant and Gu 2010 for different implementations of this idea for the case of scalar focus *dou*). In the following subsection we examine the relevant proposals by G&C and then review three representative sets of data drawn from their work.

3.4.1   On Giannakidou and Cheng 2006

One of the main claims by G&C is that crosslinguistically there are two types of FCIs, which they call "indefinite" and "definite," respectively. Indefinite FCIs are those that take an NP-argument,

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[21]Since *wúlùn* 'no matter' itself is semantically a generalized union operator under Lin's (1996) account and a D-operator also allows a collective interpretation (thanks to the flexibility of the cover), it is expected that *wh...dou* constructions should have collective readings if *dōu* is indeed an overt generalized D-operator.

English *any*-NPs and *(enas) opjosdhipote* in Greek in (232a) below being two cases. Definite FCIs, which are the primary target in G&C's work, are those that take a clausal argument, with English *wh-ever* free relatives (FRs) and *opjoshipote* in (232b) being two examples.

(232) a. *Indefinite FCI*

Dhen ime   enas opjosdhipote ego ja na mou ferese   etsi! (Ime o   aderfos su!)
not be.1SG a   FC-person   I   for SUBJ me treat.2SG so (am the brother yours)
'I am not just anybody to be treated this way. (I am your brother!)'   (G&C 2006: 150)

   b. *Definite FCI*

Opjosdhipote (fititis) irthe   sto   party efxaristithike.   (G&C 2006: 151)
wh+FC-det   student came.3SG to-the party was.happy.3SG
'{Whoever/Whichever student} came to the party had a great time.'

Note that the forms of the FCIs in (232a) and (232b) are identical, but in (232b) it takes a CP-complement and is grammatical in an episodic context. Thus, these two FCIs are decomposed by G&C in two different ways; see below.

Indefinite FCIs

G&C assume indefinite FCIs to be Heimian variables which are variables demonstrating quantificational variability effects (Heim 1982). Moreover, they are intensional in containing a "dependent" world variable, which resists event-specific episodicity.[22] Formally, the semantics of the FC determiner DET_{FC} is given in (233a). In effect, DET_{FC} is an identity function from an intensional NP-denotation to an intensional NP-denotation. The meaning of the Greek FCI, *opjos-dhipote fititis* 'who-ever student,' is (233b).[23]

(233) a. $[\![\text{DET}_{\text{FC}}]\!] = \lambda P_{<s,et>}.\lambda w.\lambda x.P(x)(w)$ (G&C 2006: 148)

   b. $[\![\text{opjos-dhipote fititis}]\!] = \lambda w.\lambda x.\text{student}(x)(w)$ (G&C 2006: 149)

Note that the FCI *opjosdhipote* is an NP-modifier which cannot be lexically decomposed, even though it contains the definite determiner *o-*. Evidence for this is the fact that the bare *wh*-phrase

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[22]G&C (2006: 141) define an episodic sentence as one that is about exactly one event that happens at a particular time (Giannakidou 1998, 2001).

[23]G&C (2006: 150) assume that the indefinite FCI always contains an indefinite determiner *enas*, overt or covert, on top of it.

opjos 'who' cannot take an NP-argument, as in (234a), nor can it serve as an independent QP by itself, as in (234b). G&C suggest that *o-* is therefore inert, despite its presence in the morphology.

(234) a. {Opjosdhipote / *Opjos} fititis   bori na   lisi   afto to provlima.   (G&C 2006: 151)
           FCI   student can SUBJ solve this the problem
           'Whichever student can solve this problem'

       b. {*Opjos/Opjosdhipote} bori na lisi afto to provlima.

           'Anyone can solve this problem.'

Definite FCIs and maximality

Definite FCIs (i.e. FC FRs), on the other hand, have an active *o-* component. The first indication that definite FCIs are distinct from indefinite ones is that only the latter can occur without a clausal complement, as shown in the following contrasts in (235) and (236).

(235) a. Whoever saw a fly in his soup complained to the manager.   (G&C 2006: 155)

       b. *Whoever/whichever customer complained to the manager.

(236) a. * Opjosdhipote paraponethike   ston   diefthindi.   (G&C 2006: 156)
           FCI-person   complained.3sg to-the manager
       b. [Opjosdhipote idhe   miga sti   soupa tu] paraponethike sto   diefthindi
           wh-ever person saw.3SG fly   in-the soup his complained.3SG to-the manager

   The second difference between the indefinite vs. definite split concerns what G&C call an "expectation of existence," illustrated by the examples below:

(237) a. If any student calls, I am not here.   (G&C 2006: 157)

       b. Whichever student calls, I am not here.

G&C observe that while (237a) is a neutral statement without an expectation that someone will actually call, (237b) seems to favor (though not require) a context where there is an expectation of call. G&C argue that such expectation arises due to the definite nature of FRs, as we tend to exclude the empty set from the plural FR collection.

   Following Jacobson (1995) on English FRs, G&C analyze definite FCIs as maximal plural entities, where the maximality interpretation stems from the definite determiner *o-* whose semantics

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is given in (238) below. The ι-operator is treated as the maximality operator that quantifiers over the set denoted by the IP (e.g., 'came to the party' in (232b)) of the FR.

(238) $[\![o]\!] = \lambda P_{<s,et>}.\iota(\lambda w.\lambda x.P(x)(w))$ (G&C 2006: 165)

Anther ingredient of a definite FCI in Greek is the FC modal *-dhipote* 'ever,' which G&C propose to be the realization of the FC determiner, as in (239a).[24] This determiner takes the FR-CP in (239b) as its input and yields the intensional set denoted by this FC-FR, as in (239c).

(239)   a. $[\![\textit{-dhipote}]\!] = \lambda P_{<s,et>}.\lambda w.\lambda x.P(x)(w)$ (G&C 2006: 164)

         b. $[\![\text{CP}]\!] = \lambda w.\lambda x.\text{came-to-party}(x)(w)$

         c. $[\![\text{FC-CP}]\!] = [\![\textit{-dhipote}]\!]([\![\text{CP}]\!]) =$

                $\lambda P_{<s,et>}.\lambda w.\lambda x.P(x)(w)(\lambda w.\lambda x.\text{came-to-party}(x)(w)) = \lambda w.\lambda x.\text{came-to-party}(x)(w)$

Thus, the meaning of the definite FCI *opjosdhipote irthe sto party* 'whoever came to the party' can be decomposed as *o-* + *pjos* 'who' + *-dhipote* '-ever' + *irthe sto party* 'came to the party.' After *o-* is applied to the FC-CP, we obtain the maximal set of possible and actual individuals who came to the party, as shown in (240).

(240) $[\![\textit{opjosdhipote irthe sto party}]\!] = [\![o\text{-}]\!]([\![\text{FC-CP}]\!]) =$

         $\lambda P_{<s,et>}.\iota(\lambda w.\lambda x.P(x)(w))(\lambda w.\lambda x.\text{came-to-party}(x)(w)) = \iota(\lambda w.\lambda x.\text{came-to-party}(x)(w))$

Overall, a definite and an indefinite FCI share in common the FC core characterized in (239a). The major difference between them is the active definite component in the former, which gives rise to a maximality interpretation along the lines of Jacobson 1995.

3.4.2   Maximality in Mandarin: The case of *dōu*

Returning now to Mandarin, G&C contend that the definite vs. indefinite split is also manifested in this language, by the presence/absence of *dōu*. The first illustrating example is the pair in (241) (adapted from G&C's ex. 71), where the *wh*-phrase *na-ge ren* 'which person' is construed as an existential polarity item licensed by conditionals. While (241a) and (241b) have similar meaning,

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[24]One complication here is that in Greek this FC determiner is optional, unlike *-ever* in English FC FRs (**Who came to the party had a great time*). In G&C's analysis, the absence of *-dhipote* only affects the intensionality of *o-*.

(241b) prefers an interpretation according to which there exists a contextually pre-established set of people who may call. Thus, the speaker of (241b) may be expecting phone calls from certain people. In contrast, (241b) bears no such interpretation; it simply conveys that someone may call, the speaker of which need not presume who that is.

(241) a. Ruguo (you) na-ge   ren   da-dianhua lai,   jiu   shuo wo bu zai.
        if   have which-CL person make-phone come then say   I   not be
        'If anyone calls, say that I'm not here.'

    b. Wulun   na-ge   ren   da-dianhua lai,   dou shuo wo bu zai.
       no.matter which-CL person make-phone come DOU say   I   not be
       'Whoever calls, say that I'm not here.'

A similar contrast can be seen in (242a) vs. (242b). According to G&C (2006: 174), (242b) "can only be interpreted as there is absolutely no book what-so-ever (from a contextually determined set) that he wants to buy." No such contextually determined set is involved in (242a).

(242) a. Ta bu xiang mai na-ben   shu.
        he not want buy which-CL book
        'He doesn't want to buy any book (in particular).'

    b. Ta na-ben   shu dou bu xiang mai.
       he which-CL book DOU not want buy
       'He does not want to buy any book at all.'

G&C claim that the pairs in (241) and (242) demonstrate the distinction of indefinite and definite FCIs in Greek discussed above. The expression *wulun* 'no matter', which may be covert (Cheng and Huang 1996, Lin 1996), is analyzed as the source of intensionalization and the exhaustivity presupposition of the *wh*-FCI. Crucially, *dōu* is present in the main clause of (241b)/(242b) but not in (241a)/(242a), and this leads to their difference in the maximality/exhaustivity quantification over the presupposed set of callers/books.[25]

Based on these observations, G&C (2006: 175) propose that (i) all *dōu*-sentences discussed above are elliptical "*wúlùn...dōu*-sentences" where the initial element *wúlùn* 'regardless, no matter' is elided, and (ii) it is *wúlùn* that provides the intensionalization (along with the presupposition of exhaustive variation; cf. Dayal 1997), on a par with *-dhipote* '-ever' in Greek. On the other

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[25]For relevant discussions on how the quantificational force of 'which person' co-varies with the conditional structure, see Cheng and Huang 1996 and Lin 1996.

hand, G&C take *dōu* to be a generalized distributive operator in Lin's (1996) analysis which "distributes over the set of situations in the generalized union corresponding to the denotation of the *wúlùn*-clause." According to G&C, this "gets translated into the claim that *dōu* is the *ι*-operator" just like Greek *o-*. As such, *dōu* encodes maximality and exhaustivity.[26]

With the assumption that *wúlùn* is an intensionalizer always present in the *dōu*-sentences and *dōu* is the equivalent of the Greek definite determiner *o-*, G&C (2006: 175–176) stepwise formalize the semantics of each component in a Mandarin *wúlùn…dōu*-sentence as follows.

(243) a. $[\![wulun]\!] = \lambda P_{<s,et>}.\lambda w.\lambda x.P(x)(w)$ (= $[\![\text{-}dhipote]\!]$)

   b. $[\![na\text{-}ge\ ren]\!] = \lambda w.\lambda y.\text{person}(y)(w)$

   c. $[\![wulun]\!]([\![na\text{-}ge\ ren]\!]) = \lambda P_{<s,et>}.\lambda w.\lambda x.P(x)(w)(\lambda w.\lambda y.\text{person}(y)(w))$
       $= \lambda w.\lambda y.\text{person}(y)(w)$

   d. $[\![dou]\!] = \lambda P_{<s,et>}.\iota(\lambda w.\lambda x.P(x)(w))$ (= $[\![\text{-}o]\!]$)

   e. $[\![dou]\!]([\![wulun\ na\text{-}ge\ ren]\!]) = \lambda P_{<s,et>}.\iota(\lambda w.\lambda x.P(x)(w))(\lambda w.\lambda y.\text{person}(y)(w))$
       $= \iota(\lambda w.\lambda y.\text{person}(y)(w))$

The final translation in (243e) is the maximal sum of a set of people in the actual and possible worlds. The parallel to Greek should be obvious; however, what happens in the level of morphology in Greek happens in syntax in Mandarin, since *dōu*, unlike *o-*, is outside the nominal domain.

In a nutshell, Mandarin *dōu* in G&C's framework is treated as a maximality operator that applies to the (union) set formed by the *wúlùn*-clause. Therefore, Mandarin FCIs show the indefinite vs. definite divide like Greek FCIs do, but through the particular "*wúlùn…dōu*-construction."

3.4.3 More on *dōu* and definiteness: Cheng 2009

In addition to the *wúlùn…dōu*-construction in which *dōu* contributes to maximality effects and can thus be treated as a definite-like element, there are other cases where *dōu* also appears to be an equivalent of a definite determiner, as discussed in a separate work by Cheng (2009).

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[26]What exactly the "exhaustivity" of *dōu* means is never made precise. In Cheng and Giannakidou 2013: 140 the authors refer exhaustivity to the stronger, more "emphatic" interpretation of *dōu*-sentences like (242b), as opposed to those without *dōu*. It seems to me that G&C's "exhaustivity" is construed in a similar sense as their maximality.

Definite interpretation of NumPs

Consider first the examples in (244). (244a) shows that a numeral phrase is ungrammatical as the subject of an episodic sentence. To get an existential reading, the predicate *yǒu* 'have' must precede the numeral subject, as shown in (244b). There is however another way to rescue (244a), i.e. by inserting *dou*, as shown in (244c). Crucially, the interpretation of the numeral becomes *definite*: its reference must be familiar/given information from the discourse and is thus contextually restricted, similar to definite descriptions.[27]

(244)   a.   * San-ge   xuesheng lai   le.   (Cheng 2009: 64)
            three-CL student   come PERF

        b.   You san-ge   xuesheng lai   le.
                have three-CL student   come PERF
                'Three students came.'

        c.   San-ge   xuesheng dou lai   le.
                three-CL student   DOU come PERF
                'The three students all came.'

If *dōu* is absent and the numeral phrase stays in object position, definiteness vanishes, as in (245).

(245)   Wo kanjian-le san-ge   xuesheng.
        I   see-PERF   three-CL student
        'I saw three students.' (Not: 'I saw the three students (in some domain).')

Examples like (244c) are, I believe, quite remarkable in showing that Mandarin, as a language without an article system (like English) or inflectional morphology (like Greek), can still express—without the aid of demonstratives—definiteness like other languages do, though via a Mandarin-specific apparatus: a particle detached from the nominal phrase. To the best of my knowledge, Cheng 2009 is the first work in the literature that systematically demonstrates true definiteness of Mandarin NumPs (i.e. number-classifier-noun sequences) where a NumP can be used to refer to discourse-salient actual individuals.

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[27]This is actually not the terminology used by Cheng (2009: 64), who describes the numeral subject in (244c) as a "specific" noun phrase. I follow the convention where specificity is registered as a term for the referentiality of existential indefinite phrases (e.g. von Heusinger 2011). Since 'three students' in (244c) is not existentially quantified (cf. (244b)), it is not a specific noun phrase.

Definiteness and domain restriction

Another type of example is given in (367a)–(367b). In (367a), the occurrence of 'this class' is required for the strong QP 'all'; in (367b), by contrast, it is not.

(246)   a. Wo jiao-guo   *(zhe-ge ban) suoyou-de xuesheng.   (Cheng 2009: 66)
            I   teach-EXP   this-CL class all-DE   student
            'I have taught all the students in this class.'

        b. Wo suoyou-de xuesheng dou jiao-guo.
            I   all-DE   student   DOU teach-EXP
            'I have taught all the students (in some domain).'

Cheng (2009) suggests that *dōu* as a definite D(eterminer) provides domain restriction: it restricts the quantificational domain of a strong QPs (i.e. quantifier phrases headed by *all*, *most*, *every*, etc.), which is why (367b) does not require an overt restricting modifier. If domain restriction is correlated with definite Ds (Martí 2003, Giannakidou 1997, Etxeberria 2005, 2009), these data imply that *dōu* should be a kind of definite D as well.

In this connection, recall that in Mandarin, perverbal strong quantifiers have the tendency of requiring the accompany of *dou*, as (247a) shows (Lin 1996: 38). Weak quantifiers like 'many' in (247b), on the other hand, can cooccur with *dōu* but do not have to; and NumPs, as we saw in (244c), obtain a definite reading in the presence of *dou*. Quite generally, then, it appears that *dōu* cuts across the strong-weak divide of Mandarin QPs, at least those in a pre-*dōu* position (see Wu 1999 for a concrete proposal along this line).

(247)   a. { Mei-ge   / Suoyou-de / Dabufen-de } ren   *(dou) mai-le   shu.
             every-CL   all-DE   most-CL   person   DOU buy-PERF book
            'Every person/All people/Most people bought a book.'

        b. Henduo ren   (dou) mai-le   shu.
            many   person DOU buy-PERF book
            'Many people bought a book.'

There are more examples and discussions in G&C 2006 and Cheng 2009 than what I have presented above. Their proposal is nevertheless already clear: *dōu* functions much like a definite determiner, which signals the presence of a maximality/ι-operator and the contextual domain restriction that comes with it.

3.4.4 Reassessing the M-theory of *dōu*

As shown by the preceding section, there is indeed more evidence the substantiates the observations put forth by G&C, which I think are by and large the first step toward the right direction in search of definiteness in Mandarin. There are, however, a number of empirical issues in their data and analysis not addressed in their work. Let us examine them one by one.

Maximality/definiteness ≠ exhaustivity

My first concern is that the two notions *definiteness* and *exhaustivity*, which should be treated as distinct and separable, do not seem to have been so regarded by G&C. Although (244c), repeated as (365c) below, exhibits a definite reading contributed by *dou*, there is additionally an emphatic, *exhaustive* interpretation on the subject. In fact, this intuition has already been reflected by the use of the floating quantifier *all* in Cheng's (2009) translation of (365c), which is indeed a more faithful translation to the meaning of this sentence than that without *all*.

(248) San-ge   xuesheng dou lai   le.
       three-CL student   DOU come PERF
       'The three students <u>all</u> came.'

Let me immediately clarify what the term "exhaustivity" is intended to capture here. It refers to the "no exception" reading in (365c) that is paraphrasable as "every one of the three students, without exceptions, came." Since the floating *all* contributes to a similar "maximizing" reading (Brisson 1998), examples like (365c) are more appropriately translated with it.

    Note that the exhaustivity in (365c) is different from the maximality in FRs or definite descriptions headed by *the*: the latter is compatible with a singular noun phrase (e.g. *the book*, *what(ever) book you have*), whereas the former is not, as (249) shows.

(249) * Yi-ge   xuesheng dou lai   le.
       one-CL student   DOU come PERF
       Intended: 'The student came.'

That *dōu* requires a plural NP to its left (ignoring the *even*-focus interpretation) is, of course, a well known fact. But then this means the exhaustivity in (365c) is not of the same nature as the

maximality in definites: the latter is responsible for domain restriction and anaphoricity, among other things, and is compatible with singular NPs.

One may argue that (365c) is ruled out for the same reason as *the one NP* is, i.e. numeral phrases with *one* are also bad with *the*, even though *the* can take an NP with singular number marking. Notice that under certain situations, *the one NP* is possible with a focus interpretation, e.g. (250a); this is not possible with *dou*, however, as in (250b). The singular NP is just out.

(250) a. The one student standing by the door is a student.

b. * Zhan zai men-bian de yi-ge ren dou shi xuesheng.
   stand at door-side REL one-CL student DOU be student
   Intended: 'The one student standing by the door is a student.'

When the subject of a *dou*-sentence is itself a referential/definite expression, the exhaustivity of *dōu* is especially prominent. The following examples in (251) (repeated from (229)), do not differ in truth condition, but (251b) clearly has an additional "no exception" reading like that in (365c).

(251) a. Tamen shui le.   (non-exhaustive)
      they sleep PERF
      'They slept.'

b. Tamen dou shui le.   (exhaustive)
   they DOU sleep PERF
   'They all slept.'

It seems safe, based on the observations above, to conclude that *dōu* is doing double duty: it licenses definiteness (qua maximality) for numeral phrases *and* exhaustivity, and these two have distinct semantic import: the former allows 'three students' in (365c) to have referents in the actual world, whereas the latter exhausts the set of three students and asserts that each of them has the property designated by the VP-predicate without exceptions. *dōu* is therefore not simply a definite determiner, since one definite determiner cannot contribute both domain restriction and exhaustivity.[28] For if it could, the additional 'all'-like reading in (365c) would be a mystery. The question, then, is how to derive these two distinct layers of interpretations based on the appearance of *dōu* alone.

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[28]In their illustration of the role of *dou* with respect to polarity *wh*-FCIs (which makes use of the pair in (241)), Cheng and Giannakidou (2013: 139–140) state that *dou* creates a "strong, more emphatic" statement, perhaps due to an implicit 'even.' This is a different situation from (365c), which is not an example of *wh*-FCIs, and the emphatic interpretation in (365c) has more of a universal flavor, rather than 'even.'

Morphological definiteness $\neq$ semantic definiteness

My second concern is related to the difference of (252a) and (252b) discussed in G&C's work. As mentioned, while (252a) is a neutral statement without the expectation that someone will call, (252b) *favors* (but does not *require*) an interpretation involving such expectation. The expectation, according to G&C, supports their definite analysis for free choice FRs (following Jacobson 1995), the use of which tends to exclude an empty set interpretation.

(252)   a. If any student calls, I am not here.   (Giannakidou and Cheng 2006: 157)

      b. Whichever student calls, I am not here.

At the same time, G&C admit that the expectation of existence in FRs is *not* as strong as the existential commitment of morphological definites, the latter appearing to be a presupposition. This variation is manifested by (253) below, cited from Horn 2000. The infelicity of (253c) indicates that definites enforce an existential presupposition (or commitment), and G&C (p. 159) acknowledge that "it is important to distinguish morphological definiteness from semantic definiteness."

(253)   She may never marry, but   (Horn 2000: 102)

      a. whoever she does marry will be Jewish.

      b. anyone she does marry will be Jewish.

      c. #the person she does marry will be Jewish.

G&C then move on to argue that morphological and semantic definiteness nonetheless do share a semantic core (i.e. the formation of a maximal plural entity through Jacobson's (1995) iota) and the difference in their presupposition does not undermine this position.[29] But the variation between FRs and definites remains an empirical one. The relevance of this point is that Cheng (2009) cites both (244c) (with a definite NumP) and (241b) (with *wulun* 'no matter') in support for the definite analysis of *dou*; however, as (253) suggests these two cases should be distinguished from each other, as far as obligatory existential presupposition is concerned. If *dōu* in (244c) were a pure maximality operator (like that in FRs), the existence presupposition of 'three students'

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[29]This is because even morphological definites may not require the existence presupposition in certain cases, e.g. *This golden coin belongs to the sailor that sights the White Whale* (Giannakidou and Cheng 2006: 158).

anchored to the actual world could not be accounted for, and there should only be an "intensional" FR reading of this NumP, which does not seem to be the case. This distinction between (244c) and (241b) is not addressed in Cheng 2009.

Dōu and strong quantifiers

Turning now to the pair in (367), there comes a different issue. Cheng's (2009) proposal is that *dōu* provides contextual domain restriction, which is why (367b) is grammatical without the NP-modifier 'this class'. But once the universal object 'all students' is fronted, *dōu* becomes obligatory even if 'this class' is present in the sentence, as evidenced by (254). This indicates that *dōu* is needed whenever 'all students' is preverbal, regardless of whether or not there is an additional, explicit modifier on the quantifier phrase.

(254)   * Wo zhe-ge ban   suoyou-de xuesheng jiao-guo.   (cf. (367b))
         I   this-CL class all-DE   student   teach-EXP
         Intended: 'I have taught all the students in this class.'

Taken together with the observation that strong QPs in Mandarin generally require *dōu* (cf. (247a)), the generalization of the relation between strong QPs and *dōu* can be stated as follows:

- Strong QPs cannot appear in object position if without a modifying phrase.

- When appearing preverbally, strong QPs must cooccur with *dou*.

I will have nothing to say about the first point: while it has been noted elsewhere (e.g., Huang 1996: 53), there appears to be no systematic investigation in the literature on why Mandarin "bare" strong QPs cannot be objects, as far as I am aware; moreover, this fact is orthogonal to the status of *dou*. Regarding the second point, it seems plausible to conjecture that *dōu* constitutes the backbone of strong QPs; in Cheng's (2009) terms, it is a definite D providing domain restriction. Yet, *dōu* is obligatory to, and only to, *preverbal* strong QPs; it cannot associate with an QP that it c-commands at surface structure, which is another well known (but quite peculiar) property of this element. Thus, analyzing *dōu* as a definite, domain-restricting D does not fully explain the pattern in (367) and (254), and the interaction between strong QPs and *dōu* cannot be taken as supporting this determiner hypothesis with full strength.

The syntax-semantics of *wulun*-constructions

My last concern has to do with G&C's compositional analysis of (241b), repeated below as (255). Here, what is associated with *dōu* is the entire antecedent clause 'no matter which person calls,' unlike other examples where *dōu* is associated with a preceding noun phrase.[30]

(255) Wulun   na-ge   ren   da-dianhua lai,   dou shuo wo bu zai.
          no.matter which-CL person make-phone come DOU say   I   not be
          'Whoever calls, say that I'm not here.'

Recall from (243) that G&C give a semantics where *dōu* combines directly with the *wúlùn*-expression, namely the constituent [*wúlùn* + *wh*-FCI], yielding the (intensional) maximal set of (possible and actual) individuals.

(256) $\llbracket \text{dou} \rrbracket (\llbracket \text{wulun na-ge ren} \rrbracket) = \lambda P_{\text{is,et}_\lambda}.\iota(\lambda w.\lambda x.P(x)(w))(\lambda w.\lambda y.\text{person}(y)(w))$ (= (243e))
          $= \iota(\lambda w.\lambda y.\text{person}(y)(w))$

Such semantic composition (built essentially upon that of FC FRs in Greek) assumes the first argument of *wulun* 'no matter' is the *wh*-phrase *na-ge ren* 'which person.' These two together combine with *dou* and we get a maximal individual. One problem is that this semantics does not match its syntax: as (257) shows, *wulun* actually takes a clause (say, a TP), not just the *wh*-FCI, as its complement (see also Cheng and Huang 1996, Lin 1996).

(257) [CP Wulun   [TP na-ge   ren   da-dianhua lai]], [TP dou shuo wo bu zai]
                no.matter   which-CL person make-phone come   DOU say   I   not be

Even if the *wh*-FCI can raise out of its own TP (at LF) and constitute the first argument of *wulun*, they have to compose with the rest of the antecedent '*x* calls' before combining with *dou*, because *dōu* is not part of the antecedent clause (Cheng 2009: 68). It is unclear how the analysis in (256) can be maintained for (255), given that the *wh*-FCI is embedded under a TP, rather than directly attached to *dou* (unlike the situation in Greek). In fact, the claim in Cheng 2009 that *dōu* is a D *outside* the nominal domain strongly suggests that one should look for a different semantic calculation from (256) that is more consistent with the syntax of *dou*.

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[30]If we follow Lin 1996 in assuming that *wh*...*dōu* constructions are actually elliptical *wulun*...*dōu* constructions, then what *dōu* quantifies over in (242b) should be a clausal constituent as well, e.g., "(no matter) which book (it is)."

Residual issues: Movement, distributivity, and focus

I would like to finally draw the reader's attention to the fact that certain properties of *dōu* (some already revealed in G&C's data) do not straightforwardly follow from the determiner analysis.

First, *dōu* is apparently closely related to *obligatory overt movement* of NumPs or *wh*-phrases in all examples cited above where they exhibit definite interpretation. That *dōu* manifests "leftward" quantification is certainly not news, and many authors have attempted to explain this somewhat surprising property with various proposals (Shyu 1995, Lin 1996, Wu 1999, Constant and Gu 2010, Liao 2011, to name just a few). In G&C's determiner approach, why NumPs or *wh*-phrases must undergo fronting to acquire definiteness is left unexplained.

Second, it is not clear whether Lin's (1996) distributivity analysis of *dōu* can be reconciled in G&C's own theory. G&C (2006: 175–176) contend that the distributivity approach of *dōu* "gets translated into a claim that *dōu* is the iota operator." On the other hand, Cheng (2009) defends the view that *dōu* is not always a distributivity operator and raises examples where *dōu* shows no distributivity (but she says nothing about cases where *dōu does* look like a distributivity operator). Conceptually, the connection between a definite D and a distributive operator is far from obvious. Empirically, there are situations where definiteness is prominent but distributivity does not seem to be relevant, e.g. (365c). Conversely, there are also situations where *dōu* does contribute a distributivity reading but definiteness is irrelevant, e.g. (258b) below.

(258)   a. Tamen mai-le   yi-bu   chezi.   (Lin 1998a: 201)
            they   buy-PERF one-CL car
            'They bought a car.'

        b. Tamen dou mai-le   yi-bu   chezi.
            they   DOU buy-PERF one-CL car
            'They all bought a car.'

While (258a) strongly prefers a collective reading, (258b) has only the distributive reading according to which each of them bought a car. It is unclear why this difference results if *dōu* is just a definite D. The distinction between (258a) and (258b) is so sharp that any theory of *dōu* should be able to provide an explanation for it.

Third, neither G&C 2006 nor Cheng 2009 has touched upon the *lian…dou even*-focus construction, e.g., (259a). As with other *dou*-constructions, the associated focus phrase 'one book' must

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occur to the left of *dou* (or *ye*), and the sentence (on non-contrastive, non-specific interpretation) is quite marginal if it remains in-situ, as in (259b).[31]

(259) a. Lisi lian yi-ben shu dou/ye mei-you kan.
Lisi LIAN one-CL book DOU/YE not-have read
'Lisi didn't read (even) one book.'

b. ?? Lisi mei-you kan yi-ben shu.
Lisi not-have read one-CL book
Intended: 'Lisi didn't read one/a book.'

As discussed in Section 3.2.3, the *lián...dōu*-construction also shares with other types of *dou*-sentences a taste of universal quantification (Shyu 1995), but it is not expressed at the level of assertion: the noun phrase preceding *dōu* in (259a) is singular, not plural. Hence the universal force operates in the domain of (scalar) presupposition in this construction, quite similar to the case of *even*. Moreover, *dōu* is generally substitutable by *yě* (literally 'also') in this focus construction, but this is not true for, e.g., (260), which does not deliver the exhaustive 'all'-like meaning like *dou* does.

(260) Tamen ye mai-le yi-bu chezi.
they YE buy-PERF one-CL car
'They also bought a car.'/'Even they bought a car.' (Not: 'They all bought a car.')

It is therefore legitimate to ask, given the properties of *lian...dou/yě* focus constructions, whether *dōu* remains the same element across such diverse range of contexts and, if *dōu* can still be regarded as (related to) a definite D à la G&C.

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[31]This has been noticed by Huang (1981). For at least some speakers, (259b) is fine on the reading where the negation scopes over the entire sentence and 'one' has a contrastive interpretation.

Chapter 4

Unifying *dōu*-quantification

4.1 Unconditional *dōu*-constructions

Previous studies have shown that a *dōu*-sentence consistently differs from a sentence without *dōu* in terms of structure: there is always overt displacement in the former, quite similar to English *wh*-movement. *Wh*-movement cannot be observed in *wh*-questions with a *wh*-subject (*Who saw him?*) because the movement is string-vacuous. For the same reason, we need to put these cases aside and examine the *dōu*-sentences in which the interacting phrase with *dōu* is an object.

4.1.1 Some generalizations

Let us firstly review some simple facts about the syntax of unconditional *dōu*-constructions (*dōu*-unconditionals for short). Compare (261a) with (261b): the *wh*-object normally stays in-situ. But the pattern is reversed when *dōu* is inserted, as in (261c). Nevertheless, in such case question meaning is unavailable, and (261c) is only understood as a declarative with universal-like quantification.

(261)   a.   Lisi xihuan shenme?
             Lisi like   what
             'What does Lisi like?'

       b.   * Lisi shenme xihuan?
             Lisi what   like
             Intended: 'What does Lisi like?'

       c.   Lisi shenme **dou** xihuan.
             Lisi what   DOU like
             'Lisi like everything.'

d.   * Lisi **dou** xihuan shenme.
     Lisi DOU like   what
     Intended: 'Lisi like everything.'

Moreover, as Lin (1996) points out, there are certain elements that can be added to the *dōu*-sentence without changing its meaning in any significant way, namely *wúlùn* 'no matter' and the copula *shì* 'be.' This does not happen in the counterpart without *dōu* and without object displacement.[1]

(262)   a.   Lisi **(wulun)** **(shi)** shenme **dou** xihuan.
         Lisi no.matter be   what   DOU like
         'Lisi like everything.'

      b.   * Lisi xihuan **(wulun)**   **(shi)** shenme?
         Lisi like   no.matter be   what
         Intended: 'Whatever does Lisi like?'

That (262b) is out is nothing surprising: there cannot be a copula or the verbal expression *wúlùn* 'no matter' in the postverbal domain. What is interesting is that the *wh*-word 'what' can be preceded by *shì* and *wúlùn* in (262a). Given that (262b) is bad, it would not be plausible to say these additional items are base-generated in the object position with 'what' in the underlying structure. Thus *wúlùn* and *shì* should appear preverbally from the beginning. And so we obtain the following generalization (which holds true for subject *wh*-phrases as well):

(263)   If *dōu* is present and associated with an object *wh*-phrase, the latter loses question meaning, acquires universal force, must occur preverbally, and the sentence structure can optionally contain *shì* 'be' and *wúlùn* 'no matter.'

It is very tempting to analyze the *wh*-object as having undergone movement, an operation presumably triggered by *dōu*. By movement, it is provided with universal force. This is more or less the traditional view.

    However, we would like to take the occurrence of *shì* and *wúlùn* into account. We need to do so because these elements cannot show up otherwise in sentences without *dōu*. Their connection is strong. Further, their appearance does not result in change of meaning, at least not obviously

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[1] *Wúlùn* has two other lexical variants: *búlùn* and *bùgǔan*. All of them are bi-morphemic: they contain a negation *wu/bu* followed by a verb 'to argue/care,' and can be translated as 'no matter' or 'regardless.' *Wúlùn* seems to be slightly more formal than the other two.

so. This leads to the question of what exactly is associated with the *wh*-phrase in an unconditional *dōu*-sentence, because *wúlùn* 'no matter' seems to be some kind of universal quantifier as well.

There are reasons to believe we don't need to assume overt movement. Consider the following pair, where the expressions preceding *dōu* are two disjunction forms discussed in Chapter 2:

(264)   a.   **(Wulun)   (shi)** [fan] haishi [mian], Lisi **dou** xiang chi.
                no.matter be   rice   or_Q   noodle Lisi DOU want eat
                '(No matter) whether rice or noodles, Lisi wants to eat (it).'

         b.   **(Wulun)   (shi)** [fan] huoshi [mian], Lisi **dou** xiang chi.
                no.matter be   rice   or   noodle Lisi DOU want eat
                '(No matter) whether rice or noodles, Lisi wants to eat (it).'

As mentioned, *háishì* is a disjunction marker that leads to disjunctive question interpretation, and *hùoshì* is a simple disjunction marker in non-interrogatives.[2] The copula *shì* can also optionally appear, and we know this from Chapter 2, where I argue that *shì*, *háishì* and *hùoshì* all selected a clausal unit in the underlying structure. This view is supported by the fact that (265a) is synonymous to (264a) and (265a) to (264a):

(265)   a.   **(Wulun)   (shi)** [chi fan] haishi [chi mian], Lisi **dou** xiang chi.
                no.matter be   eat rice or_Q   eat noodle Lisi DOU want eat
                '(No matter) whether rice or noodles, Lisi wants to eat (it).'

         b.   **(Wulun)   (shi)** [chi fan] huoshi [chi mian], Lisi **dou** xiang chi.
                no.matter be   eat rice or   eat noodle Lisi DOU want eat
                '(No matter) whether rice or noodles, Lisi wants to eat (it).'

The main verb 'eat' can be reduplicated in each disjunct and the meaning remains the same. What the pairs in (264) and (265) demonstrate is that in such *dōu*-unconditionals the element that precedes *dōu*, call it the *antecedent*, is base-generated in where it appears, even if it is a DP that seems to be originate from the postverbal position. The same can be said for (262a), in which the antecedent is a *wh*-object.

Cheng and Huang (1996) suggest that the *wh*-phrase in (262a) is an elliptical *wh*-question that is s-selected by an implicit *wúlùn*, and what is being quantified over by *dōu* is the entire *wh*-question.

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[2]Note that semantically *háishì*- and *háiyǒu*-disjunctions end up being synonymous: (264a) and (264b) both entails Lisi wants to eat rice *and* noodles. That is, the disjunction in the two examples exhibits *conjunction* meaning. It is obvious that it is *dōu* that makes this possible, by virtue of licensing universal quantification. We will turn to this point shortly.

A supporting observation is that *wúlùn* can indeed take a full-fledged interrogative clause as in (266), and the *wh*-word 'who' is not interpreted as 'everyone.'

(266) **Wulun**   shei yao wo qu, wo **dou** bu qu.
      no.matter who want I   go I   DOU not go
      'No matter who wants me to go, I won't go.'

(266) is akin to (264) and (265); they are all interpreted as corresponding to English *no matter*-sentences. For (266), it makes no sense to say the *wh*-phrase is moved from inside the *dōu*-clause into the antecedent. The *wh*-phrase is simply part of the antecedent. The implication is that if *dōu* in (266) can associate with an interrogative expression base-generated in the antecedent, so can the *dōu* in (262a).

Lin (1996) makes a similar claim that what surfaces as a "*wh…dōu*-sentence" is actually an elliptical "*wúlùn…dōu*-sentence." Thus according to these authors, *wúlùn* is in the underlying syntax of a *dōu*-unconditional. Their analyses differ in that Lin (1996) still allows the *wh*-phrase to be a nominal even when *wúlùn* is attached. But at the same time he also entertains the possibility, given the observation that the copula can appear in the antecedent, that the antecedent in cases like (262a) might involve a clausal structure.

It is conceivable that the antecedent *always* has a clausal structure, of which the copula *shì* is a part. This view fits the broader picture. In fact, if we consider all the examples of *dōu*-unconditionals discussed so far, (262a) turns out to be *exceptional* in that the antecedent is expressed by a nominal *wh*-phrase. The following cases, which are not specifically addressed by Cheng and Huang (1996) and Lin (1996), give further weight to this view.

(267)   a. **(Wulun)** **(shi)** shei mei lai,   wo **dou** hui chufa.
           no.matter be   who not come I   DOU will punish
           'No matter who doesn't come, I will punish (him).'

      b. **(Wulun)** Lisi **(shi)** mai-le   shenme dongxi, ni **dou** bu neng na.
           no.matter Lisi be   buy-PERF what   thing   you DOU not can   take
           'No matter what Lisi bought, you can't take (it).'

These examples show that even when the antecedent is already an interrogative clause, the copula can be inserted. If we compare (262a) with (267a), we find that they have quite parallel configurations, and only differ in the type of the constituent following *wúlùn*. The *wh*-phrase in (262a) needs

not be moved from the postverbal position, just like that in (267a) needs not be, and in fact cannot be, otherwise we would have a case where phrasal movement doesn't target a c-commanding position. Data such (267a) and (267b) provide an argument against

Cheng and Huang (1996) also observe that there is a selectional restriction between *wúlùn* and the antecedent of *dōu*, namely the latter must be an interrogative phrase or clause. Thus the following sentences are ungrammatical.

(268)   a.   * Wulun   Lisi, wo **dou** huanying.
           no.matter Lisi I   DOU welcome

      b.   * Wulun   Lisi haiyou Zhangsan, wo **dou** huanying.
           no.matter Lisi and   Zhangsan I   DOU welcome
           Intended: 'I welcome Lisi and Zhangsan.'

However, note that (264b), repeated as (269) below, is grammatical, where the antecedent is not an interrogative but an ordinary disjunction marked by *hùoshì*, and it conveys a conjunction meaning, not disjunction.

(269)   (Wulun) (shi) fan **huoshi** mian, Lisi dou xiang chi.
        no.matter be   rice or   noodle Lisi DOU want eat
        '(No matter) whether rice or noodles, Lisi wants to eat (it).'

In Section 2.4, we have seen that *hùoshì*-disjunction does not lead to question meaning. This observation therefore extends Cheng and Huang's (1996) finding of what can be selected by *wúlùn*.[3] Why this is so will become clear when we discuss the semantics of *dōu*-unconditionals.

I would therefore like to pursue the following generalization:

(270)   The antecedent of a *dōu*-unconditional is always an interrogative or disjunctive expression containing the possibly covert copula *shì*, and the *dōu*-clause may contain a gap that corresponds to a *wh*-expression in the antecedent.

(271)   [antecedent (*wúlùn*) (*shì*) (interrogative/disjunction XP)] [main clause *dōu* . . . (gap) . . .]

To analyze this *dōu*-construction, we will need to know not only the role of each element in the structure in (271), but also why a *dōu*-unconditional can be understood as a *no-matter*-sentence

---

[3]Cheng and Huang (1996: 148) note that the antecedent of *dōu* must be a question because *dōu* requires something to its left to denote a set of entities. In this conception, *hùoshì*-disjunctions do not constitute exceptions to their generalization because in my proposal they introduce a set of alternatives just like questions do.

even when *wúlùn* 'no matter' is silent.

4.1.2 Syntax

The goal of this subsection is to resolve the following issues: (i) the syntactic category and position of *dōu* and its antecedent, and (ii) the syntactic relation as well as the cause of locality effects between *dōu* and its antecedent.

I propose that a *dōu*-unconditional has the following basic structure in (272) (cf. Shyu 1995):

(272) The basic syntax of a *dōu*-unconditional
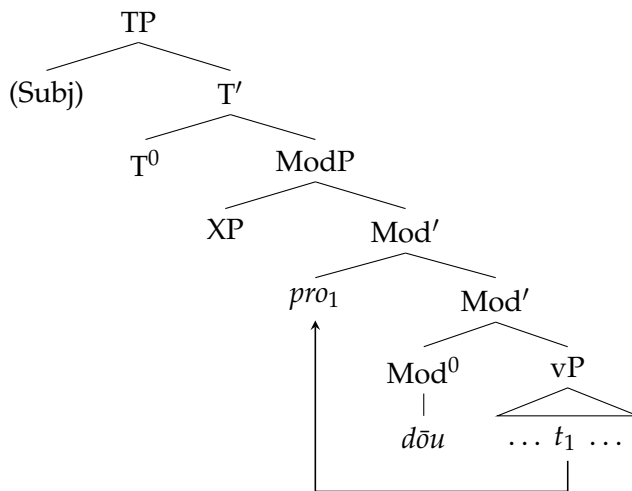
Specifically, *dōu* is a *modal* head that projects a Mod(al)P below TP and above vP. In adiition, it triggers movement of a null *pro* from inside the vP to Spec-ModP in a similar way to a functional head (e.g. C^0) triggers operator movement in Ā-constructions. Standard assumptions about Ā-movement shall apply: *dōu* carries an EPP feature that is deleted by *pro* filling Spec-ModP, and *pro*-movement also deletes an uninterpretable [D] feature on *dōu* (see below). The XP at the higher specifier of *dōu* corresponds to the *wúlùn*-constituent.

Taking *dōu* to be dominated by TP captures the generalization that *dōu* is always preceded by a referential subject, assuming the latter undergoes A-movement to Spec-TP. However, we still need to account for the fact that the antecedent (XP) of *dōu* may either precede or follow the subject.

(273) a. **Wo wulun   shei** dou huanying.
        I   no.matter who DOU welcome
        'No matter who (it is), I welcome (him).'

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b. **Wulun**　　**shei**, **wo** dou　huanying.
　　no.matter who　I　　DOU welcome
　　'No matter who (it is), I welcome (him).'

The word order of (273b) already follows from (272). I suggest that (273b) is derived by fronting

of the XP to a higher functional layer FP (possibly in the CP left periphery):

(274)

```
                    FP
              ┌─────┴─────┐
            XP₂          TP
            ↑       ┌─────┴─────┐
            │     Subj         T′
            │              ┌────┴────┐
            │            T⁰        ModP
            │                   ┌────┴────┐
            │                  t₂       Mod′
            │                        ┌────┴────┐
            │                      pro₁       Mod′
            │                            ┌─────┴─────┐
            │                          Mod⁰          vP
            │                           │         ┌───┴───┐
            └───────────────────────── dōu     … t₁ …
```
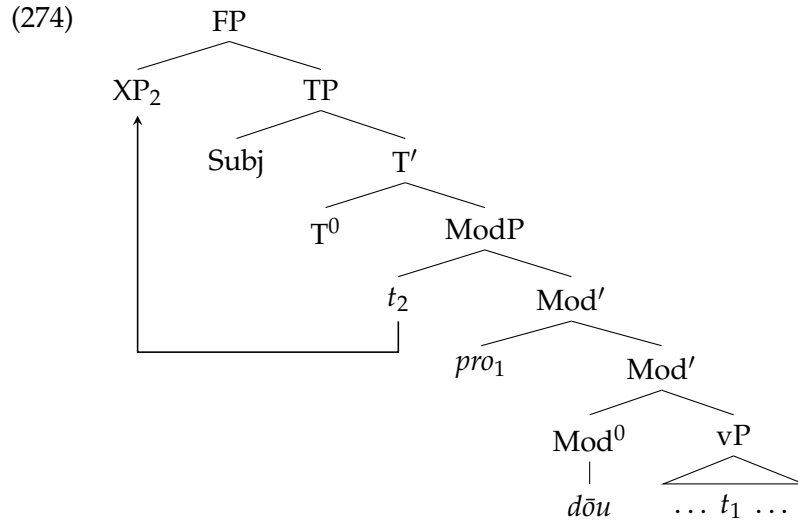
One may pursue a different structure where *dōu* takes TP (not vP) as its complement. In this

alternative analysis, we may say either that the referential subject undergoes obligatory topical-

ization to a higher Topic Phrase (or CP), as in (275), or that the subject is actually a Topic base-

generated at Spec-TopicP that binds a null subject in Spec-TP, as in (276). In either case, the an-

tecedent XP may move across the subject at Spec-TopicP to the highest FP.
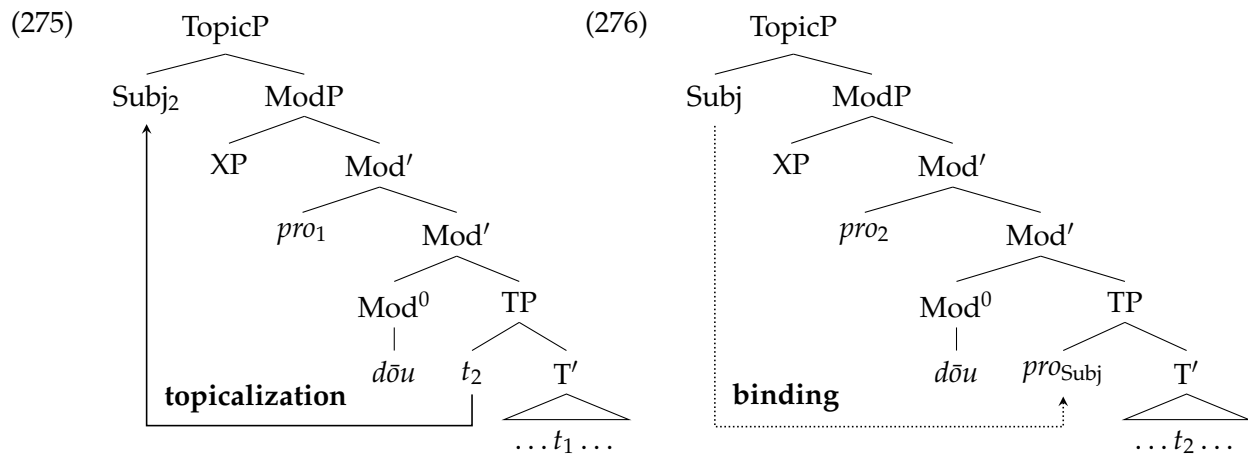
(275)

```
              TopicP
         ┌──────┴──────┐
       Subj₂         ModP
        ↑        ┌─────┴─────┐
        │       XP          Mod′
        │              ┌─────┴─────┐
        │            pro₁         Mod′
        │                   ┌──────┴──────┐
        │                 Mod⁰            TP
        │                  │         ┌─────┴─────┐
        │                 dōu       t₂          T′
        │                                    ┌───┴───┐
        └── **topicalization** ──────────── …t₁ …
```

(276)

```
              TopicP
         ┌──────┴──────┐
       Subj          ModP
        ┊        ┌─────┴─────┐
        ┊       XP          Mod′
        ┊              ┌─────┴─────┐
        ┊            pro₂         Mod′
        ┊                   ┌──────┴──────┐
        ┊                 Mod⁰            TP
        ┊                  │         ┌─────┴─────┐
        ┊                 dōu     pro_Subj       T′
        ┊                            ↑        ┌───┴───┐
        └── **binding** ············ …t₂ …
```

The choice between (272) and (275)/(276) depends on whether referential subjects in Mandarin

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always occupy a position higher than Spec-TP. As I do not have convincing evidence that they do, I will assume that (272) is the correct analysis.

As for the *wúlùn*-constituent, I follow Cheng and Huang (1996) and propose that the category of *wúlùn* 'no matter' can be analyzed as either a P or a C, and in addition it s-selects an interrogative or disjunction clause, as shown in (277).

(277)

PP/CP

P^0/C^0 — TP

wúlùn — interrogative/disjunctive clause

s-selection
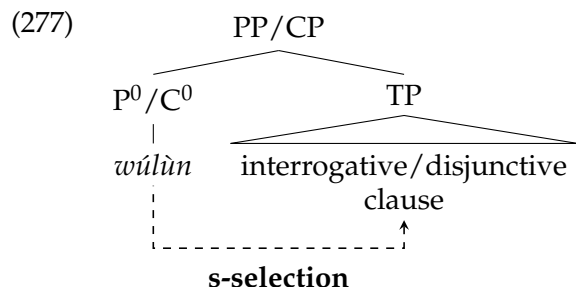
That *wúlùn* may be treated as a P is based partially on its resemblance to *regardless of* in English, a complex expression that contains a P. Since P can select for clauses in addition to noun phrases, the fact that *wúlùn* can be followed by nominal as well as clausal units falls out naturally.

On the other hand, taking *wúlùn* to be a C requires the assumption that the interrogative or disjunctive XP it selects is uniformly a proposition, even when the XP surfaces as a nominal *wh*-phrase. This may indeed be the case, however, as I have shown earlier that in such cases the copula *shì* can optionally precede the *wh*-phrase. If *wúlùn* is a C, we can also treat it similarly to other conditional markers such as *ruguo* 'if' and *zhiyou* 'only if,' which occupy the same position as *wúlùn* and are conventionally analyzed as C-heads.

Note that there is certain arbitrariness in both analyses. For one thing, *wúlùn* is lexically a negation *wú* plus a *verbal* element *lùn* 'to argue/discuss,' although the latter should be regarded as a grammaticalized one. For another, the two categories P and C in Mandarin are not as easily defined as in English; for instance, Mandarin has no lexical item that corresponds to *of* or the complementizer *that*.[4] Moreover, *wúlùn* in *dōu*-unconditionals is *optional*, which makes it different from English *regardless of* in similar constructions.

---

[4]Locative prepositions in English such as *on* or *below* are generally expressed as postpositions or nominals in Mandarin (Li 1990), and those that do look like prepositions (e.g. *zai* 'at' or *cong* 'from') can be construed as verbs and are therefore highly verbal in nature. As for C in Mandarin, it has been suggested by Cheng (1991) and others that question particles such as *ne* or *ma* are born in C. These particles are however sentence-final and only occur in root environments.

For the sake of concreteness, in what follows I will label *wúlùn* as a P. One should nevertheless bear in mind that other choices are possible once we have a well accepted theory for *wúlùn* and similar lexical items in Mandarin which do not find direct counterparts in English.

Based on the discussions, the *dōu*-unconditional (278a) can be given the syntax in (278b).

(278) a. Wulun   (shi) shei mei lai,   wo dou hui chufa.
           no.matter be   who   not come   I   DOU will punish
           'No matter who doesn't come, I will punish (him).'

       b.

```
                                    FP
                         ┌──────────┴──────────┐
                       PP₂                      TP
                  ┌─────┴─────┐           ┌──────┴──────┐
                 P⁰          IP₁         'I'          ModP
                  │       ┌───┴───┐              ┌──────┴──────┐
               wúlùn     I⁰      IP₂            t₂           Mod'
                          │    ┌──┴──┐                  ┌──────┴──────┐
                        (shì) 'who doesn't come'      pro₁          Mod'
                                                             ┌────────┴────────┐
                                                           Mod⁰               vP
                                                            │             ┌────┴────┐
                                                           dōu          'will punish t₁'
```
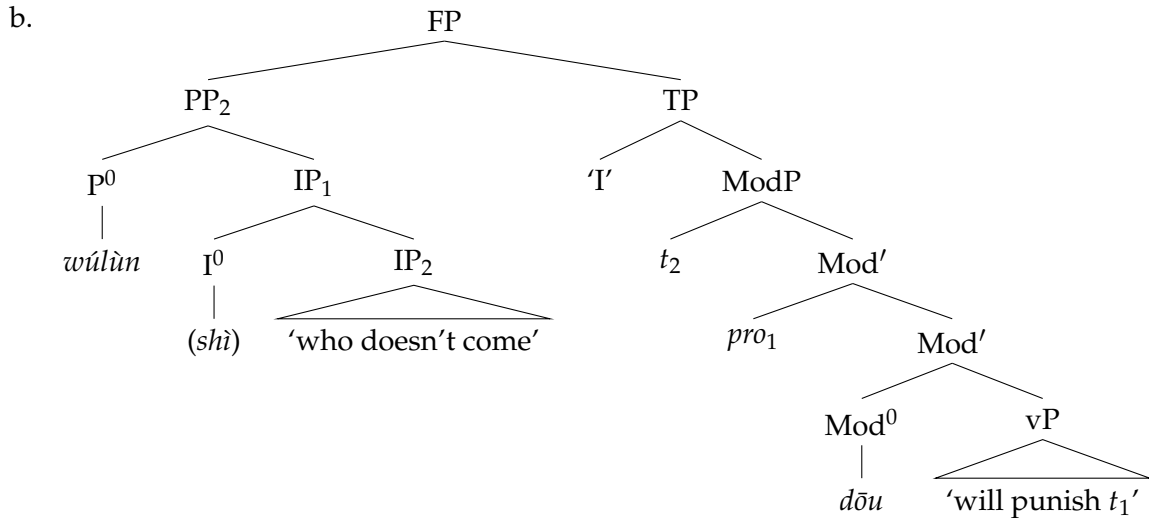
This structure involves two overt movement operations: the null *pro* moves from inside the main vP to Spec-ModP, and the *wúlùn*-PP moves from Spec-ModP to the specifier of the highest FP.

When the antecedent is a *háishì*-disjunctive question, the structure is essentially the same. The full structure of (279a) is diagrammed as in (279b).

(279) a. Wulun   (shi) [chi fan] haishi [chi mian], Lisi dou xiang chi.
         no.matter be   eat rice or$_Q$ eat noodle Lisi DOU want eat
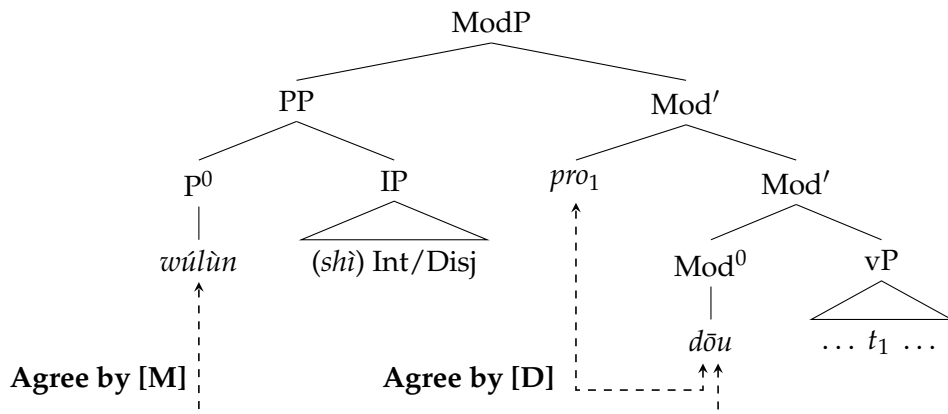   'No matter whether rice or noodles, Lisi wants to eat (it).'

b.
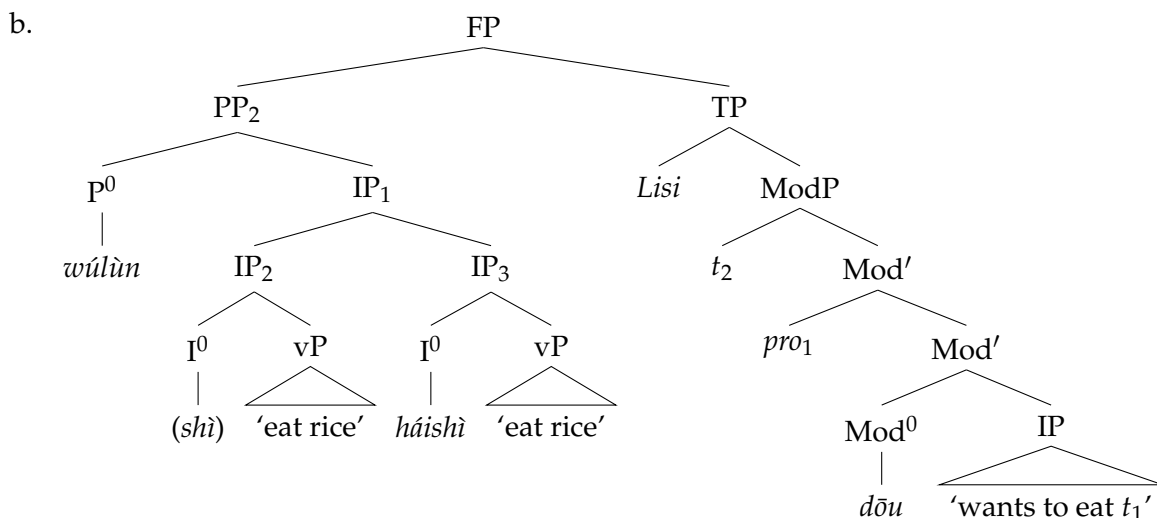
The only difference between (278b) and (279b) is the type of the IP-complement selected by *wúlùn*. The same structure is applicable to cases where the interrogative is a nominal *wh*-phrase, e.g. (262a). In such cases, the copula is directly followed by a DP and therefore looks like a transitive verb (cf. the auxiliary *did* in *I did like Mary* vs. *I did my homework*).

Turning to the syntactic relation between *dōu* and the *wúlùn*-constituent, what our analysis needs to capture is that in a *dōu*-unconditional, *dōu* is obligatory while *wúlùn* is generally optional. I will take the suggestion by Jim Huang (p.c.) and propose that the latter can be analyzed as an *argument* of *dōu*. That is, *dōu* is a modal that selects for two clausal arguments, one a vP, the other the *wúlùn*-PP that is base-generated at Spec-ModP. The selectional relation is both semantic and categorial: the first argument of *dōu*, vP, is a non-interrogative that contains a gap, and the second argument, PP, embeds a question or disjunction.

More specifically, I propose that *dōu* establishes two syntactic agreement relations with two different elements, respectively: (i) a null *pro* which is base-generated inside ModP, and (ii) the *wúlùn*-PP, as shown in the following diagram:[5]

---

[5]The mechanism of agreement is based on Chomsky 2000, 2001 and subsequent work.

(280)

ModP
├── PP
│   ├── P⁰ — *wúlùn*
│   └── IP — (*shì*) Int/Disj
└── Mod′
    ├── *pro*₁
    └── Mod′
        ├── Mod⁰ — *dōu*
        └── vP — … t_1 …

Agree by [M]   **Agree by [D]**

The agreement between *dōu* and *pro* is based on the [D] feature (D for "determiner"): *dōu* bears an uninterpretable [*u*D] that agrees with the interpretable [*i*D] carried by *pro*. The agreement between *dōu* and *wúlùn*, on the other hand, is based on the modal feature [M]; on *dōu*, this feature is *interpretable*, but on *wúlùn* it is *uninterpretable*.

(281) a. Feature on *pro*: interpretable [*i*D]

b. Features on *dōu*: uninterpretable [*u*D], interpretable [*i*M]

c. Feature on *wúlùn*: uninterpretable [*u*M]

In short, *dōu* is equipped with two features, [*u*D] and [*i*M], which undergo agreement with *pro* and *wúlùn*, respectively.

Assuming agreement and movement are both local relations, the current analysis predicts that (i) *pro* cannot start out in an island and (ii) the *wúlùn*-PP also cannot be separated from *dōu* across a clause or island boundary. The first prediction has already been attested by previous studies (e.g. Shyu 1995, Wu 1999; see also Section 3.2.2), as in (282a). Under the current analysis, (282a) is bad because the *pro* associated with *dōu* is forced to move out of the CNP Island.[6]

(282) a. * Wulun   shei₂, Lisi dou taoyan [NP [CP *e*₁ kuajiang *e*₂ de] ren₁   ].
             no.matter who   Lisi DOU dislike   praise   REL person
             Intended: 'No matter who (it is), Lisi dislikes the people who praise him.'

b. * [no matter who] [TP Lisi [ModP *pro*₁ [*dōu*… [CNP … t_1 …]]]]

---

[6]This example is modeled after Shyu's (1995: 70) ex. 11.

(283a) and (284a) show the second prediction is also borne out, where agreement between the *wúlùn*-PP and *dōu* is blocked by a clausal boundary.

(283) a. * Wulun   shei$_1$, Lisi tingshuo-le [$_{NP}$ [$_{CP}$ e_1 dou mei lai   de] xiaoxi].
             no.matter who   Lisi hear-PERF   DOU not come REL news
             Intended: 'No matter who (it is), Lisi heard the news that he didn't come.'

     b. * [no matter who] ... [$_{CNP}$ [$_{ModP}$ *pro$_1$* [*dōu* [... t_1 ...]]]]
                └ _ _ _ _ _ _ _×_ _ _ _ _ _ _ ┘

(284) a. * Zhangsan (wulun)   shei renwei [$_{CP}$ Lisi dou hen xihuan e].
             Zhangsan no.matter who think   Lisi DOU very like
             Intended: 'Zhangsan think Lisi likes everyone.'

     b. * [no matter who] ... [$_{CP}$ ... [$_{ModP}$ *pro$_1$* [*dōu* [... t_1 ...]]]]
                └ _ _ _ _ _ _ _×_ _ _ _ _ _ _ ┘

Note finally that the ungrammaticality of (285a) below is not predicted by my analysis, as the entire embedding structure following *dōu* can in principle function as a larger ModP. And indeed, this sentence is significantly improved if *wúlùn* is added, as in (285b). I conclude that (285a) should be ruled out for non-syntactic reasons, though I do not know what exactly they are.[7]

(285) a. * Shei$_1$ wo dou xiangxin [$_{IP}$ Lisi hen xihuan e_1].   (Wu 1999: 150)
             who I   DOU believe   Lisi very like
             Intended: 'Everyone, I believe Lisi likes (him).'

     b. (?) Wulun   (shi) shei$_1$ wo dou xiangxin [$_{IP}$ Lisi hen xihuan e_1].
             no.matter be   who I   DOU believe   Lisi very like
             'No matter who (it is), I believe Lisi likes (him).'

4.1.3 A note on *pro*-movement

The examples of *dōu*-unconditionals discussed so far all contain a gap in the *dōu*-clause, which I have argued is created by movement of a *pro*. The evidence is given by (282a) where *dōu* cannot be separated from the gap in the same clause across an island. This constitutes an argument for the proposed *pro*-movement.

However, not all *dōu*-unconditionals contain a gap, at least not clearly so. In the following examples there is no argument gap in the *dōu*-clause that corresponds to the *wh*-expression in the PP, as *zui* '(get) drunk' and *shengqi* '(be) angry' are not transitive predicates.

---

[7]See Section 3.2.4 for parallel facts in the *lián...dōu*-construction.

(286) a. Wulun   he   duoshao jiu, ta dou bu hui zui.
          no.matter drink how.much wine he DOU not will drunk
          'No matter how much wine he drinks, he doesn't get drunk.'

       b. Wulun   ni   shuo shenme, ta dou hui shengqi.
          no.matter you say what   he DOU will angry
          'No matter what you say, he will be angry.'

Other similar examples include those in (287), where the *wh*-expressions in the *wúlùn*-PP are adverbials.[8]

(287) a. Wulun   ni   shenme shihou lai,   ta dou hui xian zou.
          no.matter you what   time   come he DOU will first leave
          'No matter when you come, he will leave first.'

       b. Wulun   ta zenme aiqiu, wo dou bu yuanyi liuxialai.
          no.matter he how   beg   I DOU not willing stay
          'No matter how he begged, I wouldn't stay.'

In other situations, the *wh*-phrase in the antecedent corresponds to an overt possessor or pronoun in the *dōu*-clause, hence no argumental *pro* can be posited in the sentence, either.

(288) a. Wulun   na-ge   xiaohai$_1$ fan-cuo,   **ta**$_1$-de fumu dou yinggai fuze.
          no.matter which-CL child   make-mistake he-POSS parents DOU should be.responsible
          'No matter which child$_1$ makes mistakes, his$_1$ parents should be responsible (for them).'

       b. Wulun   shei$_1$ lai, wo dou hui gei **ta**$_1$ liwu.
          no.matter who come I   DOU will give he gift
          'No matter who$_1$ comes, I will give him$_1$ a gift.'

For these data, there are two analyses to consider: (i) *pro* is present only in cases where a corresponding argument gap exists, and (ii) *pro* is present in all *dōu*-constructions, but it is not base-generated as an argumental *pro* when there is no gap.

While theoretically *pro* need not be postulated as a required component in all types of *dōu*-unconditionals, there is evidence that it actually is required throughout and that the second analysis is more desirable both conceptually and empirically. Consider (289) (cf. (282a)):

(289) * Wulun   he   duoshao jiu, wo dou zhidao [$_{DP}$ [$_{CP}$ ta bu hui zui   de] chuanwen].
          no.matter drink how.much wine I   DOU know   he not will drunk REL hearsay
          'No matter how much wine he drinks, I know the hearsay that he doesn't get drunk.'

_____

[8](287b) is due to Jim Huang (p.c.).

The ungrammaticality of (289) is not due to failed agreement between the *wúlùn*-PP and *dōu* since they stand in a local relation. I argue that it is due to a null *pro* base-generated inside the complex NP, which undergoes movement to the specifier of *dōu* violating CNPC. (289), then, is a case where the main clause contains no argument gap and yet still observes island effects as if a *pro* is present.

(290) illustrates the same point: it is good on the reading where the *wúlùn*-PP is associated with the matrix verb *tihui* 'understand,' but bad on the reading that we are after, namely where the PP is associated with the predicate embedded in the complex NP island.

(290)   % Wulun   ta zenme aiqiu, wo dou neng tihui   [DP [CP ni   bu yuanyi liuxialai
           no.matter he how   beg   I   DOU can   understand   you not willing stay
           de] xinqing].
           REL mood
           'No matter how he begged, I understand the feeling that you wouldn't stay.'

Finally, (291) is also ungrammatical, where the pronoun *ta* 'he' appears in an island.

(291)   * Wulun   shei₁, wo dou hen taoyan [DP [CP hui gei **ta**₁ liwu de] ren].
           no.matter who   I   DOU very dislike   will give he gift REL person
           'No matter who₁ (it is), I dislike the people who will give him₁ a gift.'

All these data converge on the conclusion that *dōu*-unconditionals observe locality: the clause that is associated with the *wúlùn*-PP cannot be embedded inside an island. We then have an argument for movement across all types of *dōu*-unconditional sentences. Obviously, what is moved in these examples is not an argumental *pro*. I suggest that it is a null adverbial *pro* base-generated at the vP left periphery.

(292)
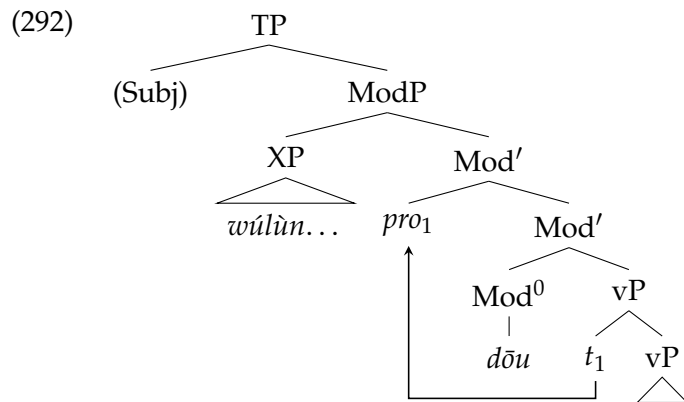
The Ā-movement of the adverbial *pro* in (292) is on a par with *wh*-movement of adverbial *wh*-phrases (e.g. *How did you come?*). A unifying analysis is therefore right in place: when the *dōu*-clause contains an argument gap, the gap is occupied by an argumental *pro* which Ā-moves to Spec-ModP, due to the agreement requirement of *dōu* (i.e., the [*u*D] feature of *dōu* must be eliminated).[9] When there is no argument gap in the structure, a vP-level adverbial *pro* moves to Spec-ModP to satisfy the same requirement. Overall, we can maintain that *pro*-movement is always required in *dōu*-unconditionals and is analogous to operator or *wh*-movement, where the moved element may be an argument or a non-argument.

4.1.4 A note on the antecedent

Before proceeding to the semantics of *dōu*-unconditionals, l would like to address one more issue mentioned by Lin (1996). Lin (1996: 80–94) argues that in some *dōu*-unconditionals (his "*wúlùn. . . dōu*-constructions") such as (294), where *wúlùn* is adjacent to a nominal *wh*-phrase, [*wúlùn wh*-NP] as a whole forms a constituent that occupies an argument position of a predicate, unlike a clausal *wúlùn*-constituent which is a sentential adjunct.

(294) Ta (wulun)   shenme dou xihuan.
      he no.matter what   DOU like
      'No matter what (it is), he likes (it).'

In this subsection, I will argue against this point and defend the view that the *wúlùn*-antecedent constituent, nominal or clausal, is always outside the *dōu*-clause.

   Lin's first argument is based on the predicate structure of *hao* 'kind, good (to someone)' in (295a). He argues that *hao* must select a PP as its internal argument, and the PP cannot be moved to a sentence-initial position, as in (295b).

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[9]Cases where the *wh*-phrase in the *wúlùn*-PP corresponds to the subject of a *dōu*-clause can be analyzed similarly, as shown in (293).

(293) a. Wulun   shei dou keyi lai.
           no.matter who DOU can come
           'No matter who (it is), (he) can come.'

       b. no matter who [*pro*$_1$ [*dōu* [*t*$_1$ can come]]]

(295) a.   Zhangsan [PP dui Lisi] hen hao.   (Lin 1996: 80)
            Zhangsan   to Lisi very good
            'Zhangsan is kind to Lisi.'

      b.   * [PP Dui Lisi] Zhangsan hen hao.
              to Lisi Zhangsan very kind
            Intended: 'Zhangsan is kind to Lisi.'

Now observe that *wúlùn* can precede the PP in (295a) but not that in (295b). Lin takes (296a) as an

indication that "*wúlùn* + PP" is not an adverbial clause, but the internal argument of *hao*.

(296) a.   Zhangsan (wulun)   [PP dui shei] dou hen hao.   (Lin 1996: 81)
            Zhangsan no.matter   to who DOU very good
            'Zhangsan is kind to anybody.'

      b.   * Wulun   [PP dui shei] Zhangsan dou hen hao.
            no.matter   to who Zhangsan DOU very kind
            Intended: 'Zhangsan is kind to anybody.'

It is unclear if this is a relevant argument. There is no evidence showing the PP is an argument

of *hao* 'good, kind.' In fact, this adjectival predicate should be treated as intransitive, i.e. it has no

internal argument, and the PP is best analyzed as an adjunct base-generated above the adjectival

predicate. All that (295b) demonstrates is merely that the PP must be local to the predicate and

cannot be, e.g., topicalized, which is independent of whether the PP is c-selected by the predicate.

Hence, nothing goes wrong if we assume the [*wúlùn* PP] constituent is base-generated outside the

dōu-clause.

    Another argument of Lin's is that *wúlùn*-NPs can follow adverbs such as *yixiang* 'always' but

wúlùn-clauses cannot, as shown in the following minimal pair (297a) and (297b).

(297) a.   Zhangsan yixiang [(wulun) shenme shu] dou kan.   (Lin 1996: 82)
            Zhangsan always no-matter what   book DOU read
            'It has always been the case that Zhangsan reads no matter what book.'

      b. ?* Zhangsan yixiang [wulun   wo zuo shenme] dou bu-hui guan   wo.
            Zhangsan always no.matter I   do what   DOU not-will interfere me
            Intended: 'It has always been the case that no matter what I do, Zhangsan won't

            interfere with me.'

(297b) becomes acceptable once the *wúlùn*-clause moves to an adverbial position, before the sub-

ject. Similarly, (298a) with a *wh*-NP is fine but (298b) with a full *wúlùn*-clause is not.

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(298) a. Women zheli [shenme shu] dou you.   (Lin 1996: 93)
           we   here what   book DOU have
           'We have any kind of book here.'

     b. * Women zheli [wulun   shi shenme shu] dou you.
           we   here no.matter be what   book DOU have
           Intended: 'No matter what kind of book it is, we have it here.'

The contrasts above suggest that a *wúlùn*-clause cannot occupy a position only available for nominal arguments, e.g. the *wh*-NP in (297a) and in (298a).

Note first that (297b) and (298b) are actually acceptable to some speakers, especially when they are read with a pause right before *wúlùn*. Second, there seems to be no general principle that bans a clausal adjunct from following *yixiang* 'always': (299a) is an example with the temporal CP-adjunct following *yixiang*. However, (299b), which has an identical structure to (299b) except for the overt subject in the CP-adjunct, sounds awkward.

(299) a. Zhangsan yixiang [CP chi-wan   wancan hou] jiu   qu xizao.
           Zhangsan always   eat-finish dinner after then go shower
           'Zhangsan always takes a shower (right) after (he) finishes dinner.'

     b. * Zhangsan yixiang [CP Lisi chi-wan   wancan hou] jiu   qu xizao.
           Zhangsan always   Lisi eat-finish dinner after then go shower
           Intended: 'Zhangsan always takes a shower (right) after Lisi finishes dinner.'

I have no good answer to why (297b), (298b) and (299b) should be ruled out, but would like to point out that the minimal pairs cited by Lin (1996) do not constitute direct evidence for the claim that [*wúlùn wh*-NP] is a nominal phrase. What these data show is simply that a full-fledged *wúlùn*-clause is dispreferred in certain situations, and this is orthogonal to whether [*wúlùn wh*-NP] is an internal argument or not.

The final argument of Lin's has to do with the fact that empty argument positions in Mandarin can be filled in by overt pronouns, as in (300).

(300) Zhangsan mei shi   deshihou, (**ta**) jiu   qu zhao Lisi.   (Lin 1996: 86)
       Zhangsan not thing when   he then go see   Lisi
       'Whenever Zhangsan is free, he goes to see Lisi.'

It follows that the *wúlùn*-NP in (301a) below must be the argument of the main predicate, because this subject position cannot be filled in by an overt pronoun, as shown in (301b). Therefore, the *wúlùn*-NP must itself be the argument.

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(301) a. Zhe-ji-ge   haizi,   [wulun   na-yi-ge]   dou hen congming.
        this-several-CL children no.matter which-one-CL all   very bright
        'As for these children, no matter which one is bright.'   (Lin 1996: 84)

     b. * Zhe-ji-ge   haizi,   [wulun   na-yi-ge]   **ta** dou hen congming.
        this-several-CL children no.matter which-one-CL he all   very bright
        Intended: 'As for these children, no matter which one is bright.'   (Lin 1996: 87)

A full investigation of the behaviors of pronouns in Mandarin is beyond what I can achieve here. Nevertheless, it suffices to mention that *ta* 'he' in (300) is a *referential* pronoun whereas that in (301b) is intended with a *bound variable* reading. Mandarin pronouns do not easily get a bound variable reading: it has been observed by Aoun and Li (1989) that the distribution of bound pronouns is not parallel to that of referential pronouns in this language, as exemplified by the following contrast:

(302) a. Zhangsan$_i$ shuo ta$_i$ bu xihuan pijiu.   (Aoun and Li 1989: 154)
        Zhangsan said he not like   beer
        'Zhangsan said that he does not like beer.'

     b. * Meigeren$_i$ dou shuo ta$_i$ bu xihuan pijiu.
        everyone   DOU say   he not like   beer
        Intended: 'Everyone said that he does not like beer.'

One can therefore not neglect the possibility that the ungrammaticality of (301b) is due to Mandarin pronouns being unable to be quantificationally bound, a fact that is independent of whether the *wúlùn*-NP is an argument or not.

I conclude that we can still maintain that the antecedent in unconditional *dōu*-constructions can be consistently analyzed as external to the *dōu*-clause. In addition, its occurrence is restricted, per Lin's (1996) observations.

4.1.5 Semantics

In Section 1.6 we reviewed K&S's (2002) proposal of the *distribution requirement* for the free choice effect of the German indefinite *irgendein*:

(303) *Distribution requirement*:

$\{\lambda w'.\forall p[p \in [\![\alpha]\!]^{w',g} \rightarrow \exists w''[w''$ is accessible from $w' \wedge p(w'') = 1]]\}$

This requirement says for every proposition in the set of propositional alternatives (expanded from the set of individual alternatives introduced by *irgendein*) there is an accessible world in which the proposition is true. K&S suggest this requirement is not part of the truth-conditional content of an *irgendein*-sentence with a modal, but (Gricean) implicature.

The gist of my analysis is that *dōu*-unconditionals have a semantics along the lines of (303). The interrogative antecedent of *dōu* denotes a set of alternative propositions, which is introduced by either a *wh*-phrase or a disjunction. The function of *wúlùn* is to indicate that for every alternative, there is a possible world in which the proposition denoted by the *dōu*-clause is true.

Let us take (304a) as a concrete example, the structure of which is (304b).

(304)   a.   **(Wulun) (shi)** Zhangsan (chidao) haishi Lisi chidao, wo **dou** hui chufa.
                no.matter be   Zhangsan late   or$_Q$ Lisi late   I   DOU will punish
                'No matter whether Zhangsan (is late) or Lisi is late, I will punish (him).'

b.
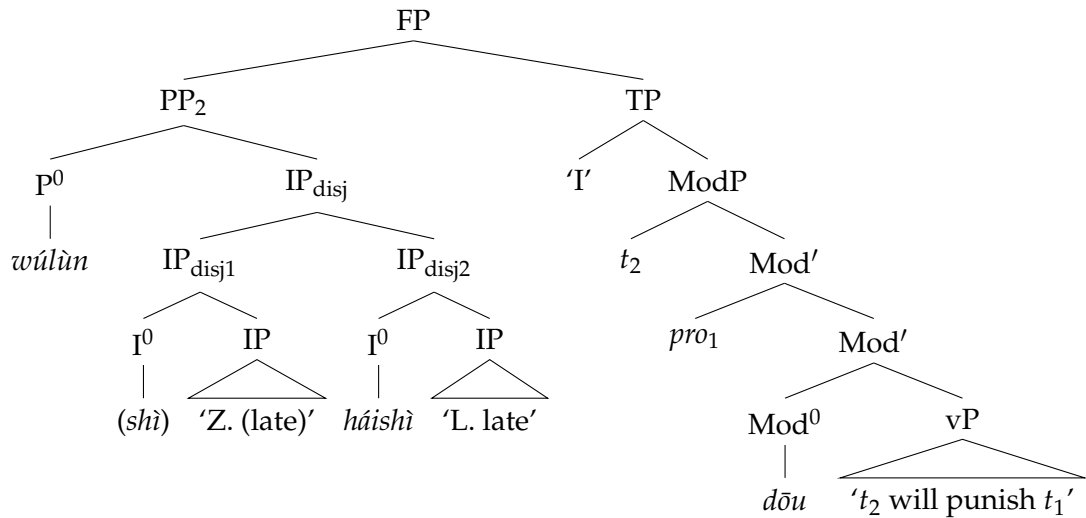
I argue that the meaning of (304a) is (305a), which is modeled on (303):

(305)   a. $\{\lambda w.\forall p[p \in [\![\text{IP}_{\text{disj}}]\!] \to \exists w'[ACC(w, w') \wedge p(w') \wedge \text{I will punish the person in } w']]\}$

           where $ACC(w, w')$ means w' is accessible from w

         b. $[\![\text{IP}_{\text{disj}}]\!] = \{\lambda w[\text{Zhangsan is late in } w], \lambda w[\text{Lisi is late in } w]\}$

In plain words, (305a) says: for every proposition p in the set {Zhangsan is late in w, Lisi is late in w}, there is an accessible world w' in which p is true and I will punish the (unique) person. Thus, given the sentence (304a), there is a world in which Zhangsan is late and I will punish the
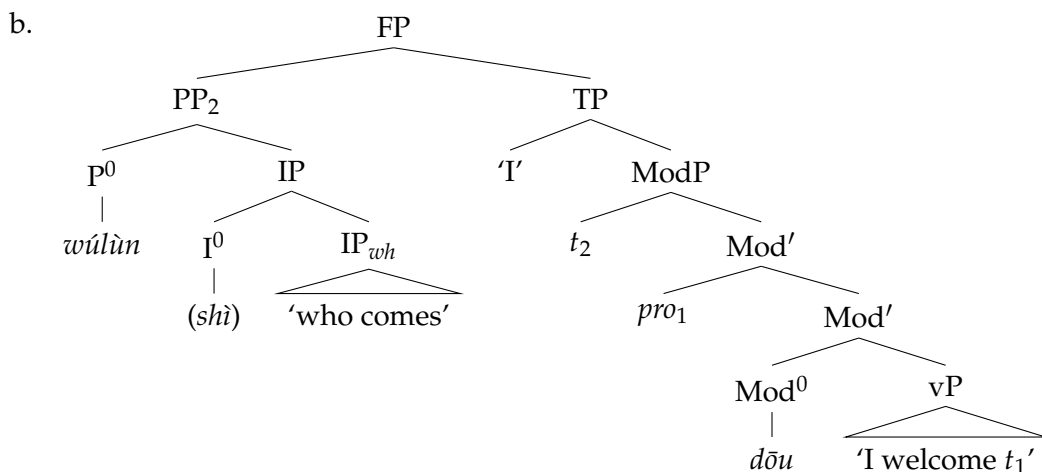
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person (= Zhangsan), *and* there is a world in which Lisi is late and I will punish the person (= Lisi). The definite description *the person* employed in this paraphrase comes from the null *pro*, which I assume is an E-type pronoun (Evans 1980) that can be semantically bound without syntactic c-command. Unlike ordinary E-type pronouns, *pro* has to undergo LF-movement to Spec-ModP as evidenced by locality effects.

In this semantic analysis, the role of *wúlùn* is a generalized quantifier with universal force. It takes two arguments, one a set of propositions expressed by the *háishì*-disjunction, the other the proposition denoted by the *dōu*-clause. Crucially, *dōu* corresponds to the existential quantifier over possible worlds in (305a). In other words, it is an existential modal.[10] One may conveniently think of the representation in (305a) as the "modal" counterpart of the doubly quantified sentence *every boy dates a girl*, which receives the standard translation $\forall x[\textbf{boy}(x) \rightarrow \exists y[\textbf{girl}(y) \land \textbf{date}(x,y)]]$. In (305a), the world quantified by *dōu* co-varies with the propositions denoted by IP_{disj} in the same sense as the referent of the variable y co-varies with x in this analogy.

The analysis can be duplicated when the complement of *wúlùn* is a *wh*-expression. In this case, the alternatives which will combined with the *dōu*-clause are introduced by the *wh*-word, which denotes a set of individual alternatives that expand to a set of propositions. The syntax of (306a) is depicted in (306b), and its meaning is shown in (306c).

---

[10]Notice that the necessity modal *hui* 'will' occurs in the scope of the existential quantifier of w', thus this sentence has a modal embedded in the scope of another modal.

(306) a. Wulun   (shi) shei lai,   wo dou huanying.
       no.matter be   who come I   DOU welcome
       'No matter who comes, I welcome (him).'

b.

```
                              FP
                    ┌─────────┴──────────┐
                  PP₂                     TP
              ┌────┴────┐           ┌──────┴──────┐
            P⁰          IP         'I'           ModP
            │        ┌───┴───┐               ┌────┴────┐
          wúlùn     I⁰      IP_wh           t₂        Mod'
                    │      ┌──┴──┐               ┌─────┴─────┐
                  (shì) 'who comes'           pro₁         Mod'
                                                       ┌────┴────┐
                                                     Mod⁰       vP
                                                      │       ┌──┴──┐
                                                    dōu    'I welcome t₁'
```

c. $\{\lambda w. \forall p[p \in [\![\text{IP}_{wh}]\!] \rightarrow \exists w'[ACC(w,w') \wedge p(w') \wedge \text{I welcome the person in } w']]\}$

d. $[\![\text{IP}_{wh}]\!] = \{\lambda w[\text{John came in } w], \lambda w[\text{Mary came in } w], \lambda w[\text{Bill came in } w], \dots\}$

The meaning of (306a) says for each proposition p in the denotation of '(be) who comes' there is an accessible world in which p is true and I welcome the unique person. As discussed in Chapter 2, the essential difference between a *háishì*-disjunction and a *wh*-phrase is that the latter does not specify the cardinality of alternatives it denotes. In semantics, however, the two are quite similar in that they both denote sets of alternatives.

In the present analysis, it is crucial that *dōu* combines with vP first to yield a modal proposition, which then combines with the alternatives denoted by the interrogative antecedent. This compositional order ensures that each alternative will get its own possible world. If we assume the antecedent *wh*-phrase is born as a postverbal object and try to "reconstruct" it back to the object position and interpret it in-situ, the result is a modal scoping over a set of alternatives. But the following is simply ungrammatical:

(307)   * Lisi dou huanying shei.
          Lisi DOU welcome who
          Intended: 'Lisi welcomes everyone.'

This is why in the syntactic analysis we let the null *pro* occupy the gap inside the *dōu*-clause, rather than the trace/copy of the antecedent: reconstruction is impossible. The syntax of *dōu*-

unconditionals is therefore very revealing, as its word order corresponds directly to the order in semantic representation.

In (306c) *wúlùn* is the $\forall$-quantifier over a set of alternatives. There is another possibility: the $\forall$-quantifier is present in a null form in the syntax of *dōu*-unconditional, and *wúlùn* contributes to something different than what we just said. Consider the following:

(308) a. Wo keyi mai shenme?
         I   can buy what
         'What can I buy?'

       b. Ni shenme dou keyi mai. **Wulun**   shenme dou keyi.
           you what   DOU can buy no.matter what   DOU can
           'You can buy anything. No matter what (it is), (you) can buy (it).'

The response in (308b) is felicitous and natural; there is no redundancy of the kind where a lexical item is repeated. This is an argument that *wúlùn* is probably not part of the sentential structure of *dōu*-unconditionals, and that we can derive the meaning of a *dōu*-unconditional without *wúlùn*.

But at the same time, *wúlùn* seems to be a universal quantifier as well, and if so, how can it appear in a *dōu*-unconditional without conflicting with the invisible $\forall$ that *dōu* agrees with? It is actually reasonable to think that *wúlùn* is not a universal quantifier per se, but a *negative* predicate perhaps identical to *no matter* in English. How to formally characterize the meaning of *no matter* is not a trivial thing to do, and here I can only pursue the intuitive hypothesis that (309a) can be paraphrased using the existential quantification in (309b):

(309) a. It doesn't matter which one you buy.

       b. $\approx$ There is not anything such that you buy it and it matters (to me).

By the same token, for the second clause in the Mandarin example (308b), the meaning of *wúlùn* is the negative existential claim "there is *not* anything that you can*not* buy." Given that $\neg\exists x[\neg P(x)]$ is logically equivalent to $\forall x[P(x)]$, this derives the impression that *wúlùn* conveys universal quantification. In this alternative view, *wúlùn* is only "compatible" or semantically "coherent" with the meaning of a *dōu*-unconditional. As we shall see subsequently, we also need *dōu* to associate with universal quantification in other constructions without *wúlùn*, which constitutes another reason not to take *wúlùn* to be the $\forall$-quantifier in *dōu*-unconditionals. For our present purposes, the original analysis would suffice, but the second option just mentioned should be kept open.

Importantly, in either situation, the quantifier (silent ∀ or *wúlùn*) takes the interrogative antecedent of *dōu* as its first complement. In other words, the expanding alternatives will be "closed" as soon as they meet this Hamblin propositional quantifier, and are therefore not accessible to any other propositional quantifiers. We then predict intervention effects.

In Section 4.1.1 we mentioned the synonym of the following two sentences:

(310) a. **(Wulun) (shi)** [chi fan] haishi [chi mian], Lisi **dou** xiang chi.
no.matter be   eat rice or$_Q$ eat noodle Lisi DOU want eat
'(No matter) whether rice or noodles, Lisi wants to eat (it).'

b. **(Wulun) (shi)** [chi fan] huoshi [chi mian], Lisi **dou** xiang chi.
no.matter be   eat rice or   eat noodle Lisi DOU want eat
'(No matter) whether rice or noodles, Lisi wants to eat (it).'

What is curious about this pair is that *háishì* and *hùoshì* are not synonymous in non-embedded contexts: *háishì* always leads to an interrogative interpretation while *hùoshì* is not interrogative. In addition, neither of the two disjunction markers deliver logical disjunction; (310a) for instance does not mean Lisi wants to eat rice *or* he wants to eat noodles. Rather, the two propositions are interpreted as a *conjunction*. The meanings of *háishì* and *hùoshì* therefore seem to be variable: they sometimes entail disjunction and sometimes don't. This is why in Section 4.1.1 I do not take them to be inherently quantificational; instead, they both introduce a set of alternatives into semantics, which then associate with a propositional operator (Q or ∃).

In *dōu*-unconditionals, they have the same denotation, i.e. a set of alternatives, which expand to a set of propositions that are collected by *wúlùn*. In the words, the alternatives denoted by *háishì*, *hùoshì* and a *wh*-phrase interact *directly* with a propositional universal quantifier. This is why a *dōu*-unconditional never gives rise to interrogative or existential (i.e. disjunctive) interpretation: *wúlùn* is an intervener between the Q/∃-operator and alternatives.

(311) Q/∃ ... *wúlùn* {PROPOSITIONAL ALTERNATIVES}   *intervention*
       └ – – – – – – –✗– – – – – – – ┘

Intervention will occur only when *wúlùn* sits in between the alternatives and Q/∃. We must make sure the *wúlùn* in (311) is inserted right above the set of propositional alternatives, so that a *dōu*-unconditional does not wind up being an existential or interrogative construction. This is why we want *dōu* to establish an agreement relation with *wúlùn* in syntax (as in (280)). This relation will be

destroyed if another propositional quantifier steps in between, in which case the uninterpretable feature [*u*M] on *wúlùn* will remain undeleted.

A further remark on *wúlùn*. I have argued that its function is to collect the alternatives in a *dōu*-unconditional. The direct evidence is syntactic: *wúlùn* subcategorizes only for interrogative and disjunctive expressions. Semantically, there is the intuition that if there is only one relevant alternative, a *dōu*-unconditional should not be used because universal quantification comes out vacuous. However, nothing in what I have said so far guarantees there be *at least two* alternatives in a *dōu*-unconditional: logically, *every unicorn is yellow* would still be true if there exists only one yellow unicorn in the world. But this is not the way we construe such sentences: if we know that there is only unicorn, we would not make such universal claim. Thus, the restriction domain of universal quantification needs to be well defined such that it contains at least two entities (cf. Horn 1996). We may stipulate the same condition for *dōu*-unconditionals.

It is instructive to see how the present account compares with K&S's (2002) on German *irgendein*-DPs. They propose that the alternatives generated by *irgendein* are existentially closed before meeting the modal, hence the modal interacts with singleton propositions.

(312) Modal + ∃ {. . . *irgendein*-DP . . . }

Their analysis is well motivated for *irgendein*, because in the absence of a modal it is interpreted as an existential indefinite. But Mandarin *wh*-phrases are different: in the absence of *dōu*, they become interrogative expressions. Traditional Existential Closure does not apply to Mandarin *wh*-phrases. This is why we let the alternatives introduced by *wh*-phrases interact directly with *wúlùn* which *dōu* agrees with in *dōu*-unconditionals.

Crucially, what is being suggested as a result of implicature by K&S, namely the distribution requirement, is part of the truth-conditional content of a *dōu*-unconditional in my analysis. In particular, *wúlùn* is the analogue of the "distributor" of alternatives to their own possible worlds. This significant distinction is evidenced by the following comparison: (313b) does not have the "no matter which" inference, unlike (313a).

(313) a. Du kannst dir   **irgendeins** von diesen beiden Büchern leihen.
          you can   you.DAT IRGEND-one of   those two   books   borrow
          'You can borrow one of those two books, it doesn't matter which.'   (K&S 2002: ex. 16)

b. Zhe-liang-ben shu, ni   keyi jie   yi-ben.
   this-two-CL   book you can borrow one-CL
   'You can borrow one of those two books.' (does NOT infer: it doesn't matter which)

This entails that the numeral phrase 'one-CL' in (313b) lacks the free-choice component of *irgendein*. It would not help if we insert *dōu* and prepose 'one-CL' to make it the antecedent of *dōu*, as (314a) is ungrammatical. However, if we add the *wh*-morphology *nǎ* 'which' to the numeral, the sentence becomes grammatical and delivers the free choice inference, as in (314b).

(314)   a.   * Zhe-liang-ben shu, ni   yi-ben **dou** keyi jie.
             this-two-CL   book you one-CL DOU can borrow
             Intended: 'You can borrow any one of those two books.'

        b.   Zhe-liang-ben shu, ni   **na**-yi-ben   **dou** keyi jie.
             this-two-CL   book you which-one-CL DOU can borrow
             'You can borrow any one of those two books.' (⤳ it doesn't matter which)

That (314a) is bad is not surprising, given what I have proposed: the set of alternatives interacting with *dōu* cannot be singleton set. However, the fact that only (314b) can semantically match the German example (313a) implies that the "no matter which" interpretation is syntactically encoded in the *dōu*-unconditional. Put differently, to express the meaning of an *irgendein*-DP in the scope of a modal, Mandarin has to make use of three ingredients scattered in the clausal syntax: *wúlùn*, an interrogative/disjunctive expression, and a *dōu*-clause.

In short, *wúlùn* is a generalized quantifier that takes a set of propositions and a *dōu*-clause as its arguments. It asserts that for every proposition p in the restriction set, there is a possible world in which p is true and the *dōu*-clause is true. The role of *dōu* in the present analysis is a modal that existentially closes a possible world variable. The overall semantic representation of a *dōu*-unconditional is parallel to that of K&S's (2002) distribution requirement for *irgendein*. What this implies is that a *dōu*-unconditional gives rise to the *free choice* effect similar to that of *irgendein* in the scope of a modal. This explains why *dōu* has been traditionally taken to be a "universal quantifier" of some sort.

4.1.6 *And*?

At the end of Section 4.1.1 we noted in passing that this example is ungrammatical, as it does not meet the subcategorization requirement of *wúlùn*:

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(315)   * Wulun   Lisi haiyou Zhangsan, wo **dou** huanying.
        no.matter Lisi and   Zhangsan I   DOU welcome
        Intended: 'I welcome Lisi and Zhangsan.'

However, this is unexpected given what I have said so far. According to the proposal in Section 2.5, the conjunction marker *háiyǒu* introduces a set of alternatives into semantics, which is closed by a Hamblin universal quantifier (under Universal Concord):

(316) $\llbracket (y\check{o}u) \text{ X } h\acute{a}iy\check{o}u \text{ Y} \rrbracket = \forall\{X, Y\} = X \land Y$ ('X is true and Y is true')

Since this basic function of *háiyǒu* is identical to the disjunction markers *háishì* and *hùoshì*, they should all be compatible with *wúlùn*. Why is (315) bad?

What seems to go wrong with (315) is that the negative existential predicate *wúlùn* cannot "penetrate" into the conjunction and "see" the alternatives in the conjunction, presumably because the universal quantifier associated with *háiyǒu* has already "closed" the conjunction, leading to the intervention effect in (317):

(317)   *wúlùn* ... $\forall$ { ... *háiyǒu*-conjunction ... }   *Intervention*
        └ _ _ _ _ _✗_ _ _ _ _ ┘

The reason why the universal quantifier associated with a *háiyǒu*-conjunction must be attached to it locally is not clear to me. However, it is possible that this has to do with the fact that cross-linguistically free choice elements (e.g. *any*, *irgendein*) are morphologically related to existential indefinites but not to universal quantifiers (see Chierchia 2013 for some relevant discussions). Whatever is responsible for this generalization may turn out to explain why Mandarin *wúlùn* is incompatible with a conjunction. I will set this issue aside.

Notice that when *wúlùn* is dropped, (315) becomes grammatical:

(318)   Lisi haiyou Zhangsan, wo **dou** huanying.
        Lisi and   Zhangsan I   DOU welcome
        'I welcome Lisi and Zhangsan.'

This is surprising, as it seems that the $\forall$ associated with the *háiyǒu*-conjunction is dropped as well, so that the alternatives in the conjunction can now interact with *dōu* in (318). How does this happen?

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I propose that the implicit *wúlùn* (or a silent universal quantifier) associated with *dōu* does not quantify over the conjunction in (318). Rather, it quantifies over the alternatives denoted by an implicit *wh*-expression in (318), the underlying form of which is actually (319), where the conjunction phrase is analyzed as a Topic which is not in the scope of *wúlùn*:

(319) [_{Topic} Lisi haiyou Zhangsan], wo [wulun   shei] **dou** huanying.
            Lisi and   Zhangsan I   no.matter who DOU welcome
       'I welcome Lisi and Zhangsan.'

In Section 4.2 I will argue that such configuration is what underlies the so-called "distributivity" of sentences like (319).

4.1.7 *Dōu* and domain widening

In their seminal work, Kadmon and Landman (1993) (henceforth K&L) observe that both types of *any* indicate "reduced tolerance to exceptions." With *any*, the speaker of (320b) conveys that she doesn't have socks, including wet ones. Likewise, (321b) can be understood to mean that wet socks are no exception.

(320) a. Do you have dry socks?

       b. I don't have ANY socks.

(321) a. Perhaps some dry socks would help?

       b. ANY socks would help.

K&L propose a unified analysis according to which *any* is an indefinite determiner that comes with two additional semantic/pragmatic characteristics, WIDENING and STRENGTHENING:

(322) WIDENING   (K&L: 361)

       In an NP of the form *any CN*, *any* widens the interpretation of the common noun phrase (CN) along a contextual dimension.

(323) STRENGTHENING   (K&L: 369)

       Any is licensed only if the widening that it induces creates a stronger statement, i.e., only if the statement on the wide interpretation ⇒ the statement on the narrow interpretation

WIDENING is essentially the extension of a previously given domain of quantification along some contextual dimension. For an NP of the form "*any* CN," the denotation of CN is extended or widened by *any*. Widening results in *the inclusion of (contextually determined) exceptions*. Thus (321b), for example, states that all socks would help including the exceptional, not previously considered, wet ones. STRENGTHENING, on the other hand, encodes the constraint that the use of *any* must make a stronger statement, where "stronger" is defined on the basis of entailment: a sentence *S* with *any* must entail *S* without *any*. In this sense, *any* is an emphatic element.

The idea that Mandarin *dōu* signals domain widening has been entertained by Lin (1996), who gives the following remark on the *dōu*-unconditional (his "*wúlùn*-conditionals") in (324b):

(324)   a.   A: Nimen zheli you-mei-you   xiaohaizi kan de   shu?
                 you   here have-not-have children read REL book
             'Do you have books for children to read here?'

        b.   B: Wulun   ni   yao   shenme shu, women zheli **dou** you.
                 no.matter you want what   book   we   here DOU have
             'No matter what (kind of) book you want, we have it here.'

"So in [(324b)], when A brings up the relevance of books for children to read, this kind of book should be the most salient entity. However, when B replies to A with a *wúlùn*-sentence, those kinds of books which are previously regarded as irrelevant by A now become relevant in the discourse. What we see in [(324b)] is this: *wúlùn*-conditionals have an effect of widening the previously given domain of quantification."

(Lin 1996: 109–110)

Lin (1996: 112–113) goes on and employs a Hamblin-style analysis on the *wh*-phrase *shei* 'who' in (325a). In particular, he treats *shei* as denoting the set of singleton sets in (325b), and *wúlùn* 'no matter' a union formation operator that combines with *shei* and yields a set of individuals.

(325)   a.   (Wulun) shei **dou** hen congming.
                 no.matter who DOU very bright
             'No matter who (= any person) is bright.'

        b. $[\![\text{shei}]\!] = \{\{a\}, \{b\}, \{c\}, \dots\}$

        c. $[\![\text{wulun shei}]\!] = \cup[\![\text{shei}]\!] = \{x : \exists y \in [\![\text{shei}]\!] \wedge x \in y\} = \{a, b, c, \dots\}$

However, Lin (1996) assumes that the *dōu* in (325a) is the same generalized distributivity operator as in other *dōu*-sentences. In *wúlùn*-conditionals, its function is to distribute the property denoted

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by the VP over each member in the set denoted by [*wúlùn shei*].

Although Lin (1996) is quite explicit in associating *dōu* with domain widening, nothing in his semantics guarantees that the quantificational domain of a *wh*-phrase is widened. It is not enough to say a *wh*-phrase denotes a set of alternatives; this is just the basic meaning of it in Hamblin semantics. Moreover, it is unclear how to incorporate the domain-widening property of *dōu* in a theory where *dōu* is a generalized distributivity operator, as these are two very different concepts.

As discussed in Section 1.6, the domain of an indefinite in K&S's (2002) framework is widened if the set of individuals it denotes includes all individuals in the evaluation world. Thus the simple indefinite *ein Mann* denotes a subset of the set of men but *irgendein Mann* denotes the set of all men.

(326) a. $g(D) \subseteq D$ (D = the set of possible individuals)

    b. $[\![\text{ein}_D \text{ Mann}(\alpha)]\!]^{w,g} = \{x : \textbf{man}(x)(w) \wedge x \in g(D)\}$ (a subset of the set of men)

    c. $[\![\text{irgend-}[\text{ein}_D \text{ Mann}]]\!]^{w,g} = \{x : \exists g'[\textbf{man}(x)(w) \wedge x \in g'(D)]\}$
       $= \{x : \textbf{man}(x)(w)\}$ (the set of all men)

This implementation of domain widening needs to be handled with care when analyzing Mandarin *dōu*-constructions. In the following example, the domain of individuals associated with *dōu* is fixed: there are only two. If *dōu* instantiates domain widening, what is being widened cannot literally be the set of individuals. On the other hand, (327a) indeed is perceived to have a slightly different interpretation than (327b) without *dōu*-quantification.

(327) a. Zhangsan he Lisi (wulun)   shei **dou** hen congming.
        Zhangsan and Lisi no.matter who DOU very bright
        'Zhangsan and Lisi, no matter who it is, he is bright.'

    b. Zhangsan he Lisi hen congming.
        Zhangsan and Lisi very bright
        'Zhangsan and Lisi are bright.'

Intuitively, the distinction between the two examples, which is not truth-conditional, is that (327a) is more "emphatic" or, in K&L's words, reduces tolerance of exceptions. Given the proposed semantic analysis, can we incorporate the notion of domain widening to characterize such distinction between (327a) and (327b)?

I think the answer is positive. In my account, the meaning of a *dōu*-unconditional involves universal quantification over a set of *non-singleton* propositions. The domain of *wúlùn* must con-

tain at least two propositional alternatives. What is widened in (327a), then, can be said to be the domain of alternatives, each of which is distributed to its own possible world. The domain of (327a) is wide with respect to (327b); in the latter, widening is not even relevant because there is no *dōu*-quantification taking place. The "emphatic" sense of (327a) is therefore a result of a more "complex" semantic calculation at the intensional level, namely universal quantification over alternatives. More discussions to come in the next subsection.

4.1.8   Over realizations of alternatives

The Hamblin-style alternative-based analysis for *dōu*-unconditionals is empirically supported by the fact that the propositional alternatives in their denotation can be "flattened" to a visible set of sentences, each of which can be deemed the realization of a propositional alternative.

The following pairs should be transparent enough:

(328) a. (Wulun)   shei **dou** mei lai.
           no.matter who DOU not come
           'Nobody came.' (Lit. 'No matter who (it is), (he) didn't come.')

     b. Zhangsan **ye** mei lai,   Lisi **ye** mei lai,   Wangwu **ye** mei lai
           Zhangsan YE not come Lisi YE not come Wangwu YE not come
           'Zhangsan didn't come, Lisi didn't come, Wangwu also didn't come.'

(329) a. Lisi shenme shu   **dou** kan-le.
           Lisi what   book DOU read-PERF
           'Lisi read every book.'

     b. Lisi GB **ye** kan-le,   MP **ye** kan-le.
           Lisi GB YE read-PERF MP YE read-PERF
           'Lisi read GB and also read MP.'

The a-examples and b-examples share the same syntactic skeleton and differ in two aspects: (i) the conjunction of two or more *yě*-sentences is equivalent to the meaning of one *dōu*-sentence (in a limited context), and (ii) the associate phrase with *yě* is non-interrogative but that with *dōu* is interrogative. *Yě* takes place in exactly the same position as *dōu* in each case. The literal meaning of *yě* is 'also,' but it is clear in these cases it cannot mean *also* (cf. **John also came and Mary also came*). Let us call such constructions as "serial *yě* constructions."[11]

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[11]Similar data have been observed by Chao (1968) and Biq (1989). Chao (1968) calls the serial *yě* constructions "cor-

Impressionistically speaking, a serial *yě* construction sounds like reading off a list of partial answers to a question. Each *yě*-clause constitutes one answer but *not the only one*, and therefore it would not be felicitous to pronounce just one *yě*-clause in this construction. This is evidenced by the following contrast:

(330)   *Who didn't come to the class?* (speaker has no presupposition of who didn't come)

    a. % Zhangsan **ye** mei lai.
        Zhangsan YE not come
        %'Zhangsan also didn't come'

    b. Zhangsan **ye** mei lai,   Lisi **ye** mei lai,   Wangwu **ye** mei lai.
        Zhangsan YE not come Lisi YE not come Wangwu YE not come
        'Zhangsan didn't come, Lisi didn't come, Wangwu also didn't come.'

Note that (330a) is not ungrammatical; it is grammatical with the meaning shown in the translation, which is nevertheless infelicitous in the given context because *yě* implies that it is familiar information that someone else other than Zhangsan didn't come. On the other hand, (330b) is fine but does not infer that someone other than the three mentioned didn't come. Rather, it infers that these three individuals exhaust the answers to the question. Thus *yě* in the serial *yě* construction cannot be equated to *also*.

The following pair shows the same point:

(331)   a. Lisi **ye** kan-le   GB.
        Lisi YE read-PERF GB
        'Lisi also read GB.'

    b. * Lisi **ye** kan-le   GB, **ye** kan-le   MP.
        Lisi YE read-PERF GB YE read-PERF MP
        Intended: 'Lisi read GB and also read MP.'

If we try to put the objects in (329b) back to the postverbal position, the result is ungrammatical, but if only one *yě*-clause is uttered, it is fine. This implies that there may be two related but distinct uses of *yě*. What we are interested in is the second use where it seems to mark one of the alternatives of a *dōu*-unconditional.

In *dōu*-unconditionals, the universal expression *wúlùn* 'no matter' can be lexically decomposed as the negation *wú* + *lùn* 'to argue/discuss.' In the serial *yě* constructions exemplified by

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relative conjunctions." I will not follow this terminology since it presupposes association with correlatives.

(328b)/(329b), there is also some (highly grammaticalized) verbal element that can appear before each *yě*-clause, for instance *shuo* 'say':

(332) a. [Shuo Zhangsan], Zhangsan **ye** mei lai,   [shuo Lisi], Lisi **ye** mei lai.   ≈ (328b)
say   Zhangsan   Zhangsan YE not come say   Lisi   Lisi YE not come
'Zhangsan didn't come and Lisi also didn't come.'

(Lit. 'To mention Zhangsan, he didn't come; to mention Lisi, he didn't come.')

b. [Ni shuo GB], Lisi GB **ye** kan-le,   [ni shuo MP], Lisi MP **ye** kan-le.   ≈ (329b)
you say   GB   Lisi GB YE read-PERF say say   MP   Lisi MP YE read-PERF
'Lisi read GB and also read MP.'

(Lit. 'If you mention GB, Lisi read it; if mention MP, Lisi read it.')

(332a) and (332b) are roughly synonymous to (328b) and (329b), respectively, but the former two have a stronger *conditional* or *topical* flavor, in that each *yě*-clause is anteceded by a conditional-/topic-like constituent which contains some material copied from the *yě*-clause that follows it. More examples are given in (333).

(333) a. (Yao) shuo ta gao, ta **ye** bu suan   gao, (yao) shuo ta ai,   ta **ye** bu suan   ai.
need say   he tall   he YE not consider tall   need say   he short he YE not consider short
'He is neither tall nor short.'

(Lit. 'If you say he is tall, he is not tall; if you say he is short, he is not short.')

b. Tiaowu ne, ta **ye** hen hui tiao,   changge ne, ta **ye** hen hui chang.
dance   TOP he YE very can dance sing   TOP he YE very can sing
'He can both dance and sing well.'

(Lit. 'With respect to dancing, he dances well; with respect to singing, he sings well.')

In these two examples, the modal *yào* 'need' or the topic marker *ne* can also appear as part of the antecedent.[12] The fact that (333b) can take *ne* suggests that the antecedent of *yě* may actually be a (contrastive) topic.

It is instructive to see how the serial *yě* construction sheds light on the analysis of *dōu*. Consider the following scenario in the two responses in (334a) and (334b):

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[12]Constant (2014) proposes that *ne* is a contrastive topic marker.

(334) *Did Zhangsan or Lisi come to the class?*

    a. [Shuo Zhangsan], Zhangsan **ye** mei lai,   [shuo Lisi], Lisi **ye** mei lai.
       say   Zhangsan Zhangsan YE not come say   Lisi   Lisi YE not come
       'Zhangsan didn't come and Lisi also didn't come.'

       (Lit. 'To mention Zhangsan, he didn't come; to mention Lisi, he didn't come.')

    b. Zhangsan he   Lisi mei lai.
       Zhangsan and Lisi not come
       'Zhangsan and Lisi didn't come.'

At first blush, (334a) and (334b) mean the same thing: they both convey that neither Zhangsan nor Lisi came. But then why/when would a speaker use the more complicated (334a) to answer the question if the simpler (334b) can do the same job? In addition, why isn't (334a) redundant in repeating certain expressions? The intuition is that (334a) not only makes an assertion about who didn't come, but also evaluates each possible answer individually. Copying *Zhangsan/Lisi* to a sentence-initial phrase is similar to constructing a topic, which is "commented" by the *yĕ*-clause that follows. And this is what is unusual about it: normally the answer to a *wh*-question should be a declarative statement like (334b), not a topic-comment (or conditional).

    I suggest that (334a) can be seen as an instantiation of *domain widening*, where the widened domain is not one of relevant individuals (because our context is fixed for both (334a) and (334b)) but one of *possible worlds*. By using (334a), the speaker chooses to open up a set of possible worlds, some of which contain Zhangsan (and no one else) and others contain Lisi (and no one else), and asserts that in the first set of worlds Zhangsan didn't come, and in the second set Lisi didn't come. These are modal claims. The idea is that (334a) means something like the following:

(335)   'You wonder whether Zhangsan or Lisi didn't come. The choice is yours. You can pick Zhangsan, and if you do, the proposition [the person didn't come] is true. You can also pick Lisi, and if you do, the proposition [the person didn't come] is true.

This is just K&S's distribution requirement: in a world where you can pick one alternative, in that world the proposition [the person didn't come] is true.

    The preverbal particle *yĕ*, then, is a syntactic marker that tells us the sentence in which it appears is a modalized proposition and is one among a set of permissible alternatives. Nevertheless,

a set of *yĕ*-clauses does not always entail domain widening. While (336a), reproduced from (329b), displays the free choice effect, (336b), reproduced from (331b), does not.

(336)   a.   Lisi GB **ye** kan-le,   MP **ye** kan-le.
             Lisi GB YE read-PERF MP YE read-PERF
             'Lisi read GB and also read MP.'

        b.   * Lisi **ye** kan-le   GB, **ye** kan-le   MP.
             Lisi YE read-PERF GB YE read-PERF MP
             Intended: 'Lisi read GB and also read MP.'

The difference is obviously syntactic. It is only when a series of *yĕ*-clauses appear in the form of (336a) can the free choice effect come about. This syntactic condition is what I have proposed in Section 4.1.2, namely a modal structure. Each *yĕ*-clause in (336a) has this syntax.

In the literature, *yĕ* and *dōu* have been noted to be related in one way or another (e.g. Shyu 1995, Hole 2004). Their parallelism can be given a new explanation from the Hamblin perspective. In particular, the *wh*-phrase in the *dōu*-sentence in (328a)/(329a) denotes a set of alternatives that expand to a set of propositions (as before), and the *yĕ*-sentences in (328b)/(329b) represent the alternatives of the respective *dōu*-sentence. Such parallelism is schematically shown below:

(337)   a.   (328a)/(329a): [. . . {a, b, . . . } *dōu* . . .]

        b.   (328b)/(329b): [. . . *yĕ* . . .] [. . . *yĕ* . . .] . . .

The two representations are formally equivalent: the set of individual alternatives denoted by the *wh*-phrase ({a, b, . . . }) in (337a) expands to a set of propositions represented by the *yĕ*-sentences in (337b). Hence, in (337) we are seeing a case in which the alternatives in the Hamblin denotation of a sentence is "flattened" and visible in the syntactic (not just the semantic) component.

It is interesting to note that Japanese demonstrates a similar pattern, where *dōu* and *yĕ* are expressed by the same morpheme -*mo*.[13]

(338)   a.   Taro-**mo** Ziro-**mo** Saburo-**mo** odotta.   (Shimoyama 2006: 155)
             Taro-MO Ziro-MO Saburo-MO danced
             'Taro, Ziro and Saburo danced.'

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[13]Same in Korean (Dorothy Ahn, p.c.), Thai (Tyler Lau, p.c.) and Vietnamese (Kim Ngọc Quang, p.c.).

b. Dono gakusei-**mo** odotta. (Shimoyama 2006: 154)
   which student-MO danced
   'Every student danced.'

There are other intricacies in the serial *yě* construction that I cannot discuss here. The syntactic evidence that it provides for the alternative-based approach to unconditional *dōu*-constructions is nevertheless quite compelling, in my opinion.

4.2 Distributivity as free choice effects in disguise

The last issue I will address in this chapter is the so-called DISTRIBUTIVITY property of *dōu*. As the section title suggests, I argue that *dōu* is not a distributivity operator, and that the seeming distributivity effects in *dōu*-unconditional are in fact free choice effects.

Recall that the distributivity-based theory, particularly that of Lin (1998a), aims to account for the following data (among others):

(339) a. Tamen mai-le   yi-bu chezi. (Lin 1998a: 201)
           they   buy-PERF one-CL car
           'They bought a car.'

      b. Tamen dou mai-le   yi-bu chezi.
           they   DOU buy-PERF one-CL car
           'They all bought a car.'

(340) Naxie ren   dou shi fuqi. (Lin 1998a: 227)
       those people DOU be couple
       'Those people are all couples.'

(341) Tamen san-ge   dou shi tongxue. (Lin 1998a: 228)
       they   three-CL DOU be classmate
       'Those three are all classmates.'

I argue, following He (2011), that the referential subjects in these sentences are actually topics, and that what *dōu* is interacting with is a silent *wh*-phrase.[14] Thus the data above have the underlying structure in (342):

(342) Topic . . . (*wúlùn*) (*shì*) [*wh*-phrase] [*dōu*-clause]

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[14]He (2011) assumes that *wúlùn* is generated in the same constituent as the *wh*-phrase, which is different from my proposal.

Wúlùn and the *wh*-phrase can indeed be pronounced, and in many cases (especially those where the *dōu*-clause contains a group/symmetric predicate) the *wh*-phrase has to be a *which*-phrase (see He 2011: Chapter 4 for more examples).

(343) a. Tamen **(wulun) shei/na-yi-ge**   dou shui le.
       they no.matter who/which-one-CL DOU sleep ASP
       'They all slept.' (Lit. 'No matter who/which one, he slept.')

     b. Naxie ren   **(wulun) na-yi-dui**   dou shi fuqi.
       those people no.matter which-one-pair DOU be couple
       'Those people are all couples.' (Lit. 'No matter which pair, they are a couple.')

     c. Tamen san-ge **(wulun) na-liang-ge**   dou shi tongxue.
       they three-CL no.matter which-two-CL DOU be classmate
       'Those three are all classmates.' (Lit. 'No matter which two, they are classmates.')

(343c) is more natural in the following form:

(344) Tamen san-ge   **(wulun) shei gen shei** dou shi tongxue.
     they   three-CL no.matter who with who DOU be classmate
     'Those three are all classmates.' (Lit. 'No matter who and who, they are classmates.')

It seems that *dōu*-sentences that have been claimed to show distributivity can be reconstructed with the addition of *wúlùn* and a *wh*-expression. This is syntactic evidence that these cases can be analyzed as unconditionals.

Why can *wúlùn* and the *wh*-expression be dropped? In my proposal, *dōu* agrees with an invisible ∀ which universally quantifies over the modal propositional alternatives generated by *wh*-phrases. If a *dōu*-sentence can obtain free-choice like interpretation in the absence of an alternative-denoting expression, I have to stipulate that the latter is actually present but is unpronounced.

This might sound unsatisfactory. But note that the distributivity-based theory also needs to make the same stipulation for cases in which *dōu* "distributives" over a null element, e.g. (345b).

(345) a. Tamen shui le   ma?
       they   sleep PERF Q
       'Did they sleep?'

     b. *pro* dou shui le.
         DOU sleep PERF
       '(They) all slept.'

Thus, if *dōu* is a distributivity operator, it will be one that does not require an overt plural NP in the same clause that gets distributed. A null *pro* will do. The same can be said for the alternative-based theory: the *wh*-phrase can be unpronounced because it can be "recovered" from the context. Thus (346b) can be understood as containing a covert *wh*-phrase that interacts with *dōu* just like a typical *dōu*-unconditional.

(346) a. Shei shui le?
       who sleep PERF
       'Who slept?'

   b. *pro_{wh}* dou shui le.
          DOU sleep PERF
       'Anyone slept.'

Now consider the following dialogue:

(347) *Scenario: John and Mary are invited to a banquet. They don't know who or how many will attend.*

   a. John: Mingtian de yenhui, ni   juede ji-ge   ren   hui he-zui?
            tomorrow DE banquet you think how.many-CL person will drink-drunk
       'How many people do you think will get drunk in tomorrow's banquet?'

   b. Mary: (Wo juede) *pro* dou hui he-zui.
            I   think   DOU will drink-drunk
       '(I think) anyone will get drunk.'

The conveyed meaning by (347b) is that whoever Mary thinks will attend the banquet will get drunk. For (347b) to be felicitous, the null *pro* will have to be interpreted as something like (348):

(348) '*everyone* who will attend the banquet'

This expression is not in John's utterance, nor does it denote a set of individuals that is known to Mary, because she only knowns a few of those who will attend. Moreover, (348) is *intensional*, because there does not exist such group of people at the utterance time. Therefore, if *pro* is understood as (anaphoric to) (348), which it is, then its quantificational domain is *widened* intensionally. We get an effect very close to *domain widening*.

For this case, the distributivity theory will have to assume that the distributivity operator (i.e. *dōu*) can distribute over the unpronounced NP in (348) in a widened domain. It is not clear how

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this can be done. Distributivity is not a mechanism that can yield domain widening effects, at least not obviously so.

Lin (1996) analyzes *dōu* as a generalized distributivity operator (Schwarzschild 1996) in the "distributive" *dōu*-sentences, and extends this analysis to *dōu*-unconditionals, where he takes *dōu* to distribute over a set of Hamblin propositional alternatives.[15] What I propose is the other way around: the basic meaning of *dōu* is the one we see in *dōu*-unconditionals where it is a modal agreeing with *wúlùn*, and this analysis should carry over to the "distributive" *dōu*-sentences.

I argue that the *wh*-phrase can be dropped in cases like (349a) because of the presence of the referential topic phrase—it "recovers" the content of a *wh*-phrase. It can do so because the topic is a plural NP, which provides an explicit domain of individuals. The recovered *wh*-phrase therefore denotes the set of individuals in (349b), and the meaning of (349a) is spelled out as in (349c).

(349) a. Tamen dou mai-le   yi-bu   chezi.
          they   DOU buy-PERF one-CL car
          'They all bought one car.'

     b. $\{x : x \in [\![\text{tamen}]\!]\}$

     c. $\{\lambda w. \forall x[x \in [\![\text{tamen}]\!] \rightarrow \exists w'[ACC(w, w') \wedge \mathbf{in}(x)(w') \wedge \text{the person bought one car in } w']]\}$

In other words, the presence of *dōu* in (349a) gives rise to a *free choice* effect: 'As for them, it's your choice to pick one; if you pick person A, then this person bought one car; if you pick person B, then this person bought one car, etc.' It should be obvious that this is how the felt "distributivity" comes about. What is really being "distributed" is the individual alternatives that spread over different possible worlds. We therefore obtain the seeming "distributivity" effect through K&S's (2002) distribution requirement.

The meaning of (350a) can be derived similarly.

(350) a. Naxie ren   dou shi fuqi.
          those people DOU be couple
          'Those people are all couples.'

     b. $\{x : \mathbf{husband\text{-}wife}(x) \wedge |x| = 2 \wedge x \in [\![\text{naxie ren}]\!]\}$

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[15]I discuss the problems of this treatment in Section 3.3.3.

c. $\{\lambda w.\forall y[y \in \{x : \textbf{husband-wife}(x) \wedge |x| = 2 \wedge x \in [\![\text{naxie ren}]\!]\} \rightarrow$

$\exists w'[ACC(w,w') \wedge \textbf{in}(y)(w') \wedge \text{the individuals are a couple in } w']]\}$

As shown in (350c), that the individuals satisfying the predicate 'be couples' must be husband-wife pairs, the cardinality of which must be two, is encoded as part of the lexical semantics of *fuqi*, a compound word that literally means 'husband-wife.' This meaning is not what *dōu* gives you. What it does is, as before, providing a modal that introduces a possible world in which the proposition 'the individuals are a couple' is true. Exactly which husband-wife pairs in the contextually relevant group of individuals count as "couples" is based on the lexical meaning of *fuqi* and the discourse participants' real-world knowledge.

The present account also explains why, as Xiang (2008) remarks, *dōu*-sentences never give rise to "intermediate" distributive readings, which is nevertheless a crucial feature of Schwarzschild's (1996) theory of distributivity. (349a), for instance, does not allow the reading where three out of five relevant individuals bought one car each, and two others did not. The reason is simply that the quantification of *wúlùn* has the semantics on a par with free choice effects. "Intermediate" distributive readings of sentences like *The men wrote operas* (Gillon 1987) are of a different character.

4.3 Universal *mei*...*dōu*-constructions

The universal determiner-like expression *mei* is traditionally taken to be the counterpart of *every* in Mandarin. The goal of this section is to challenge this traditional view and argue that *mei* is best analyzed not as a universal determiner but as a *concord* element, in the spirit of Dong (2009).

4.3.1 On nominal *mei*

It is well known in the literature that *mei* 'every' bears strong connection to *dōu* in light of the fact that the latter is typically obligatory to the former, as in (351).[16]

(351) Mei-yi-ge   ren   *(**dou**) you yi-bu   diannao.
       every-one-CL person   DOU exist one-CL computer
       'Every person has one computer.'

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[16]*Mei-yi-ge ren* 'every-one-CL person' can surface in the contracted form *mei-ge ren* 'every-CL person' with the numeral *yi* deleted.

There are several puzzles regarding the occurrence of *dōu* in (351) that I think have not been well understood. One is how the co-occurrence of *mei* and *dōu* doesn't give rise to any interpretive redundancy, given that they both seem to be universal-like expressions (i.e. the DOUBLING property mentioned in Section 3.1). This question becomes more interesting when one considers the *obligatoriness* of *dōu* in (351).

Further, for many (though not all) speakers, the *every*-QP is dispreferred in postverbal position. The following examples demonstrate judgments from respective authors:

(352)   a.   ?? Wo kan-le   mei-yi-ben   shu.   (Lin 1996: 68)
                I   read-PERF every-one-CL book
                Intended: 'I read every book.'

        b.   * Wo xihuan mei-yi-ge   xuesheng. (without stress on *mei*)   (Dong 2009: 177)
                I   like   every-one-CL student
                Intended: 'I like every student.'

        c.   ?? Wo xihuan mei-bu   dianying.   (Cao 2008: 10)
                I   like   every-CL film
                Intended: 'I liked every film.'

        d.   ??/* Yuehan gai-le   mei-fen   baogao.   (Yuan 2011: 5)
                  John   correct-PERF every-CL report
                  Intended: 'John corrected every report.'

There have been different approaches to the meaning of *mei* 'every.' Yang (2001) proposes a generalized quantifier analysis for QPs headed by *mei*. Lin (1998a) argues instead that a *mei*-QP denotes a non-quantificational, type *e* entity on a par with definites.

More recently, Dong (2009) advocates a Hamblin-style treatment. He gives the *mei*-QP a Hamblin denotation identical to *wh*-phrases, and the meaning of the universal *mei*…*dōu*-sentence (353a) is derived as follows:

(353)   a. Mei-ge   ren   dou xihuan chi pingguo.   (Dong 2009: 185)
             every-CL person DOU like   eat apple
             'Everyone likes to eat apples.'

        b. Syntax: [*dōu* [$_{vP}$ mei-ge-ren likes to eat apples]

        c. $[\![\text{mei-ge-ren}]\!] = \{x \in D_e : \mathbf{person}(x)(w)\}$

        d. $[\![\text{likes to eat apples}]\!]([\![\text{mei-ge-ren}]\!])$

           $= \{\lambda w[\text{a likes to eat apples in } w], \lambda w[\text{b likes to eat apples in } w], \dots\} = \mathscr{A}$

e. $[\![\text{dōu}]\!]^w(\mathscr{A}) = \{\lambda w'.\forall p[p \in \mathscr{A} \rightarrow p(w')]\}$

For Dong, the *mei*-QP has the same semantics as the *wh*-word *shei* 'who,' both denoting a set of people. This set composes with the verbal predicate pointwise yielding the set of propositions $\mathscr{A}$. Dong takes *dōu* to be the universal propositional operator that selects $\mathscr{A}$ and returns the singleton proposition that every alternative in $\mathscr{A}$ is true. The co-occurrence of *mei* and *dōu*, then, is a consequence of Universal Concord à la Kratzer (2005):

(354) $[\ldots \forall \ldots \forall \ldots]$ (Dong 2009: 181)

In this analysis, there is only one universal quantifier in (353a), namely *dōu*. *Mei* is a concord element bearing a $[u\forall]$ feature that agrees with *dōu*'s $[i\forall]$ feature. Note that Dong assumes *dōu* is base-generated above the *mei*-QP, and the surface word order is derived via movement of the QP to check of its $[u\forall]$ feature in a Spec-Head configuration.

Dong's (2009) treatment of *mei*-QPs is an important step toward generalizing the Hamblin semantics approach from *wh*-phrases and indefinites to other types of QPs. The doubling pattern in *mei*...*dōu*-sentences provides an empirical ground for analyzing *every*-phrases not as quantificational but as non-quantificational. There are nevertheless two potential problems with Dong's account. First, *mei* has its own morphosyntactic property: it only attaches to a NumP (but the singular numeral *yi* 'one' is optional).

(355) a.   mei-(yi-)ben shu
            every-one-CL book
            'every book'

       b.   mei-liang-ben shu
            every-two-CL book
            'every two books'

       c.   * mei   shu
            every book

By contrast, *wh*-phrases such as *shei* 'who' and *shenme* 'what' are number-neutral, and *shenme* can attach to bare nouns (e.g. *shenme shu* 'what book'). There is one *wh*-morpheme that does behave like *mei*, namely *nǎ* 'which':

(356) a. na-(yi-)ben   shu
           which-one-CL book
           'which book'

       b. na-liang-ben   shu
           which-two-CL book
           'which two books'

       c. *na   shu
           which book

As Section 2.3 has shown, there are two types of *wh*-morphemes, one selecting for an NP and the other a NumP. Since *mei* shares the morphosyntax with the latter rather than the former, we would like the semantics of *mei* to reflect this property. Dong's semantics of the *mei*-QP in (353c), however, does not.

Second, phrasal movement of the QP is unavoidable in Dong's analysis, given that *dōu* has to scope above the QP in the underlying structure in order to quantify over the set of propositional alternatives. K&S's system, however, is one that attempts to dispense with movement of this kind: the agreement relation between a Hamblin propositional operator and the set of alternatives that it selects manifests as a concord phenomenon, which is independent of movement. It is unclear to me why, if a *mei*-QP establishes a concord relation with *dōu*, the former cannot just stay in-situ.

My proposal on *mei...dōu*-sentences is a version of Dong's Hamblin-style analysis. I argue that the *mei*-QP in (357a) has the denotation in (357b), i.e. a set of "one-person" individuals. The meaning of (357a) is derived by taking *dōu* to be an existential modal, as before, which agrees with a Hamblin ∀-operator that collects the set of alternatives introduced by the *mei*-QP, as in (357c).

(357) a. Mei-yi-ge   ren   Lisi dou xihuan.
           every-one-CL person Lisi DOU like
           'Lisi likes everyone.'

       b. $[\![\text{mei-yi-ge ren}]\!] = \{x : \textbf{person}(x)(w) \wedge |x| = 1\}$

       c. $\lambda w. \forall x [x \in [\![\text{mei-yi-ge ren}]\!] \rightarrow \exists w'[ACC(w, w') \wedge \textbf{in}(x, w') \wedge \textbf{like}(\text{Lisi}, pro, w')]]$

In this current proposal, *mei* is also a concord marker, but the propositional operator is not *dōu* but rather the covert ∀ with which *dōu* agrees. Hence the relation between *mei* and *dōu* is only indirect. The Kratzer-style Universal Concord of (357a) is then recast in the manner of (358),

where no movement aside from the *pro*-movement in the *dōu*-clause is posited and the *mei*-QP is base-generated at where it is seen.

(358) $\forall$ ... [*mei*-QP] [*pro*$_1$ *dōu* [... t_1 ...]]
       └ _ _ _ ┘
       U. Concord

A *mei*-QP is dispreferred in postverbal position because in this case the set of alternatives it denotes is captured by a closer operator (e.g. the Aux *-le/yǒu*), namely *intervention*.

(359) $\forall$ ... [*Op* ... *mei*-QP ...]
       └ _ _ _✗_ _ _ ┘

One argument that supports the proposal that the *mei*-QP does not directly interact with *dōu* is the fact that *dōu* is not the only quantificational particle that co-occurs with a *mei*-QP: when *mei* attaches to a plural NumP, the particle that "matches" the *mei*-phrase is *jìu*, as shown in (360). *Dōu* is illicit in such constructions (cf. (351)).

(360) Mei-**san**-ge   ren   **jiu**/***dou** you yi-bu   diannao.
       every-three-CL person JIU/DOU have one-CL computer
       'Every three people have one computer.'

The syntax of (360) looks otherwise identical to that of (351). (360) involves universal quantification in much the same sense as (351), and both sentences are ungrammatical if without either *dōu* or *jìu*, which indicates that they are central to the interpretation of universal quantification in Mandarin. Meanwhile, *dōu* and *jìu* do not alternate freely; the former "matches" with *mei* + singular NumPs and the latter *mei* + non-singular ones.

Note that *mei* in (360) is, surprisingly, *optional*. Hence (361) is synonymous to (360).[17]

(361) San-ge   ren   **jiu**/***dou** you yi-bu   diannao.
       three-CL person JIU/DOU have one-CL computer
       'Every three people have one computer.'

While the absence of *mei* is unexpected, it is reminiscent of the situation in *dōu*-unconditionals where *wúlùn* 'no matter' is also optional. On the other hand, the optionality of *mei* in (360) makes

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[17](361) is actually *ambiguous* between at least two readings, one the universal reading discussed here, the other a "definite" reading where *three people* refers to a unique set of three people in the context. When the second reading is salient, the sentence conveys that it is somewhat unexpected that as few as three people (and not more) can share one computer.

it no longer look like English *every*. In my analysis sketched above, this is possible because *mei* is not a quantificational determiner at all, but a concord element. Its optionality can be attributed to *jìu/dōu*, which agrees with a Hamblin operator that selects a set of alternatives. *Jìu/dōu* therefore suffices to signal the existence of alternatives, rendering *mei* optional.

4.3.2 Clausal *mei*

An even stronger argument for *mei* being a concord element rather than a determiner is that it can actually occur above VP. Consider (362a) and (362b) below. Unlike the case of nominal *mei*, here *dōu* and *jìu* seem to be interchangeable, although *dōu* sounds slightly degraded to my ear.

(362) a. Ta **mei** gongzuo san-tian jiu/?dou yao xiouxi yi-tian.
　　　　he every work　three-day JIU/DOU need rest　one-day
　　　　'He needs to rest for one day when working for three days.'

　　　b. Ta **mei** chi-wan yi-dun-fan jiu/??dou chou yi-gen yan.
　　　　he every eat-finish one-CL-meal JIU/DOU　smoke one-CL cigarette
　　　　'He smokes one cigarette every time he finishes a meal.'

Like the examples containing nominal "*mei*-Num" where Num is a numeral larger than one, *mei* can also be dropped in the clausal *every*-constructions, as (363a) and (363b) show, which are semantically identical to (362a) and (362b), respectively, though the use of *dōu* becomes almost ungrammatical.

(363) a. ta gongzuo san-tian jiu/*dou yao xiouxi yi-tian.
　　　　he work　three-day JIU/DOU need rest　one-day
　　　　'He needs to rest for one day when working for three days.'

　　　b. ta chi-wan yi-dun-fan jiu/*dou chou yi-gen yan.
　　　　he eat-finish one-CL-meal JIU/DOU smoke one-CL cigarette
　　　　'He smokes one cigarette every time he finishes a meal.'

All these examples involve universal quantification over events/situations (à la Rothstein 1995). For instance, (362a)/(363a) conveys that "every time he works for three days, he rests for one day;" the restriction of the optional *every* is the clause preceding *jìu* and the nuclear scope the clause following it. Once again, we find that *jìu* alone suffices to license the universal interpretation. In addition, *jìu/dōu* also seems generally obligatory in such clausal *every*-constructions; (364) without *jìu* sounds quite incomplete.

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(364) ?? ta (mei-)chi-wan   yi-dun-fan   chou   yi-gen yan.
      he every-eat-finish one-CL-meal smoke one-CL cigarette
      Intended: same as (362b)/(363b)

The brief discussions in this and the previous subsection will not suffice as a detailed inves-tigation of *mei* being such unusual creature, which looks like a determiner but can occur either adjacent to a NumP or somewhere in the clausal spine, and sometimes its presence/absence does not affect the meaning of a sentence. While I cannot baldly claim that *mei* is never a determiner like *every*, I hope it now makes sense to say that we should stop thinking of *mei* as a direct counterpart of *every* (or *each*) in English, given the facts just demonstrated. On the other hand, the alternative-based approach is compatible with these facts: *mei* is simply an analytic concord marker agreeing with a ∀-quantifier over alternatives, and alternatives may be individual or propositional. This explains why *mei* can attach to either NumPs or VPs.

4.4 "Definite" *dōu*-constructions and the meaning of NumPs

The proposal that in *dōu*-unconditionals *wúlùn* quantifies over an (implicit) *wh*-phrase and thereby yields free choice effects can also account for the so-called "definite" type of *dōu* discussed in Section 3.4.3 that associates with a NumP.

4.4.1 Recap

The relevant data are reproduced below, which demonstrate that *dōu* can not only license a subject NumP but also contributes to the kind of definiteness that is otherwise absent if the NumP does not co-occur with *dōu*.

(365) a. * San-ge   xuesheng lai   le.   (Cheng 2009: 64)
            three-CL student   come PERF

       b.   You san-ge   xuesheng lai   le.
             have three-CL student   come PERF
             'Three students came.'

       c.   San-ge   xuesheng dou lai   le.
             three-CL student   DOU come PERF
             'The three students all came.'

    d.   Wo kanjian-le san-ge   xuesheng.
           I   see-PERF   three-CL student
           'I saw three students.' (Not: 'I saw the three students (in some domain).')

Notice that the distinction between (365c) on the one hand and (365b)/(365d) on the other is very similar to that between universal and existential *wh*-phrases: the existential ones are always licensed in the scope of a licensing operator, while the universal ones always precede *dōu*. The crucial difference between an existential *wh*-phrase and a NumP is that the licensor of the latter is either the existential verb *yǒu* 'have' or an aspect marker.

    As discussed in Section 3.4.4, what Cheng (2009) calls the "definite" interpretation of (365c) is actually questionable because this sentence has a stronger "exhaustive" meaning, which is signaled by the floating *all* in its translation. We also mentioned (366) as an argument against *dōu* in (365c) being a definite D^0 because it is not compatible with a singular NumP; a definite D^0 should have no problem combining with a singular nominal expression.

(366)   * Yi-ge   xuesheng dou lai   le.
           one-CL student   DOU come PERF
           Intended: 'The student came.'

Finally, the maximality-based analysis also leaves it open why the "definite" NumP must precede *dōu* if the latter is nothing but an *ι*-operator.

(367)   a. Wo jiao-guo   *(zhe-ge ban) suoyou-de xuesheng.   (Cheng 2009: 66)
           I   teach-EXP   this-CL class all-DE   student
           'I have taught all the students in this class.'

        b. Wo suoyou-de xuesheng dou jiao-guo.
           I   all-DE   student   DOU teach-EXP
           'I have taught all the students (in some domain).'

4.4.2 Proposal

I propose that, at least in the cases under discussion, NumPs in Mandarin denote sets of alternatives just like *wh*-phrases do, and that they also interact with *dōu* in the same way as *wh*-phrases do. The crucial difference between them is that the number of alternatives is overtly specified by the NumP but not by a *wh*-phrase. The NumP *san-ge xuesheng* 'three students,' for instance, has

the denotation in (368): it is a set of student individuals in some contextually relevant domain C, and C contains exactly three individuals.

(368) $[\![\text{san-ge xuesheng}]\!] = \{x \in C : \textbf{student}(x) \wedge |C| = 3\}$

Here is how the novel analysis in (368) accounts for the "definite" type of *dōu*. Assuming there are three relevant students in the context, the meaning of (369a) is given in (369c):

(369)   a.   San-ge   xuesheng dou lai   le.   (Cheng 2009: 64)
            three-CL student   DOU come PERF
            'The three students all came.'

       b. $[\![\text{san-ge xuesheng}]\!] = \{x \in C : \textbf{student}(x) \wedge |C| = 3\} = \{\text{John}, \text{Bill}, \text{Mary}\}$

       c. $\{\lambda w.\forall x[x \in [\![\text{san-ge xuesheng}]\!] \rightarrow \exists w'[ACC(w, w') \wedge \textbf{in}(x)(w') \wedge \text{the person came in } w']]\}$

What (369c) says is that for each of the students John, Bill and Mary, there is a world in which the student exists and the unique person came. The way the set of alternatives is generated is identical to *dōu*-unconditionals; the only changes are that the *wh*-phrase is replaced by a NumP, and that the $\forall$-quantifier that ranges over the set of individual alternatives is not *wúlùn* but a silent one.

In this proposal, the only true definite expression is the null *pro* inside the *dōu*-clause, which is paraphrased using the singular definite description "the person" in (369c). However, *pro* is only anaphoric to each of the alternatives (i.e. John, Bill and Mary) and has never raised out of the *dōu*-clause, and it certainly does not contribute definiteness directly to the NumP. There is no "definite operator" that combines with the NumP in the same way as *the* combines with an NP in English. What *dōu* does is to provide a possible world for each alternative, as before, and calls for a *wúlùn* that collects all the alternatives. The perceived "definite" interpretation is a result of the alternatives being salient individuals in the context of utterance, and not a result of direct quantification of the NumP by an *ι*-operator.

One advantage of this analysis is that it more accurately captures the "exhaustive" character of sentences like (369a) than Giannakidou and Cheng's (2006) approach: since the NumP generates a set of alternatives and *dōu* agree with *wúlùn*, such sentences will always have a parallel semantics with *dōu*-unconditionals, hence free choice effects (that is, K&S's distribution requirement). This explains why (369a) cannot be appropriately translated as 'the three students came' without the

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floating *all*, the purpose of the latter being a (rough) indication of the free choice effect that is otherwise underivable by the analysis where *dōu* is a definite D^0 or a maximality operator quantifying over the NumP.

That a singular NumP cannot appear in a *dōu*-sentence to be interpreted as a "definite" NP also falls out naturally: *dōu* requires the presence of at least two alternatives, but a singular NumP denotes a singleton. In other words, the incompatibility of a singular NumP and *dōu* stems from the semantic clash when one tries to derive free choice effects from a domain with only one individual.

The current proposal also explains why a NumP in Mandarin has to occur in the syntax of *dōu*-constructions to receive "definiteness": the way we obtain the "definite" reading of the NumP is identical to the way we obtain the meaning of *dōu*-unconditionals. That the NumP precedes *dōu* is because the *dōu*-clause is syntactically saturated by the null *pro*.

4.5   Scalar *dōu*-constructions

The scalar *dōu*-construction, which has often been referred to as the "*lián...dōu*" construction and studied in great lengths by Shyu (1995) and many others, is another construction in which *dōu* is generally obligatory. One of the most salient features of this construction is that it is entirely parallel to unconditional *dōu*-constructions in terms of the syntactic skeleton, but is almost in *complementary distribution* with *dōu*-unconditionals in terms of what serves as the antecedent of *dōu*.

4.5.1   Core facts and issues

First, in the *lián...dōu*-construction, the initial *lián* 'connect, include' is optional, and when it is not pronounced the *even*-like scalar focus interpretation is still available (though stress is usually required on the antecedent), as in (370a) and (370b). Second, the antecedent must precede *dōu*, as in (370c). and thus the *dōu*-clause always contains a gap that corresponds to the antecedent.

(370)   a.   Ta (lian) Zhangsan **dou** gan ma.
             he LIAN Zhangsan DOU dare scold
             'He even dare scold Zhangsan.'

        b.   Ta (lian) xiayu **dou** yao   chu-men.
             he LIAN rain   DOU want out-door
             'He wants to go out even if it rains.'

    c.   * Ta **dou** gan ma   (lian) Zhangsan.
         he DOU dare scold LIAN Zhangsan
         Intended: 'He even dare scold Zhangsan.'

Third, in many cases *lián* can be substituted with the complex expression *jìu* + *suàn* (+ *shì*) 'focus particle + consider (+ be),' and an *even if* concessive conditional interpretation is salient when the antecedent of *dōu* is a clausal unit.[18]

(371) a. Ta **jiu suan**   (**shi**) Zhangsan **dou** gan ma.
         he JIU consider be   Zhangsan DOU dare scold
         'He even dare scold Zhangsan.' (Lit. '(Let) it be not Zhangsan, he dare scold (him).')

      b. **Jiu suan**   (**shi**) mei xiayu, Lisi **dou** bu chu-men.
         JIU consider be   not rain   Lisi DOU not out-door
         'Even if it's not raining, Lisi wouldn't go outside.' (Lit. '(Let) it be not raining, . . . ')

The fact that the initial element *lián* in *lián. . . dōu*-constructions can frequently (though not always) alternate with *jìu-suàn(-shì)* is particularly relevant for our purposes, as it shows two more similarities to *dōu*-unconditionals: (i) the optionality of the copula *shì*, and (ii) the use of a communicative or attitudinal verb *suàn* 'to consider' (in *dōu*-unconditionals, it is *lùn* 'to argue/discuss').

    A crucial distinction between *lián. . . dōu*-constructions and *dōu*-unconditionals is that in the former the antecedent cannot be a *wh*-expression or a *háishì*-disjunction.[19]

(372) a.   * Ta lian shei **dou** gan ma.
         he LIAN who DOU dare scold
         Intended: 'He even dare scold someone.' (Okay as a *wh*-question)

      b. ?? Ta lian Zhangsan haishi Lisi **dou** gan ma.
         he LIAN Zhangsan or$_Q$ Lisi DOU dare scold
         Intended: 'He even dare scold Zhangsan or Lisi.'

    In brief, we have the following facts at hand. First, the particle *lián* or the complex string *jìu-suàn-shì* seems to contribute scalarity interpretation similar to either *even* or *even if*. Second, the syntax of both *dōu*-constructions is by and large identical; a proper analysis should capture this fact. Third, that the antecedent of the focus construction cannot be an interrogative indicates that a different type of quantification than *dōu*-unconditionals is operative. This last point, however, has

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[18]In Mandarin, *even if* is also frequently expressed by the adverb-like item *jishi*.

[19]This distinction can be observed only when the initial marker *lián* is pronounced; if not, such sentences will be interpreted as *dōu*-unconditionals, because *wúlùn* 'no matter' is optional as well.

the implication that we actually need only one type of *dōu*, which gives rise to different meanings when embedded in different environments.

4.5.2 Syntax

Starting with the syntactic analysis, I propose that the *lián...dōu*-construction has a parallel structure to *dōu*-unconditionals. The structure of (373) is given in (374), in which *dōu* is a Modal head that agrees with (i) a null *pro*, which moves to Spec-ModP, and (ii) the particle *lián*, which I assume is categorically a P.

(373) Ta lian   Zhangsan **dou** gan ma.
       he LIAN Zhangsan DOU dare scold
       'He even dare scold Zhangsan.'

(374)
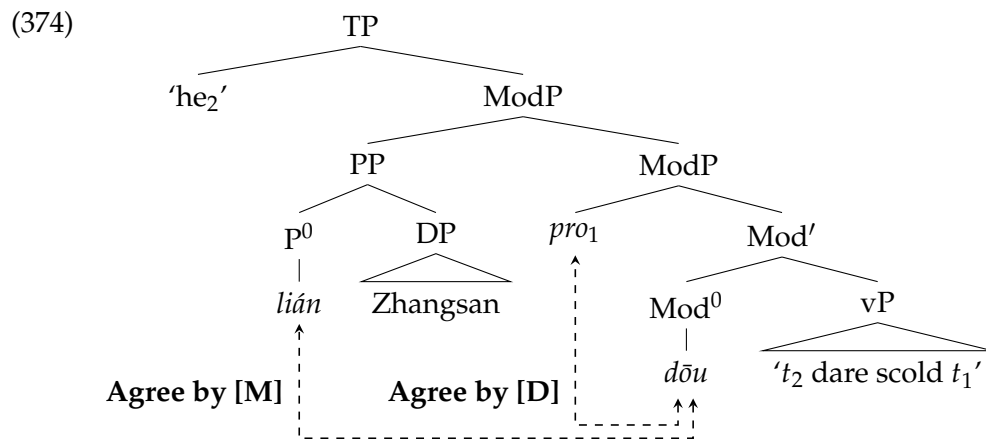
This structure differs from that proposed by Shyu (1995) in that the *lián*-constituent is not born inside the *dōu*-clause, and that *lián* is not part of a nominal. The reason why it is not is that non-nominal expressions can in general follow *lián*, e.g., (370b). (375) is another example:

(375) Ta lian [$_{IP}$ mingtian yao kaoshi] dou bu zhidao.
       he LIAN   tomorrow will exam   DOU not know
       'He doesn't even know there will be an exam tomorrow.'

4.5.3 Revisiting Shyu 1995

In Section 3.2.1 we reviewed the six arguments taken by Shyu (1995) as evidence for an overt A-movement analysis of the *lián*-antecedent. In what follows I will demonstrate that those facts can be accounted for as well with the current syntactic analysis of *lián...dōu*-constructions.

Island conditions

As noted earlier, the sensitivity of island effects does not distinguish covert from overt movements, as both operations display such effects. In my account, (376a), for instance, is ruled out because of the illicit movement of the null *pro*, as shown in (376b).

(376) a. * Zhangsan |lian Mali$_2$| dou taoyan [$_{NP}$ [$_{CP}$ t_1 kuajiang t_2 de] ren$_1$].
            Zhangsan LIAN Mary DOU dislike   praise   REL person

b. *Zhangsan [*lián* Mary] [$_{Mod'}$ *pro* [$_{Mod'}$ *dōu* [dislike [$_{NP}$ [$_{CP}$ t_1 praise t_2 REL] person]]]]

On the other hand, the present account, but not Shyu's (1995), correctly makes the prediction that movement of another scope-bearing unit from inside the scope of *dōu* is not permitted due to Relativized Minimality (Rizzi 1990) or intervention induced by the Ā-movement of *pro*. As indicated by (377b) and (378b), the "A-not-A" question operator and adverbial *wh*-word *weishenme* 'why' cannot occur inside the *dōu*-clause, as they both take matrix scope and therefore must move to the highest position at LF (see Huang 1991, Tsai 1994).

(377) a. Ni zhe-ben shu **you-mei-you** kan?
            you this-CL   book have-not-have read
            'This book, did you read (it)?'

b. * Ni lian zhe-ben shu   dou **you-mei-you** kan?
            you LIAN this-CL book DOU have-not-have read
            Intended: 'This book, did you even read (it)?'

In contrast, ordinary object preposing in Mandarin does not intervene Ā-movement, as evidenced by (377a) and (378a).

(378) a. Ni zhe-ben shu   **weishenme** mei kan?
            you this-CL   book why   not read
            'This book, why didn't you read (it)?'

b. * Ni lian zhe-ben shu   dou **weishenme** mei kan?
            you LIAN this-CL book DOU why   not read
            Intended: 'This book, why didn't you even read (it)?'

On Shyu's (1995) analysis, which asserts that the *lián*-phrase undergoes A-movement, the ungrammaticality of (377b)/(378b) are unexplained because A-movement should not intervene Ā-movement.

DO/IO movement asymmetry & idiom chunks

As pointed out in section 3.2.4, the DO/IO movement asymmetry (that DOs but not IOs can undergo passivization/Ā-movement is likely due to other factors than the type of movement involved, and thus this point is irrelevant to the current discussion. As for the idiom chunks cited by Shyu (1995), they can actually be broken up across an island boundary, which is fully compatible with the present approach.

Clause-boundedness

Shyu raises the examples reproduced below in (379) to argue that the *lián*-NP can move across a nonfinite clause as in (379a) but not a finite clause (379b).

(379) a. Lisi │lian zhe-ben shu₁│ dou bi   [IP Zhangsan kan │t₁│].
          Lisi LIAN this-CL book DOU force   Zhangsan read
          'Lisi forces Zhangsan to read even this book.'

       b. * Zhangsan │lian Mali₁│ dou renwei [CP Lisi hen xihuan │(ta₁)│].
          Zhangsan LIAN Mary DOU think   Lisi very like   she
          Intended: 'Zhangsan think Lisi likes even Mary.'

In my analysis, (379b) is predicted to be fine since *pro*-movement can be unbounded, contra the judgment. However, as I noted in Section 3.2.4 there are grammatical examples with the same constituency as (379b), e.g., (380).

(380) Lisi │lian shuxue₁│ dou renwei [CP │t₁│ shi hen-jiandan de kemu].
       Lisi LIAN math   DOU think   be very-easy   DE subject
       'Even math, Lisi thinks (it) is an easy subject.'

What rules (379b) out seems to have to do with the animacy of the *lián*-NP. Under my analysis, the awkwardness of (379b) can be ascribed to *Mary* blocking the fronting of the matrix subject due to some kind of animacy effect.

No reconstruction/WCO effects

The last two pieces of evidence for Shyu's (1995) A-movement analysis is the absence of reconstruction or WCO effects. The relevant data are again reproduced below from section 3.2.1.

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(381) *No reconstruction (Binding Condition A & C)*

    a. ?? Wo | lian [yi-ben guanyu taziji$_1$ de shu]$_2$ | dou bei   Zhangsan$_1$ qiang-zou le | t_2 |.
          I   LIAN one-CL about himself POSS book DOU PASS Zhangsan rob-away ASP
          Intended: '(lit.) I was robbed of [even a book about himself] by Zhangsan.'

    b. ? Wo | lian [Zhangsan$_1$ de shu]$_2$ | dou bei   ta$_1$ qiang-zou le | t_2 |.
         I   LIAN Zhangsan POSS book DOU PASS he rob-away ASP
         '(lit.) I was robbed of [even Zhangsan's book] by him.'

(382) *No WCO*

    Wo | lian meimei$_1$ | dou bei   [xihuan ta$_1$ de ren]   qiang-zou le | t_1 |.
    I   LIAN sister   DOU PASS like   she REL person rob-away ASP
    '(lit.) I was robbed of even my sister$_1$ by the person that likes her$_1$.'

As it turns out, the absence of reconstruction/WCO effects is not only compatible with but actually an argument for my treatment of *lián*. . . *dōu*-constructions, because the *lián*-phrase is never base-generated inside the *dōu*-clause. Instead, it is linked to the gap in the *dōu*-clause through the mediation of a null *pro* which agrees with *dōu*.

To conclude, the data that Shyu (1995) considers as evidence for her analysis can all be explained by the present proposal that the movement involved in the scalar *dōu*-construction is Ā-movement of *pro*.

4.5.4 *Lián*. . . *dōu* ≠ *shenzhi* 'even'

As mentioned, although the combination of *lián* and *dōu* has been regarded by many authors as equivalent to English *even*, they can co-occur without a double *even*-reading. In fact, *lián* + *dōu* have different behaviors from the true focus adverb *shenzhi* 'even,' a point that has been articulated by Shyu (2004).

Shenzhi is a preverbal focus-sensitive adverb, as exemplified in (383a). Just like its English translation, (383a) asserts that Lisi bought one camera and infers (on the salient reading) that the camera is the most unlikely thing among what he bought (the *scalar* implicature, Karttunen and Peters 1979). This in turn implies Lisi bought something else than one camera (the *existential* implicature). At the same time, the same meaning can be expressed through a *lián*. . . *dōu*-construction, as in (383b).

(383) a. Lisi **shenzhi** mai-le   zhe-tai xiangji.
          Lisi even   buy-ASP this-CL camera
          'Lisi even bought this camera.'

      b. Lisi **lian** zhe-tai xiangji **dou** mai-le.
          Lisi LIAN this-CL camera DOU buy-ASP
          'Lisi even bought this camera.'

Apparently the two sentences differ in syntax: while (383a) has an ordinary SVO order, (383b) has the object phrase preceding the verb. According to Shyu (2004), the primary difference of *shenzhi* and *lián…dōu* is the "quantificational" interpretation that is obligatory only to the latter. Note first that *lián…dōu* can only sandwich a focused NP or a clausal element (CP/VP) (Shyu 1995), as indicated by the ungrammaticality of the examples below in which *lián* is followed by a V^0 and a manner adverb, respectively (see also Paris 1979).[20]

(384) a. * Lisi lian [likai-le] dou youju.   (Shyu 2004)
            Lisi LIAN leave-ASP DOU post.office
            Intended: 'Lisi even went to the post office.'

      b. * Lisi lian [hen-xiaoxin] dou fan-le   san-ci   cuowu.
            Lisi LIAN very-careful   DOU make-ASP three-CL mistake
            Intended: 'Lisi made three mistakes even if he did it very carefully.'

Further, recall that in Mandarin strong QPs (e.g. *every*-QPs) tend to require the presence of *dōu*, and if they are objects they must "move" to precede *dōu*. This pattern is quite similar to that of *lián…dōu*-sentences. Based on these and other observations, Shyu (2004) suggests that *lián*-NPs and strong QPs are syntactically parallel.

The focus adverb *shenzhi*, on the other hand, is associated with a focused expression in its scope, never forces "object movement" or the presence of *dōu*, and does not pose restriction on the category of the associated focus. In these respects, *shenzhi* is much more similar to English *even* than *lián…dōu* is.[21]

Crucially, Shyu (2004) provides two kinds of contexts that enable us to distinguish *shenzhi* from

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[20]Of course, strong QPs only quantify over individuals (NPs) and not events (CPs/VPs). Hence the parallel between a *lián*-constituent and a strong QP does not hold entirely.

[21]However, *shenzhi* has a stricter distribution than *even*. In particular, *shenzhi* occupies a high clausal position which out-scopes certain operators, and that it does not occur postverbally or NP-internally, nor can it associate with a subject that precedes it (Shyu 2004). All these are by and large in accord with the general properties of adverbial quantifiers in Mandarin.

lián. . . dōu. The first one is where the focused constituent is a *before*-clause. While a *before*-clause can follow *shenzhi*, it cannot follow *lián*:

(385) a. Evans **shenzhi** zai zhidao Mary-de mingzi yiqian jiu qin-le ta.
Evans even at know Mary-POSS name before then kiss-ASP her
'Evans kissed Mary even before he knew her name.'

  b. * Evans **lian** zai zhidao Mary-de mingzi yiqian **dou** qin-le ta.
Evans LIAN at know Mary-POSS name before DOU kiss-ASP her
Intended: same as above

The second type is comparatives. Again, while *shenzhi* is felicitous in the comparative form "X is even taller than Y," *lián. . . dōu* is not.

(386) a. Wangwu hen gao, John hen gao. Bill **shenzhi** bi John gao.
Wangwu very tall, John very tall. Bill even compare John tall
'Wangwu is tall, and John is tall. Bill is even taller than John.'

  b. * Bill **lian** John$_i$ **dou** bi (ta$_i$) gao.
Bill LIAN John DOU compare he tall
Intended: 'Bill is even taller than John.'

Shyu (2004) explains such difference in terms of the "expectation-violation interpretation" and the quantification associated with strong QP: *shenzhi* signals a violation of expectation but does not evoke $\forall$-quantification, while *lián. . . dōu* requires both. Hence, (385b) is ruled out because the intended reading does not involve a set of quantified events, and (386b) is impossible also due to the absence of $\forall$-quantification (of degrees of tallness), as Bill need not be the tallest one in the given context.

Whether Shyu's (2004) explanation regarding the distinction mentioned above is correct or adequate is debatable. Important to us is the fact that *lián. . . dōu* does not always behave like *even*, whereas the adverb *shenzhi* is obviously a more comparable counterpart of *even* in Mandarin. For Shyu, the discontinuous expression *lián. . . dōu* still means *even*, but unlike *even* it demands a "quantificational" interpretation which is not always obligatory to *shenzhi*/*even*, and the syntax of *lián. . . dōu* follows from overt focus movement (Shyu 1995).

In the next subsection, I will argue that the scalar meaning of the scalar *dōu*-construction can be derived without treating either *lián* or *dōu* as the *even*-operator. The *even*-interpretation follows as a result of implicature.

4.5.5 Deriving scalarity

A number of authors have correlated the focus *lián…dōu*-construction with universal quantification and/or scalarity. Tsai (1994: 26) suggests that *lián* presupposes a contrast set to the *lián*-phrase, a set that is universally quantified by *dōu*. Similarly, Shyu (1995: 44) states that "*dōu* is related to both plural referential NPs and *lián*-singular NP exhaustively quantifying all members in the domain in discussion, except for the scalarity being implied in *lián*-NPs." Hole (2004) also contends that *dōu* involves universal quantification over alternatives.

Badan (2008) and Cheng and Vicente (2013), on the other hand, advocate that *lián* provides additivity while *dōu* is a maximality operator (following Giannakidou and Cheng 2006). A close but technically more refined analysis is provided by Xiang (2008: 242), who suggests that "*lián* sets up the set of alternatives and *dōu* imposes maximality on the set, which leads to strong exhaustivity… Being a focus marker, *lián* naturally evokes a set of alternatives (Rooth 1985)… It is this set of alternatives on which *dōu* can operate."

More specifically, the alternative-based semantics of *lián* and *dōu* are defined by Xiang as in (387) and (388), respectively.

(387) The lexical entry of *lián*:   (Xiang 2008: 242)

    a. $\llbracket lián(x)(P) \rrbracket = 1$ iff $P(x) = 1$

    b. $\exists y[y \neq x \wedge C(y) \wedge P(y)]$ (*C* is the alternative set)

    c. All the alternatives are (partially) ordered on a scale about unexpectedness such that:

        $\forall y[y \neq x \rightarrow \text{unexpected}(P(x)) > \text{unexpected}(P(y))]$

(388) *D* is a set of ordered degrees,   (Xiang 2008: 244)

    $dōu(D) = \iota d(d \in D \wedge \forall d' \in D(d \geq d'))$

Xiang treats *lián* as a two-place focus-sensitive operator: it takes an individual *x* (the variable that is replaced by alternatives of the same type at the level of focus interpretation) and a predicate *P*. *Dōu*, on the other hand, takes a set of degrees as its argument and yields the maximum of this set.

While the semantics in (387), which is basically identical to that of *even* (cf. Karttunen and Peters 1979), straightforwardly captures our intuition about the scalarity of *lián…dōu*-constructions,

there are a number of concerns in this analysis. First, the formula in (388) appears to be redundant given that the semantics of *lián* in (387c) already specifies the maximality semantics. (387c) is tantamount to saying that $P(x)$ (the assertion) represents the maximal degree of unexpectedness compared to its alternatives. It is thus unclear why we need to define *dōu* as in (388), because *lián* alone can pick out the maximal degree, per (387c).

Second, how *lián* and *dōu* are composed is also not clear. What Xiang intends seems to be that *dōu* takes as its input the set of degrees introduced by *lián*. But this requires the *lián*-expression to form a constituent with *dōu*, which is not the case in syntax (recall the discussion in Section 3.4.4). This semantics of *lián* also does not say anything about why the *lián*-antecedent always precedes *dōu* or why *lián...dōu* behaves differently than *shenzhi* 'even' (cf. section 4.5.4), if *lián* is so similar to English *even*.

I propose that neither *lián* nor *dōu* is *even*. Taking either of them to be *even* does not explain why *shenzhi* 'even' can co-occur with *lián...dōu*, as Shyu (2004) points out:

(389)　a.　Ta **shenzhi** lian　Zhangsan dou gan ma.
　　　　　he even　　LIAN Zhangsan DOU dare scold
　　　　　'He even dare scold Zhangsan.'

　　　　b.　Ta **shenzhi** lian　xiayu dou yao　chu-men.
　　　　　he even　　LIAN rain　DOU want out-door
　　　　　'He wants to go out even if it rains.'

To derive the meaning of a *lián...dōu*-construction, the proposal that *dōu* is a modal that agrees with a ∀-quantifier will suffice. The *even*-like scalar interpretation will be derived as an *implicature* of the entire *dōu*-sentence, rather than as the lexical meaning of *dōu* or *lián*.

Consider (390). The truth-conditional content of this sentence is that Lisi didn't buy any book. It moreover infers that Lisi didn't buy one book is less likely than he didn't buy two or more.

(390)　Lisi (lian) yi-ben shu　dou mei-you mai.
　　　　Lisi LIAN one-CL book DOU not-have buy
　　　　'Lisi didn't buy one book.'

Following the analysis of Mandarin NumPs in Section 4.4.2 (cf. (369b)), the denotation of 'one book' in (390) has the following denotation as a singleton set of books:

(391)　⟦yi-ben shu⟧ = $\{x \in C : \textbf{book}(x) \land |C| = 1\}$

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(391) however cannot compose with *dōu* in (390) because *dōu* has the non-singleton requirement that its antecedent contain at least two alternatives. How then is (390) grammatical?

Again, it is very tempting to analyze the scalar *dōu*-construction as involving quantification over not individuals but over *degrees* of some relevant measure that are introduced by the initial marker *lián*, as Xiang (2008) and many others have suggested. This way, *dōu* can be said to be associated with a set of abstract degrees represented by alternatives of the *lián*-antecedent, e.g., along the lines of (392).

(392) $[\![(\text{lian) yi-ben shu}]\!] = \{n \text{ books} : n \in \mathbb{N}\} = \{1 \text{ book}, 2 \text{ books}, 3 \text{ books}, \dots\}$

This set of propositions can then be collected by a $\forall$-operator that *dōu* agrees with (which however cannot be spelled out as *wúlùn*) and the final meaning of (390) can be rendered as something like "for every alternative n, there is a world in which n books exist and Lisi didn't buy the things (= n books)."

In this kind of analysis, we obtain the set of alternatives by substituting the numeral 'one' in (390) with different natural numbers in the same way as how Rooth's (1985) two-dimensional approach obtains focus alternatives. That is, the numeral 'one' in (390) is given the denotation as *a set of numbers* (as triggered by *lián*), in addition to the one proposed earlier in (391).

Here is why I will argue for a slightly different treatment than the one just sketched. First, K&S's (2002) system, which I adopt here, is "one-dimensional," where alternatives are directly given in the denotation of certain nominal expressions rather than derived through a particularized interpretative process at a different semantic dimension. Japanese indeterminates and German *irgendein* come with a set of individuals as their basic denotation; such set is not "activated" by any focus-sensitive operator. In my analysis, the properties of *dōu* have been kept consistent: its antecedent is a set of alternatives (i.e. an interrogative) that are collected by *wúlùn*/$\forall$. Resorting to the view of (392) will not only break this uniformity but also complicate the semantic system, as alternatives are now all over both dimensions. It will be unclear, for any given *dōu*-sentence, what kind of alternatives *dōu* is associating with.

Second, in K&S's system, there is one interrogative expression that may be plausibly assumed to denote a set of numbers: the degree question phrase *how many*. In Mandarin, it is the *wh*-morpheme *jǐ* in (393):

(393) Lisi ji-ben   shu dou mei-you mai.
       Lisi how.many-CL book DOU not-have buy
       Lit. 'No matter how many books, Lisi didn't buy (them).'

And this causes a dilemma: if we are to use Rooth's (1985) two-dimensional analysis for 'one book' in (390), we seem to be forced to say that the NumP in this case has the same denotation as *ji-ben shu* 'how many books.' There is no way in my account to distinguish between (390) from (393), since they now have the same LF, per the Rooth-style execution on 'one book' in (390). Nevertheless, the two sentences do not sound synonymous, even though they have quite similar truth-conditions; the *even*-like reading is prominent in (390) but not in (393).

My proposal is that the *lián*-antecedent of the scalar *dōu*-construction should be treated as akin to a yes-no (or polar) question, which, in Hamblin semantics, denotes a set of two propositions that differ from each other in polarity, e.g. (394):

(394) ⟦Do you know John?⟧ = {λw[you know John in w], λw[you don't know John in w]}

The guiding idea is that the contribution of *lián* is to similarly generate the *negative* counterpart of the *lián*-phrase, and thus it denotes a set of two alternatives that differ in polarity.

The meaning of (395a) is now derived as follows. The NumP has the denotation in (395b), as proposed above: it is a singleton set of books. The function of *lián* is to produce a second set that contrasts with 'one book' in the size of the domain of book-alternatives, as in (395c).

(395) a. Lisi lian yi-ben shu dou mei-you mai.
          Lisi LIAN one-CL book DOU not-have buy
          'Lisi didn't buy one book.'

       b. ⟦yi-ben shu⟧ = {$x \in C$: $\mathbf{book}(x) \wedge |C| = 1$}

       c. ⟦lian yi-ben shu⟧ = {{$x \in C$: $\mathbf{book}(x) \wedge |C| = 1$}, {$x \in C'$: $\mathbf{book}(x) \wedge |C'| \neq 1$}}

The denotation of the *lián*-PP is a set of two sets of book-alternatives, one a singleton set, the other non-singleton. Exactly how many books are contained in the second set is determined contextually.

The meaning of the scalar *dōu*-sentence (395a) can now be rendered as follows, based on the proposal that *dōu* is a modal that agrees with a $\forall$-quantifier that collects a set of alternatives.

(396) $\llbracket(395a)\rrbracket = \{\lambda w.\forall x[x \in \{\{x \in C : \textbf{book}(x) \wedge |C| = 1\}, \{x \in C' : \textbf{book}(x) \wedge |C'| \neq 1\}\} \rightarrow$

$\exists w''[ACC(w, w'') \wedge \textbf{in}(x, w'') \wedge \text{Lisi didn't buy the thing in } w'']]\}$

This says for every alternative x in the set in (395c), there is an accessible world in which x exists and Lisi didn't buy the thing. Thus, Lisi didn't buy the one book in the world with a single book, and Lisi didn't buy the n books in the world with n books where $n \neq 1$. We obtain this result by having the NumP scope above both *dōu* and negation. This stands in contrast with the English sentence *John didn't buy one book* where the NumP is intended as taking narrow scope below negation. The truth-conditions of them are the same, but the ways they reach the final meaning are different.

I assume that *lián* is doing double duty here: it generates a set of alternatives that differ from the asserted one in terms of polarity, and also lexically incorporates the universal quantifier that ranges over these alternatives. In this sense, *lián* is similar to English *even*, which is sensitive to focus alternatives and at the same time expresses universal quantification.

Another example is shown in (397a), where the antecedent is a proper name. Here, what *lián* does is again to introduce a set of alternatives all of which are distinct from Lisi. The semantics of (397a) is shown in (397b).

(397) a. Lian Lisi dou lai le.
LIAN Lisi DOU come ASP
'(Even) Lisi came.'

b. $\{\lambda w.\forall x[x \in \{\text{Lisi}, \{x \in C : \textbf{person}(x) \wedge x \neq \text{Lisi}\}\} \rightarrow$

$\exists w''[ACC(w, w'') \wedge \textbf{in}(x, w'') \wedge \text{the person came in } w'']]\}$

I have demonstrated how to derive the meaning of a scalar *dōu*-construction using the analysis developed for *dōu*-unconditionals and the new proposal that *lián* evokes an alternative with an oppositional polarity. The remaining task is to explain where the scalar *even*-like interpretation comes from. Consider the following dialogue:

(398) a. You: Did John come to the party last night?

b. I: Lian Lisi dou lai le.
LIAN Lisi DOU come ASP
I: '(Even) Lisi came.'

c. Additive inference: John came.

d. Scalar inference: That Lisi came is more unexpected than John came.

Upon hearing (398b), you immediately understand that I meant to convey (398c) and (398d). However, nothing in the proposed meaning of (398b), namely (397b), entails (398c) or (398d). In fact, what I say does not even address your question directly, because it does not mention John at all. (398b) is a *weaker* response than the plain statement "John came" with respect to your question, because the former has *widened* the domain of relevant individuals including Lisi.

Domain widening must occur for a reason. If you ask me if John came to the party, I cannot say *Yes, someone came* to mean *Yes, he came*. Without any condition, domain widening will only result in weakening, not strengthening (in the sense of Kadmon and Landman 1993). (398b) is then a case where widening can actually lead to a *stronger* (not weaker) claim than "John came." How? You as the hearer obtain this interpretation by introducing a likelihood scale on which (398b) and (398c) are two different points on a scale of likelihood, and by taking (398b) to be the less unlikely or the *maximally informative* one, in the sense that (398b) asymmetrically entails (398c). The *even*-like scalar interpretation of (398b) arises as a consequence of widening of the "scalar domain," where one scale point either entails, or is entailed by, another scale point.

I argue this scalar reading is an *implicature*: it emerges when the hearer tries to interpret the speaker's utterance as maximally relevant. Suppose neither of John and Lisi is more/less likely to come than the other. My utterance (398b), which conveys that there is a world in which Lisi came and there is a world in which someone other than Lisi came, will be understood as implying that John didn't come, because the content of (398b) is not relevant to your question. However, if a scalar interpretation is entertained such that (398b) by itself can entail another proposition that is relevant to your question (i.e. whether John came or not), then (398b) becomes felicitous. The *even*-like reading is therefore the hearer's strategy to make (398b) maximally informative. It follows that the focus adverb *shenzhi* 'even' can be added to the scalar *dōu*-construction because implicature can be strengthened without redundancy.

Two remarks are in order. First, the scalar reading can only emerge when the antecedent in the scalar *dōu*-construction denotes a set of alternatives. (399), which is not a *dōu*-construction, cannot give rise to the scalar interpretation. Rather, it infers (by Gricean reasoning) that only Lisi came.

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(399) Lisi lai   le.
      Lisi come ASP
      'Lisi came.' (does NOT infer: someone other than Lisi came)

Widening of the scalar domain is therefore not purely pragmatic; we cannot do it in any given sentence. It is only in the *dōu*-construction where widening is possible, thanks to the presence of *lián* which generates a set of two sets of alternatives that differ in polarity value, as sketched in (395c). Strictly speaking, the scalar interpretation, or widening of the scalar domain, is a *grammatical*, not pragmatic, phenomenon of the *dōu*-construction because *dōu* always comes with a ∀-operator that quantifies over a set of alternatives.

Second, we have derived the meaning of (398b) without positing an *even*-operator in the syntax. As mentioned, the pragmatic scale associated with *lián* is evoked because of the avoidance of a weaker claim in a widened domain. Even in English, there are many cases where an *even*-reading is prominent without *even*, e.g. sentences containing a minimizer like *a red cent* or concessive conditionals such as *Naked as I was, I braved the storm*.[22] My claim is that we need not assume either *lián* or *dōu* to be the lexicalization of an *even*-operator, although the meaning of a scalar *dōu*-construction is fully compatible with an overt instance of *even*.

To sum up, the main advantage of this analysis is that we need not resort to Rooth's (1985) focus semantics to derive the alternatives of the *lián*-antecedent. The key analysis in my proposal is that *lián* enforces two sets of alternatives, one based on the form of the antecedent and the other based on its negative counterpart. This alternative-generating mechanism is already available in the (one-dimensional) Hamblin system where yes-no questions denote a set of polarity-oppositional alternatives. *Lián*, therefore, is a functional head that carries analogous semantic function as the yes-no question operator; it is present in the syntax of *dōu*-sentences whenever they are interpreted as scalar *dōu*-constructions. Finally, the role of *dōu* has remained the same throughout all kinds of *dōu*-constructions, i.e. introducing a possible world for each alternative in the denotation of the antecedent.

Now we see why *dōu* is intuitively very "universal" in unconditionals but more like a "focus particle" in the scalar construction: in both cases, *dōu* consistently agrees with a ∀-quantifier, but

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[22]Quirk et al. 1985: 1098.

in the latter construction one alternative (the one pronounced) entails all others, which renders the universal force undetectable.

It follows that the distinction between *dōu*-unconditionals and scalar *dōu*-constructions is on a par with that between non-polar questions (including *wh*-questions and alternative questions) and polar questions. In Hamblin semantics, alternatives in a *wh*-question are introduced by the *wh*-phrase, as in (400), and by the disjunction in an alternative/disjunctive question, as in (401). Alternatives in a polar question, on the other hand, are derive with an additional step: adding negation to the surface form, as in (402).

(400) a. Who came?   Wh-*question*

       b. Alternatives: {John came, Bill came, Mary came, ... }

(401) a. Did John or Bill come?   *Alternative/disjunctive question*

       b. Alternatives: {John came, Bill came}

(402) a. Do you know John?   *Polar (yes-no) question*

       b. Alternatives: {you know John, you don't know John}

As a consequence, the number of alternatives is lexically unspecified in *wh*-questions, is overtly specified by the number of disjuncts in alternative/disjunctive questions, and is always "two" in polar questions.[23] Aside from this distinction, the underlying representations of these three types of questions are uniformly sets of alternative propositions. *Dōu*-unconditionals and scalar *dōu*-constructions can be unified in the same way as these three types of questions can.

Moreover, as we mentioned in the beginning, *lián* can often be substituted by the complex string *jìu-suàn*(-*shì*), in which case a *concessive conditional* interpretation is made salient. In this case, too, *shenzhi* 'even' can co-occur to strengthen the *even*-reading.

(403) a. (Shenzhi) **jiu suan**   (**shi**) Zhangsan, ta **dou** gan ma.
          even   JIU consider be   Zhangsan he DOU dare scold
          'He even dare scold Zhangsan.' (Lit. '(Let) it be not Zhangsan, he dare scold (him).')

       b. (Shenzhi) **jiu suan**   (**shi**) mei xiayu, Lisi **dou** bu chu-men.
          even   JIU consider be   not rain   Lisi DOU not out-door
          'Even if it's not raining, Lisi wouldn't go outside.' (Lit. '(Let) it be not raining, ... ')

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[23]More precisely, the alternatives evoked by *lián* that differ from the asserted one are considered one alternative.

Importantly, an *if*-clause can also serve as an embedded polar question, as in *John knows [if it will rain tomorrow]*. The fact that the scalar *dōu*-construction has the variant form as shown above lends further support to the analysis that the denotation of the antecedent in this construction is similar to that of a polar question.

Chapter 5

Further issues

5.1 Revisiting existential *wh*-phrases

In Section 2.3 I proposed, following Kim (2004), Dong (2009), and He (2011), that Mandarin *wh*-phrases denote sets of alternatives:

(404) a. $[\![\text{shenme}]\!] = \{x : x \in D_e\}$ ('what')

      b. $[\![\text{shenme dongxi}]\!] = \{x : \mathbf{thing}(x)\}$ ('what thing')

In K&S's (2002) system, individual alternatives expand (via Pointwise Functional Application) to propositional alternatives until they meet a propositional operator that selects them. This operator is some clausal head that carries one of the following features: [∃], [∀], [Neg], and [Q].

In Section 1.4.1, we also reviewed the data where Mandarin *wh*-phrases are interpreted as existential expressions when they occur in certain environments. The particular problem that I raised is that the precise interpretation of the *wh*-phrase varies in different contexts: sometimes they are *some*-NPs and sometimes *any*-NPs. As far as I am aware, this problem has not been addressed in the literature; but it is an important one because we don't know why an existential term can alternate between these two interpretations.

The guiding idea of the discussions to follow is that this problem can receive an explanation once we regard Mandarin *wh*-phrases as denoting alternatives, rather than existential phrases or Heimian variables, and that when a *wh*-phrase should be interpreted as a *some*-NP and when as an *any*-NP will also become predictable.

5.1.1 Negative contexts

We will begin with the negative sentence in (405), where I follow the convention in translating the *wh*-word *shenme* 'what' as the NPI *anything*.

(405)   Wo mei-you chi shenme.
        I   not-have eat what
        'I didn't eat anything.'

As discussed in Section 1.3.1, Mandarin sentences containing a *wh*-phrase in the scope of negation are peculiar in their interpretation (Dong 2009); for instance, (405) delivers the inference that I actually ate something not special or not significant. This is not what one would normally get if *shenme* 'what' is a simple existential or NPI.

Let us firstly consider the interpretation which should follow from the simple alternative-based analysis where the *wh*-word denotes a set of entities. The LF of (405) is given in (406a), which is equivalent to (406b) in the limited case with only three entities a, b, and c.

(406)   a. $\neg\exists$ [I ate $\{x : \text{thing}(x)\}$]

        b. $\neg\exists$ [I ate {a, b, c}] = $\neg$[I ate a $\vee$ I ate b $\vee$ I ate c] = $\neg$[I ate a] $\wedge$ $\neg$[I ate b] $\wedge$ $\neg$[I ate c]
             = I didn't eat a $\wedge$ I didn't eat b $\wedge$ I didn't eat c

The meaning of (406b) is the standard logic of negation scoping above existential quantification. It asserts that in the context containing just a, b and c, I ate nothing. The question now is why this is not exactly what (405) conveys.

In the representation (406a)/(406b), we employ existential closure over the set of alternatives denoted by the *wh*-word *shenme* 'what' just as we did before, and the scope of the closure is below negation. This analysis seems all the more plausible in light of the fact that in (405) the negation is followed by the existential verb *yǒu* 'have,' which appears to be nothing but the syntactic realization of existential closure, and so (405) instantiates the $[\neg > \exists]$ logical relation.

This intuitive and straightforward treatment turns out to be problematic by itself. The reason is that the existential verb *yǒu* in fact does *not* have the function of existentially closing a *wh*-word: (407) does not have a non-interrogative reading.[1]

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[1]The use of (aspectual) *yǒu* in a preverbal position in affirmative sentences is productive in southern Mandarin dialects as well as Cantonese and Taiwanese, but not in Beijing Mandarin, where it is realized as the verbal suffix *-le*.

(407)   % Lisi you   chi shenme.
        Lisi have eat what
        Intended: 'Lisi ate something.' (Okay as a question for southern Mandarin dialects)

That (407) can only be interpreted as a question is of course uncontroversial; what is problematic is the assumption that the sequence *méi-yǒu* 'not-have' yields the $[\neg > \exists]$ scope relation which directly associates with the *wh*-word. If *yǒu* alone doesn't license an existential *wh*-phrase, neither can *méi-yǒu*. Negation is just negation; it does not "license" an alternative-sensitive $\exists$-operator that is otherwise unavailable when negation is absent (e.g. in (407)). Thus (406a)/(406b) is not the correct logical form for (405).

Since the negation-auxiliary sequence *méi-yǒu* does not "close" the alternatives denoted by *shenme*, they will keep expanding *across* the negation. This means the meaning of (405) involves the following set of propositions, each of which is in the form of [I didn't eat *x*]:

(408)   {I didn't eat a, I didn't eat b, I didn't eat c}

This set must be closed by some propositional operator, otherwise it will be interpreted as the question *What didn't I eat?*.

In Section 2.5 I proposed that the conjunction marker *háiyǒu* establishes Universal Concord with a silent $\forall$-quantifier over propositions. In particular, it is the existential morpheme *yǒu* that signals the concord relation (as substituting *yǒu* with the copula *shì* will allow Interrogative Concord only). The key observation here is that the negated *méi-yǒu* and *háiyǒu* has very different syntax: the former cannot function as a coordinator.

(409)   a.   [Zhangsan] **haiyou** [Lisi] hui lai.
             Zhangsan   and   Lisi will come
             'Zhangsan and Lisi will come.'

        b.   * [Zhangsan] **mei-you** [Lisi] hui lai.
             Zhangsan   not-have Lisi   will come

In addition, unlike *háiyǒu*, *méi-yǒu* cannot form negative counterpart of the discontinuous 'not only...but also' additive expression in (410a).

(410)   a.   Bu **zhiyou** [Zhangsan hui lai], **haiyou** [Lisi] ye   hui lai.
             not only   Zhangsan will come and   Lisi   also will come
             'Not only Zhangsan will come, but also Lisi will come.'

b. * **Mei-you** [Zhangsan hui lai], **mei-you** [Lisi] ye hui lai.
    not-have Zhangsan will come not-have Lisi also will come
    Intended: 'Neither Zhangsan will come, nor Lisi will come.'

I conclude that the negated *méi-yǒu* cannot undergo Universal Concord with the null $\forall$-operator, even though its morphology incorporates *yǒu*. The inability to establish Universal Concord may be a result of intervention by the negation *méi*:

(411) $\forall$ ... $\neg$ [$_{\text{IP}}$ *méi- yǒu* ...]   *intervention*
      └ $-$ $-$ $-$×$-$ $-$ $-$ ┘

Now the question is: what closes the set of propositions in (408)? It is neither the Q-operator nor the $\forall$-quantifier. It also cannot be the $\exists$ because the latter agrees with *hùo(shì)*.

5.1.2   A new proposal

I propose that the quantifier that collects the set in (408) is an operator introduced by a modal head that is similar to *dōu*, but the operator it agrees with is not $\forall$ but rather $\neg\forall$. The intuition that I am after is that (405) seems to convey something like (412a), which has the semantics in (412b):

(412)   a. Wo mei-you chi shenme, **jiu** chi-le   yi-wan   mian.
          I   not-have eat what   JIU eat-PERF one-bowl noodle
          Lit. 'I didn't eat what, just ate one bowl of noodles. '

      b. $\{\lambda w. \neg \forall p[p \in [\![(412c)]\!] \rightarrow \exists w'[ACC(w,w') \wedge p(w') \wedge \text{I ate one bowl of noodles in } w']]\}$

      c. $\{\lambda w[\text{I didn't eat a in } w], \lambda w[\text{I didn't eat b in } w], \lambda w[\text{I didn't eat c in } w]\}$

What (412b) says is: not every proposition p in (412c) has a possible world in which p is true and I ate one bowl of noodles. In other words, at least one of the following propositions is false:

(413) $\{\lambda w. \exists p[p = \lambda w[\text{I didn't eat a in } w] \wedge \exists w'[ACC(w,w') \wedge p(w') \wedge \text{I ate o.b.o.n. in } w']]\}$,

      $\{\lambda w. \exists p[p = \lambda w[\text{I didn't eat b in } w] \wedge \exists w'[ACC(w,w') \wedge p(w') \wedge \text{I ate o.b.o.n. in } w']]\}$,

      $\{\lambda w. \exists p[p = \lambda w[\text{I didn't eat c in } w] \wedge \exists w'[ACC(w,w') \wedge p(w') \wedge \text{I ate o.b.o.n. in } w']]\}$

Suppose the first line in (413) is the false one. This entails that the proposition $\lambda w[\text{I didn't eat a in } w]$ is false. In the typical situation where w is anchored to the actual world, then it is tantamount to

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saying that I actually ate the alternative a. That is, the first clause in (412a) (= (405)) infers that I ate something, though does not explicitly say what this something is.

This outcome, which may be surprising given the traditional view that (405) is frequently taken to mean 'I didn't eat anything,' may actually be a welcome one, in my opinion. It explains why (405) delivers the inference that I ate something not important or not special. Suppose I ask you what you ate, and in reality you ate nothing. To make your statement maximally informative, you should directly tell me "I ate nothing" or "I didn't eat anything." Normally, you should not say something like "I didn't eat everything" (with $[\neg > \forall]$ being the intended scope). This latter statement is in fact not contradictory if you indeed ate nothing; nevertheless, it gives rise to the implicature that you actually ate something. At the same time, it also infers the thing you ate is not important, because if it is worth mentioning you should use the stronger statement "I ate x."

The sentence (405) is precisely one such case, under the present analysis: the negated $\neg\forall$ quantifier which agrees with the morpheme *jìu* will necessarily generate the implicature that I actually ate something, but at the same time since I am not telling you what I ate, you will take my utterance to infer that what I ate is not important. This indeed matches the intuition of Dong (2009) and Liao (2011) toward (405) and cases alike. What remains to be proved is whether the morpheme *jìu* does have the given semantics in (412b).

Jìu is a preverbal quantificational particle with many intriguing syntactic and semantic properties. It is traditionally treated as an adverb (Chao 1968, Li and Thompson 1981) and the notion of "focus" has been taken by many to be the essence of its meaning (Biq 1984, Hole 2004, 2006, Shu 2011, and to some extent Lai 1995, 1999). In most of these references, another morpheme *cái* is also studied along with *jìu* as they are correlated in many ways. In this subsection we will concentrate on *jìu*.

To get a first taste on the semantic import of *jìu*, consider (414):

(414)   Lisi **jiu** neng tai-qi   zhe-zhang zhuozi.
        Lisi JIU can   lift-up this-CL   table
        'Lisi (alone) can lift this table.' ($\rightsquigarrow$ someone else also can)

In this simple example, *jìu* precedes the VP and follows the subject *Lisi*. It asserts that Lisi can lift this table, but further infers *someone else also can*. Note that in the translation of (414) I give a parenthesized "(alone)" to reflect the inference, but no part of this sentence literally means 'alone.'

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The inference of (414) is not as strong as presupposition. When embedded under the "A-not-A" disjunctive question operator as in (415), the sentence no longer conveys that someone else also can lift the table; rather, whether someone else also can seems to be what is being asked in (415). This means the inference does not "project" through the question operator.

(415)   Shi-bu-shi Lisi **jiu** neng tai-qi   zhe-zhang zhuozi?
        be-not-be Lisi JIU can   lift-up this-CL   table
        'Is it the case that Lisi (alone) can lift this table?'

This simple example (414) raises a lot of questions: How does one obtain the inference? What is the role of *jìu*? How can we derive a compositional semantics that can at the same time be mapped to the syntax of this sentence?

The first clue comes from the fact observed in the literature that (414) can take a sentence-initial complex consisting of the focus morpheme *zhǐ* 'only' and a modal auxiliary *yào* 'need,' as in (416):

(416)   (*Would four people be enough?*)
        Zhi-yao   san-ge   ren   **jiu** gou   le.
        only-need three-CL person JIU suffice INCH
        'Three people would be enough.' (⤳ There is no need for more.)

Notice that the addition of the initial 'only-need' complex seems to only increase the "force" or "degree" of the implicature and does not alter the truth-condition of either sentence. This observation motivates Hole (2004) to propose that *jìu* is a grammaticalized "focus-background" agreement marker.

Nevertheless, previous studies have also revealed that *jìu* appears in a wide range of contexts including those that do not require, or not even allow, 'only.' Lai (1995, 1999) discusses data similar to the following:

(417)   (*Did Lisi go to bed at eleven?*)
        Lisi shi-dian   **jiu** shui le.
        Lisi ten-o'clock JIU sleep INCH
        'Lisi went to bed at ten (already).' (⤳ Ten is earlier than expected.)

Here the role of *jìu* appears to resemble the temporal adverbial *already*, which is associated with what Lai calls "early" effect. But we know that *jìu* does not literally mean *already* since the meaning of, e.g.,(416) has nothing to do with the "early" effect. Further, while it is intuitively clear that

certain kind of (temporal) quantification is operative in (417), claiming that it involves an invisible 'only' is a far cry. Indeed, the 'only-need' complex in (416) is not allowed in (417).

It has also been noted that *jìu* can also instantiate *sufficient* conditions (Biq 1984, Lai 1999). In (418) where the interacting expression with *jìu* is an *if*-clause, *jìu* serves to indicate that it is a sufficient condition of the *jìu*-clause.

(418) (*Are you going to stay home tomorrow?*)
    (**Ruguo**) xiayu, wo **jiu** dai zai jia.
     if   rain I   JIU stay at home
    'If it rains, I stay at home.'

What is remarkable about (418) is that the conditional marker *ruguo* 'if' is entirely optional. This implies that *ruguo* is not the "real" conditional marker like *if* and that it is unclear what *jìu* should agree with in such case if it is a focus-background agreement marker.

Note also that (418) by no means infers that raining weather is an "easy" condition for me to stay at home. In fact, under the given context (418) can even be understood as implicating "if it does not rain, I will not stay at home." This latter case is in sharp contrast to the *jìu*-sentence in (416). This comparison shows again that *jìu* appears to contribute to different meanings in different contexts.

Based on these observations, I argue that *jìu* indeed has the semantics proposed in (412b).[2] This analysis explains the meaning of (419a) as follows:

(419) a. (*Are four people enough?*)
        (**Zhi-yao**) san-ge   ren   **jiu** gou   le.
        only-need three-CL person JIU suffice INCH
        'Three people would be enough.' ($\leadsto$ There is no need for more.)

    b. $\{\lambda w.\neg\forall p[p \in [\![(419c)]\!] \rightarrow \exists w'[ACC(w, w') \wedge p(w') \wedge \text{the people are enough in } w']]\}$

    c. $\{\lambda w[\text{three people are needed in } w], \lambda w[\text{four people are needed in } w], \ldots\}$

The relevant alternatives are shown in (419c): it is a set of propositions of the form [*n* people are needed] where $n \geq 3$. The quantifier $\neg\forall$ in (419b) entails that some proposition in this set is false. This false proposition cannot be the first alternative, since it's the assertion. But it can be the second

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[2]Hole (2004) is a predecessor of this idea that *jìu* reflects negated universal quantification over alternatives.

alternative, and the resulting meaning is coherent: 'Three people would be enough, and it is false that four people are needed.' The role of the initial expression 'only-need' provides a direct clue of the content of the alternatives: they are propositions that concern with the number of individuals needed.

The temporal example (420a) can be accounted for similarly.

(420) a. (*Did Lisi go to bed at eleven?*)
           Lisi shi-dian   **jiu** shui le.
           Lisi ten-o'clock JIU sleep INCH
           'Lisi went to bed at ten (already).' ($\rightsquigarrow$ Ten is earlier than expected.)

       b. $\{\lambda w.\neg\forall p[p \in [\![(420c)]\!] \rightarrow \exists w'[ACC(w,w') \land p(w') \land \text{Lisi went to bed in } w']]\}$

       c. $\{\lambda w[\text{it was ten in } w], \lambda w[\text{it was eleven in } w], \dots\}$

The negated alternative is the second one, and the final meaning of (420a) can be paraphrased as: 'Lisi went to bed at ten, and it is false that Lisi went to bed at eleven.' This derives the "early" effect, because the alternatives that are negated are the propositions in which the relevant times are later than ten. Given the proposed semantics of *jiu* that it agrees with $\neg\forall$, the alternative propositions cannot take the form [it was t] where t is prior to ten, because these propositions are already *entailed* by the assertion: if Lisi went to bed at ten, then it is necessarily true that he didn't go to bed before ten.

In short, I claim that the negated sentence (405), repeated as (421) below, involves propositional alternatives that are quantified over by the invisible $\neg\forall$ that agrees with *jiu*. The *wh*-word *shenme* is not an (existential) NPI; it denotes a set of alternatives.

(421) Wo mei-you chi shenme.
       I   not-have eat what
       Lit. 'I didn't eat what.'

5.1.3 *If*-conditionals

Consider the conditional configuration in (422):

(422) Ruguo shei da ni, jiu   gen wo shuo.
       if   who hit you then with me tell
       'If someone/anyone hits you, tell me.'

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As noted in Section 1.3.1, *if*-clauses are an environment where the *wh*-word can be translated as either *someone* (as in Tsai 1994, Lin 1998b) or *anyone* (as in Huang 1982a, Li 1992). Since *any*-NPs are, like *some*-NPs, also existential terms (Ladusaw 1980, Chierchia 2013, etc.), the non-interrogative interpretation of (422) indicates that the set of alternatives that *shei* 'who' denotes receives existential quantification, although the fact that its translation can be either *someone* or *anyone* does *not* follow from this and requires a deeper investigation.

It turns out that (422) is just a subcase of the *jìu*-construction discussed in the previous section, as it also involves the element *jìu*. Not surprisingly, (422) is synonymous with (423a) where *ruguo* 'if' is substituted with *zhǐ-yào* 'only-need.' The meaning of this example is shown in (423b), in accordance with the proposed semantics of *jìu*.

(423)   a. (Zhi-yao) shei da ni, jiu   gen wo shuo.
           only-need who hit you then with me tell
           'If someone/anyone hits you, tell me.'

       b. $\{\lambda w.\neg\forall p[p \in [\![(423c)]\!] \rightarrow \exists w'[ACC(w,w') \wedge p(w') \wedge \text{tell me in } w']]\}$

       c. $\{\lambda w[\text{that John hits you is needed in } w], \lambda w[\text{that Mary hits you is needed in } w], \dots\}$

What (423b) says is that not all propositions of the form [that *x* hits you is needed] are true in a world in which you inform me of this hitting situation. That is, at least one such proposition is false. Suppose the negated proposition is the first one in (423c), then the meaning of (423a) can be paraphrased as "for you to tell me (about it), it need not be the case that John hits you." In other words, "you don't need to wait until John hits you (badly); you can tell me if anyone else hits you." This interpretation indeed seems to be what (423a) means.

The reason why a *wh*-phrase can be understood as either a *some*-NP or an *any*-NP when it is embedded in a conditional clause is a consequence of *implicature* of the meaning of *jìu*. That is, (423b) implicates the following:

(424)   a. You can tell me if there is *someone* that hits you.   (*shei* is understood as *someone*)

       b. You can tell me *regardless of* who hits you.   (*shei* is understood as *anyone*)

Crucially, we derive this result without taking the *wh*-phrase to be inherently existential; rather, it starts out as a set of alternatives that is "closed" by the higher ¬∀ quantifier which agrees with *jìu*.

5.1.4 Yes-no questions

Let us turn now to yes-no (or polar) questions, another environment where existential *wh*-phrases may be translated as either *some*-NPs and *any*-NPs. In the standard treatment of polar questions, (425a) may be taken to denote the set of propositions in (425b)/(425c). It consists of two alternative propositions that differ from each other in the polarity of the statement, and each contains a disjunction. In the toy situation containing a, b and c, an appropriate paraphrase of the meaning of (425a) under this analysis would be (425d).

(425) a. Ni xihuan shenme ma?
            you like   what   Q
            'Do you like something/anything?'

        b. {it is true [∃ you like {x : thing(x)}], it is false [∃ you like {x : thing(x)}]}

        c. {you like a ∨ b ∨ c, you don't like a ∨ b ∨ c}

        d. Do you like a, b or c, or do you not like a, b or c?

The semantics of polar questions is a complicated issue that I cannot discuss here. For our purposes, we are interested in knowing how to derive the *any*-reading of the *wh*-word in (425a). What I think is a possible explanation is to say that a yes-no question is interpreted under an implicit speech-act predicate "I want to know." Nicolae (2013: Chapter 5) discusses Guerzoni's (2011) observation on the (subtle) contrast in (426), and argues that these two polar questions have different underlying representations.

(426) a. *Did Mary order any dessert or not?

        b. Did Mary order any dessert?

In particular, Nicolae suggests that while (426a) has a clausal disjunction configuration (Han and Romero 2004), (426b) is underlying a *conditional*. The reason that (426a) is bad is that in the logical form (427a), the NPI *any* is not licensed in IP$_2$. In contrast, interpreting (426b) as the conditional in (427b) gives a straightforward explanation as to why *any* is licensed, as *any* now appears in the restriction of a conditional statement, a typical NPI-licensing environment, as in (427c).

(427) a. *[$_{IP_1}$ Mary didn't order any dessert] ∨ [$_{IP_2}$ Mary ordered any dessert]

b. <u>I want to know</u> if Mary ordered any dessert.

c. [Mary ordered any dessert → I want to know]

I maintain that Nicolae's (2013) proposal can be extended to the polar question (425a). Specifically, the LF of (425a) is not (425b) but (428a), or equivalently (428b), which implicates (428c).

(428)   a. I want to know if [∃ you like $\{x : \text{thing}(x)\}$]

b. I want to know if [you like a ∨ you like b ∨ you like c]

c. [you like a → I want to know] ∧ [you like b → I want to know] ∧ [you like c → I want to know]

This is pretty much what (425a) means: you may and may not like anything, but any relevant thing is such that if you like it, I want to know. It should become obvious that this analysis, if on the right track, unifies polar questions and *if*-conditionals as a single type of licensing environment of Mandarin existential *wh*-phrases. The existential *wh* in polar questions oscillates between a *some*- and an *any*-reading just like it does in ordinary *if*-conditionals.

(429)   a. I want to know if you want **something**.

b. I want to know if you want **anything**.

Interestingly, Guerzoni's (2011) observation on the contrast in (426) also sheds some light on the interaction of Mandarin non-interrogative *wh*-phrases and the so-called "A-not-A" disjunctive questions (Huang 1991). The syntax and semantics of this type of question is another big area that I cannot evaluate in any detail here; for our purposes, it suffices to note that when the A-not-A question operator is realized as a morphologically complex head such as that in (430a), the *wh*-phrase *shenme dongxi* can be interpreted existentially; but if it comes in the form of a (partially elided) clausal disjunction built on the disjunctive marker *haishi*, as in (430b) or (430c), the sentence becomes much degraded.

(430)   a.   Ni   xiang-bu-xiang mai shenme dongxi?
              you want-not-want buy what   thing
              Intended: 'Do you want to buy something?'

b. ?? Ni   xiang mai haishi bu xiang mai shenme dongxi?
              you want buy or   not want buy what   thing
              Intended: 'Do you want to buy something or not?'

c. ?? Ni   xiang mai shenme dongxi haishi bu xiang (mai)?
   you want buy what   thing   or   not want buy
   Intended: 'Do you want to buy something or not?'

This asymmetry can be explained if (430a) can be understood as a conditional (at least in se-mantics,) whereas (430b) and (430c) have no such option and are therefore at odds with a non-interrogative *wh* because the positive disjunct cannot license it.

In this connection, notice that the NPI *renhe dongxi* 'any thing' also sounds odd in (431a) and even worse in (431b), cf. (431c).[3]

(431) a. ?? Ni   xiang-bu-xiang mai renhe dongxi?
          you want-not-want buy any   thing
          Intended: 'Do you want to buy anything?'

       b.   * Ni   xiang mai haishi bu xiang mai renhe dongxi?
          you want buy or   not want buy any   thing
          *'Do you want to buy anything or not?'

       c.   Ni   xiang mai renhe dongxi ma?
          you want buy any   thing   Q
          'Do you want to buy anything?'

I have no explanation of why (431a) is not that good, but these facts in (430) and (431) overall do seem to support Nicolae's (2013) claim that polar questions may come in (at least) two types with different underlying structures.

In a nutshell, *if*-conditionals and polar questions constitute two baseline contexts in which Mandarin *wh*-expressions are existentially quantified but can deliver the free choice implicature, thus accounting for the translation problem. Insofar as these two contexts are concerned, the free choice implicature is their characterizing property as "polarity items." The implicature, however, is not obtainable from the surface syntax: it is derived from the invisible quantifier $\neg\forall$ that collects a set of alternatives introduced by the *wh*-expression.

5.1.5 Deontic modals

Let us turn now (432a), where the *wh*-phrase *shenme shu* 'what book' is understood as 'some book.'

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[3]There seems to be some variation among speakers regarding the acceptability of the examples in (431), though the contrast of (431a)/(431a) vs. (431c) is clear.

(432) a. Lisi bixu mai *(ben) shenme shu.   (after Liao 2011: 59)
          Lisi must buy   CL   what   book
          'Lisi must buy some book.'

      b. MUST ∃ [Lisi buy $\{x : \text{book}(x)\}$]

      c. It is mandatory that [Lisi buy a ∨ Lisi buy b ∨ Lisi buy c]

Following the proposal that *shenme* 'what' denotes a set of alternatives and the assumption (pace K&S 2002) that a modal introduces existential closure of its scope, (432a) has the logical form in (432b) which can be paraphrased as (432c).[4] Intuitively, (432c) already comes quite close to what (432a) conveys: Lisi is required to buy some book, and in the toy situation with just three books, this book can be either a, b or c.

There is more than one interpretation that a deontic modal + disjunction sentence can generate.

(433) a. Jane must sing or dance, <u>whichever she prefers</u>.   *narrow-scope or*

      b. Jane must sing or dance, <u>but I don't know which</u>.   *wide-scope or*

The upshot here is that the Mandarin sentence (432a) is *not* ambiguous this way. Specifically, (432a) only has the *narrow-scope* reading: it must be interpreted as a request/order that Lisi buy some book, and cannot be understood as an uncertain report of what book Lisi is obliged to buy. This is evidenced by the following contrast in (434).

(434) a. *Narrow-scope reading: okay*

          Lisi bixu mai ben shenme shu, (suibian)   shenme shu dou keyi.
          Lisi must buy CL   what   book regardless what   book DOU can
          'Lisi must buy some book, whatever book would do.'

      b. # *Wide-scope reading: bad*

          Lisi bixu mai ben shenme shu, dan wo bu zhidao shi shenme shu.
          Lisi must buy CL   what   book but I   not know   be what   book
          #'Lisi must buy some book, but I don't know what (book).'

(434b) is bad because the first clause cannot be interpreted as "there is some uncertain book that Lisi must buy." Notice that there is a reading on which (434b) is felicitous, according to which a

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[4]In Section 1.3.1 we have seen that in Lin's (1998b) Group C environments (into which deontic modal contexts would be classified, although Lin does not use this term), a classifier such as *ge* or *dian* (lit. 'dot') is usually required, though possibly not always. For the case at hand, *ben* is necessary to give rise to the non-interrogative reading, and so I will stick to this example, where the necessity modal *bixu* 'must' is the licensor.

third person requests that Lisi must buy some book and I don't know which book that person is requesting. This is a reading where the deontic modal is dependent on someone else's deontic state, not the speaker's, and therefore is not the reading we are after in (434b).[5]

Here is another set of examples, where the deontic modal is *(yiding) dei* '(necessary) need.'

(435) a.   *Narrow-scope reading: okay*

Lisi (yiding) dei chi dian shenme yao, (suibian) shenme yao dou keyi.
Lisi necessary need eat CL what   drug regardless what   drug DOU can
'Lisi must take some medication, whatever medication would do.'

      b.   # *Wide-scope reading: bad*

Lisi (yiding) dei chi dian shenme yao, dan wo bu zhidao shi shenme yao.
Lisi necessary need eat CL what   drug but I   not know be what   drug
#'Lisi must take some medication, but I don't know what (medication).'

Again, (435b) can be felicitous if someone reports that Lisi must take some medication but I am uncertain as to what kind of medication it has to be; this is not the reading we are interested here. (435b) is bad on the reading "there is some uncertain medication that Lisi must take but I don't know what that is," which entails that there exists some medication that Lisi must take. But the first clause of (435b) has no such entailment; it merely states that Lisi has the obligation to take some medication.

The scope property of Mandarin existential *wh*-phrases in deontic modal sentences seems clear by now. However, there is a problem: where does the mysterious obligatoriness of the classifier in (432a) come from? We do not see this classifier in epistemic modal contexts, and it is not clear how a classifier should affect the interpretation of an existential *wh*-item. But if we take this problem seriously, it turns out that *nothing* I have said so far about (432a) can make sense if the classifier is not there, because (432a) would have to interpreted as a question. It simply is a fact that the meaning depicted in (432b) is dependent (at least partially) on the classifier. Hence (436) can never be interpreted as non-interrogative.

(436) Lisi bixu mai shenme shu?
      Lisi must buy what   book
      'What book must Lisi buy?' (Not: 'Lisi must buy some book.')

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[5]See Simons 2005: 274 for another example on the epistemic modal *might*.

5.1.6 The role of classifiers

It is in fact likely that deontic modals in Mandarin do *not* license non-interrogative *wh*-phrases at all. Deontic as well as imperative sentences with a classifier-less *wh*-phrase are just as awkward as the English examples in (437).

(437)   a.   ??You should/must do any homework.

       b.   ??Give me any gift.

The only possibility we are left with is that it must be the classifier being what sanctions the existential interpretation.

     Consider the following examples:

(438)   a.   Ta zaoshang qu mai-le   ge shenme dongxi song nu-pengyou (suoyi chidao le).
             he morning go buy-PERF CL what   thing   give girl-friend   so   late   INCH
             'He went to buy something for his girlfriend this morning (so he is late).'   cf. (17a)

       b.   Ta yijing   chi-le   dian shenme dongxi, xianzai bu   e.   cf. (17c)
             he already eat-PERF CL   what   thing   now   not hungry
             'He already ate something and is not hungry now.'

       c.   Ta gangcai zhao-le   ge shei pei   ta   yiqi   qu yiyuan.   cf. (17d)
             he just.now find-PERF CL who accompany him together go hospital
             'He asked somebody to accompany him to the hospital just now.'

These sentences are modeled on Lin's (1998b) Group C "future" oriented examples. Crucially, each of them has the perfective aspect *-le* and must be interpreted as describing past events, and the *wh*-item can still obtain non-interrogative construal. This indicates that it is not the "future" property (whatever that means) that licenses existential *wh*-phrases. Put differently, the examples in (438) violate the Non-Entailment-of-Existence Condition proposed by Lin (1998b) in (439) (see Section 1.3.1), because all of them entail the existence of some entity/individual that satisfies the description of the *wh*-phrase.

(439)   Non-Entailment-of-Existence Condition on EPWs (NEEC)

       The use of an EPW is felicitous iff the proposition in which the EPW appears does not entail existence of a referent satisfying the description of the EPW.

There are further indications that the presence of a classifier affects the interpretation of a *wh*-expression. First, the examples in (440) are all awkward when intended as questions. It appears that classifiers "intervene" in the association between the *wh*-phrase and the Q-operator at CP.

(440) a. ?? Ni kanjian ge shenme dongxi?
           you see   CL what   thing
           Intended: 'What did you see?'

       b. ?? Ni wancan chi-le   dian shenme dongxi?
           you dinner eat-PERF CL   what   thing
           Intended: 'What did you eat for dinner?'

       c. ?? Lisi zhao-le   ge shei bang ni?
           Lisi find-PERF CL who help you
           Intended: 'Who did Lisi ask to help you?'

They are also bad as embedded questions:

(441) a. ?? Wo bu zhidao [Lisi kanjian ge shenme dongxi].
           I   not know Lisi see   CL what   thing
           Intended: 'I don't know what Lisi saw.'

       b. ?? Wo bu zhidao [Lisi wancan chi-le   dian shenme dongxi].
           I   not know Lisi dinner eat-PERF CL   what   thing
           Intended: 'I don't know what Lisi ate for dinner.'

Second, existential *wh*-phrases can normally not be substituted by non-*wh* common nouns without inducing a change in meaning. For instance, when *shenme* 'what' in (442a) is dropped as in (442b), the sentence becomes quite funny; (442b) seems to convey that if you like *things*, as opposed to, e.g., *humans*, let me know.

(442) a. Ruguo ni   xihuan shenme dongxi, jiu   gen wo shuo.   = (422)
           if   you like   what   thing   then with me tell
           'If you like something/anything, let me know.'

       b. Ruguo ni   xihuan dongxi, jiu   gen wo shuo.
           if   you like   thing   then with me tell
           Not: 'If you like something/anything, let me know.'

           (Okay: 'If you like things, let me know.')

There is also a contrast between the negative sentences (443a) and (443b): while the former infers that I actually ate something insignificant, as discussed in Section 5.1.2, the latter simply says I did not eat and by no means suggests I actually ate something.

(443) a. Wo mei-you chi shenme dongxi.
       I   not-have eat what   thing
       'I didn't eat something.' ($\rightsquigarrow$ I actually ate something.)

   b. Wo mei-you chi dongxi.
       I   not-have eat thing
       Not: 'I didn't eat something.' (Okay: 'I didn't eat (things).')

On the other hand, in deontic modal sentences with a classifier, the presence/absence of the *wh*-word does not make such dramatic difference. Both (444a) and (444b) sound perfect and deliver roughly the same indefiniteness.

(444) a. Lisi bixu mai ben shenme shu.   = (432a)
       Lisi must buy CL   what   book
       'Lisi must buy some book.'

   b. Lisi bixu mai ben shu.
       Lisi must buy CL   book
       'Lisi must buy some book.'

For (445a) with the deontic modal *yinggai* 'should,' the *wh*-word *shei* 'who' can be substituted by the bare noun *ren* 'person' and the sentence means pretty much the same thing, as in (445b).

(445) a. Ni   yinggai zhao ge shei bang ni.
       you should find CL who help you
       'You should find someone to help you.'

   b. Ni   yinggai zhao ge ren   bang ni.
       you should find CL person help you
       'You should find someone to help you.'

What these observations demonstrate is the following generalization in (446):

(446) If a *wh*-word requires a classifier in order to be licensed, this *wh*-word either can be dropped
       or can be substituted by a non-*wh* NP, without resulting in obvious change of meaning.

If this generalization is correct, we should consider the possibility that in such environments (deontic modal contexts being the representative ones) non-interrogative *wh*-words actually do *not* denote sets of alternatives. Rather, they are possibly more akin to the NP-internal, modifier-like *some* as in the following examples (collected from Google).

(447) a. You should buy **some** good, comfortable, ergonomic chair.

    b.   You should use **some** good diet plan.

    c.   You must get **some** good sleep.

Since such non-interrogative *wh*-words need not appear in licensing environments (e.g. (438)) and have a relatively peripheral role in contributing to indefiniteness (per the generalization (446)), I conclude that they must be treated as of a different species than the *wh*-items discussed before.

Exactly what these atypical existential *wh*-words denote is a problem that I unfortunately must leave for future investigation. Nevertheless, the fact that they always follow, not precede, the classifiers may be deemed as an indication that it is the classifiers that license the non-interrogative use of these *wh*-words by scoping over them. Such licensing relation would presumably be a different one than clausal level existential closure.

(448)   a.   Lisi bixu mai ben shenme shu.
               Lisi must buy CL   what   book
               'Lisi must buy some book.'

       b.   * Lisi bixu mai shenme ben shu.   *wh* > classifier
               Lisi must buy what   CL book

I propose that the existential interpretation of (448a) is one that is associated with the classifier-*wh*-NP constituent as a whole, not just the *wh*. Assuming the classifier in (448a) is in fact preceded by a deleted singular numeral *yi* 'one' (Jiang 2012), (448a) turns out to instantiate quantification over the numeral-classifier phrase *(yi-)ben shenme shu* 'lit. (one) some book.' Thus, the generality of the semantic schema outlined earlier in (432b) as well as the narrow-scope character of the classifier-*wh*-NP phrases can still be maintained, but these facts would have to be viewed from the angle of quantification of the denotation of a (reduced) numeral phrase rather than a *wh*-phrase.

5.2 More on NumPs

In Section 4.4.2 I proposed that a NumP denotes a set of quantity-specific individuals. On this approach, the meaning of a simple episodic sentence like (449a) is analyzed along the lines of (449c):

(449)   a. Wo kanjian-le san-ge   xuesheng.
            I   see-PERF   three-CL student
            'I saw three students.'

      b. $[\![$san-ge xuesheng$]\!] = \{x \in C : \textbf{student}(x) \wedge |C| = 3\} = \{\text{John, Bill, Mary}\}$

      c. $\forall\{\lambda w[\text{I saw John in } w], \lambda w[\text{I saw Bill in } w], \lambda w[\text{I saw Mary in } w]\}$

          $= \lambda w[\text{I saw John in } w] \wedge \lambda w[\text{I saw Bill in } w] \wedge \lambda w[\text{I saw Mary in } w]$

The individual alternatives denoted by 'three students' expand to a set of propositions, which is closed by the Hamblin universal quantifier $\forall$. The meaning of (449a) is thus derived by conjunction of three propositions. This gives us the same truth-condition as the more traditional account would have where the NumP is an existential phrase:

(450) $\exists X[\textbf{student}(X) \wedge |X| = 3 \wedge \textbf{saw}(\textbf{I}, X)]$

In Chapter 2 I argued that the Hamblin $\forall$-quantifier comes in the derivation in a concord relation with the existential verb *yǒu* 'have' or the conjunction marker *háiyǒu*. What licenses the $\forall$ in (449a)? It is the perfective marker *-le*. A strong supporting argument for this view is that in some southern Mandarin dialects as well as Cantonese and Taiwanese (though not Beijing Mandarin), this aspect marker is realized by *yǒu* or the counterparts of *yǒu* in respective languages. (451), for instance, is perfectly acceptable in Taiwanese Mandarin:

(451)   Wo you kanjian san-ge   xuesheng.
         I   have see   three-CL student
         'I saw three students.'

In effect, what has been usually referred to as an "existential" verb turns out to be a concord element of the Hamblin *universal* quantifier in the current proposal.

My Hamblin-style analysis immediately becomes distinguishable from the traditional existential analysis once a NumP occurs in other environments where *yǒu/-le* is not available or does not scope above the NumP. Recall that (365a), repeated below as (452a), is ungrammatical. In Section 1.4 we also observed that Mandarin NumPs are either ungrammatical or awkward in the intensional contexts in (452b)–(452d).

(452)   a. * San-ge   xuesheng lai   le.   *Subject NumP*
            three-CL student   come PERF

b. * Lisi zongshi zai Amazon mai yi-ben shu.   *Adverbial quantification*
    Lisi always   at   Amazon buy one-CL book
    Intended: 'Lisi always orders a book at Amazon.'

c. * Lisi wancan hou he   yi-bei   cha.   *Characterizing generics*
    Lisi dinner after drink one-cup tea
    Intended: 'Lisi drinks a cup of tea after dinner.'

d. ?? Wo mei-you kanjian yi-ge   ren.   *Negative contexts*
    I   not-have see   one-CL person
    Intended: 'I didn't see a person.'

Moreover, when a NumP occurs legitimately in a conditional, it does not give rise to quantifica-tional variability effects (QVEs), as (453) does not have the reading where the reference of 'one girl' co-varies with the Q-adverb 'usually.'

(453) % Ruguo Lisi xihuan yi-ge   nusheng, ta changchang hui gei ta   xie   xin.
         If   Lisi like   one-CL girl   he usually   will to she write letter
         'Generally/Typically, if Lisi likes a girl, he writes her letters frequently.'

       (Not: 'Usually, if Lisi likes a girl, he writes her letters.')

As I argued, if Mandarin NumPs could be traditional existential indefinites or even Heimian vari-ables, none of these facts is expected: indefinites should be permitted in the scope of adverbs of quantification or negation, and Heimian variables should display QVEs, etc.

We can now reevaluate the data from the Hamblin perspective that NumPs in Mandarin, like *wh*-phrases, also denote sets of individuals. Let us begin with (454a), where the NumP denotes the set of two individuals in (454b), which expands to the set of two propositions in (454c).

(454) a. * Liang-ge xuesheng lai   le.   *Subject NumP*
           two-CL   student   come PERF
           Intended: 'Two students came.'

       b. $\llbracket$liang-ge xuesheng$\rrbracket = \{x \in C : \textbf{student}(x) \wedge |C| = 2\} = \{$John, Bill$\}$

       c. $\{\lambda w[$John came in $w], \lambda w[$Bill came in $w]\}$

To obtain the intended meaning of (454a), the set in (454c) has to be universally quantified by the Hamblin propositional operator $\forall$. Suppose $\forall$ can come for free, that is, we can attach it to a set of propositions as needed. Then sentences like (454a) should be able to be interpreted as John came and Bill came. But this clearly is not the case. I argue that the lack of *yǒu* in (454a) is what makes it

ungrammatical, as there is no element that can agree with ∀. Without ∀, the propositions in (454c) will remain unclosed. Now, a set of propositions is the denotation of a question, not an assertion; but (454a) does not have *wh*-morphology that allows for Interrogative Concord. The sentence therefore crashes, because neither Universal Concord nor Interrogative Concord is possible.

On the other hand, if *yǒu* 'have' precedes the NumP as in (455a), the ∀ is licensed and the sentence is grammatical, per the concord relation in (455b). That *yǒu* occurs in both conjuncts is a direct result of expansion of the alternatives denoted by the NumP.

(455)   a. **You** liang-ge xuesheng lai   le.
            have two-CL student   come PERF
            'Two students came.'/'There are two students who came.'

    b. ∀ … [*yǒu*$_{[∀]}$ [$_{IP_1}$ 'John came']] [*yǒu*$_{[∀]}$ [[$_{IP_2}$ 'Bill came']]   (*Universal Concord*)
            └─*Concord*─┘ |
            └ ─ ─ ─ ─ ─ ─*Concord*─ ─ ─ ─ ─ ─ ┘

Note that (455b) is the underlying semantic representation of (455a) in the Hamblin-style analysis of the NumP 'two students' being a set of alternatives. (455b) does not entail that *yǒu* can be overtly followed by a proper name in a sentence, nor do I claim it can. Huang (1987) has shown that *yǒu* is an existential verb displaying the definiteness effect similar to *there*-existentials. Hence, (455b) should (and must) be regarded as the "Hamblin" semantic representation of (455a).

Consider next the case of adverbial quantification (452b), repeated below in (456a). Here the object NumP 'one book' has the denotation in (456b), namely the book alternative in the domain where it is the only alternative. If LGB is the relevant book, then it denotes {LGB}.

(456)   a. * Lisi zongshi zai Amazon mai yi-ben shu.   *Adverbial quantification*
            Lisi always at Amazon buy one-CL book
            Intended: 'Lisi always orders a book at Amazon.'

    b. ⟦yi-ben shu⟧ = $\{x \in C : \textbf{book}(x) \wedge |C| = 1\}$ = {LGB}

    c. $\{\lambda s \forall s'[[s' \leq s \wedge Q(s')] \rightarrow \exists s''[s' \leq s'' \wedge \text{Lisi orders LGB at Amazon in } s'']]\}$

The situation semantics in (456c) (following Kratzer 2014) says for every Q-situation s' (where the content Q is contextually provided, e.g. a situation in which Lisi feels bored) there is an extended situation s'' in which Lisi orders LGB. (456c) is again obtained by expanding the book alternative to a propositional alternative, thus a singleton proposition. We can now see why this sentence

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does not have the intended QVE: the alternative is not a variable bound by the Q-adverb, and as a result the only meaning (456c) can have is that Lisi always or habitually orders the same book from Amazon. By the same token, the characterizing generic sentence (452c) is bad because the NumP 'one cup' cannot be construed as a bound variable.

Finally, the negative sentence (457a) is ruled out because this sentence only allows for the interpretation in (457c), which is much weaker than the intended meaning.

(457) a. ?? Wo mei-you kanjian yi-ge   ren.   *Negative contexts*
           I   not-have see   one-CL person
           Intended: 'I didn't see a person.'

       b. ⟦yi-ge ren⟧ = $\{x \in C : \mathbf{person}(x) \wedge |C| = 1\}$ = {John}

       c. $\{\lambda w[\text{I didn't see John in } w]\}$

Assuming the only contextually relevant individual is John, (457c) conveys that I didn't see John. This meaning is derived by expanding the (single) alternative from an individual to a proposition *across negation*; the alternative does not "scope below" negation because it is not a quantificational variable to be bound by the existential quantifier associated with the negation *méi-yǒu* 'not have.' Put differently, (457a) does not have the logical form in (458).

(458) $\neg \exists x[\mathbf{person}(x) \wedge \mathbf{saw}(x)(\mathbf{I})]$ (not the meaning of (457a))

On this proposal, the meaning of (457c) is that I didn't see the individual in this "singleton domain" containing only one individual, which is equivalent to saying "there is one individual I didn't see." In a scenario in which I saw two individuals and didn't see the third one, (457a) will be true on this analysis so long as the domain C in (457b) is properly defined. However, this is not the intended meaning of (457a) that I saw no one. The deviance of (457a) therefore follows.

In short, I have shown that the oddness of the examples in (452) can be explained by extending Hamblin's view on *wh*-phrases to NumPs. Assuming their denotations are both sets of alternatives, a sentence with a NumP must involve an element (e.g. *yǒu* 'have') that can agree with a Hamblin operator to select for ("close") the proposition grown from the NumP.

5.3 Strong QPs in Mandarin

Below is a summary of the finding from Section 1.3 to Section 1.4:

- In Section 1.3, we saw that non-interrogative *wh*-phrases split into two main groups: existential and universal. Existential *wh*-phrases always occur in the domain of their licensors (*yǒu*, modals, negation, etc.); universal ones always occur to the left of *dōu*. Semantically, the meaning of an existential *wh*-phrase shifts between that of *some*-NPs and *any*-NPs among the repertoire of licensing environments; the quantificational force of universal *wh*-phrases also seems to alternate between universal and free choice.

- In Section 1.4, we saw that NumP expressions do not exhibit QVEs and are generally bad in generic as well as negative contexts, and are also odd as objects of some attitude verbs. They are neither nonspecific nor specific. To get the nonspecific reading (in, e.g., negative contexts), they must occur to the left of *dōu*; to get the specific reading, they require *yǒu*.

In the previous chapter I have argued that *dōu* is a modal that agrees with a ∀-quantifier that selects a set of alternatives. It is obligatory to universal *wh*-phrases and "nonspecific" NumPs (i.e. those in the scalar construction) because these nominal expressions denote sets of alternatives that must be "closed" by some appropriate quantifier. *Dōu* is one such quantifier.

What we will see right below is that *dōu* is also generally obligatory to strong quantifier phrases (e.g., *every man*, *most dogs*, *all boys*, etc.) in Mandarin as well, where the notion of "strong" is used after Milsark (1977).

5.3.1 The morphology of strong QPs

The strong QPs in Mandarin to be discussed in this subsection include *suǒyǒu(de)* 'all,' *quanbu(de)* 'all' and *dabufen(de)* 'most.' In the generative literature, these lexical items have often been treated as monomorphemic just like their English counterparts. Upon scrutiny, however, each of these QPs can be decomposed into smaller units.

The first of our empirical observations is that *suǒyǒu(de)* 'all' is a morphologically complex word, which can be analyzed as consisting of three morphemes: the preverbal pronominal clitic in

relatives *suǒ*, the existential verb *yǒu* 'have' which can also mean 'to own/possess,' and the marker of nominal modification *de* which is optional.[6] As such, the sentence in (459) has the (a)- and (b)- readings depending on how one parses *suǒyǒu-de*, although the (b)-reading is not salient due to the fact that *suo* is not productively used in modern Mandarin and *suǒyǒu-de* has grammaticalized into a fixed expression meaning 'all.'

(459) Wo suoyou-de shu dou zai zheli.
      I all-DE   book DOU at here
      a. 'All books of mine are here.'   (*suǒyǒu-de shu* = 'all books')
      b. 'The books which I own are here.'   (*suǒyǒu-de shu* = 'the books which (I) own')

Remarkably, on the (b)-reading the string *[wo suǒyǒu-de]* is treated as a relative clause modifying the head noun 'book,' the two of which are mediated by the modification marker *de*. This means the use of *suǒyǒu(de)* as a universal quantifier is related to an NP-modification structure. And in fact, we may further conjecture that the 'all' meaning of *suǒyǒu(de)* is indeed derived from a relative construction. Consider another example shown in (460) and its two readings:

(460) Zhe-ge ban suoyou-de xuesheng dou hen-congming.
      this-CL class all-DE   student   DOU very-smart
      a. 'All students of this class are smart.'
      b. 'The students of this class are smart.'/'The students who exist in this class are smart.'

That a locative phrase can be the "subject" of *yǒu* 'have' is evidenced by (461):

(461) Zhe-ge ban you hen-duo   xuesheng.
      this-CL class have very-many student
      'This class has many students.'/'There are many students in this class.'

Here the key idea is that the plural definite *the students of this class* has a meaning very similar to the universal *all students of this class*. It is therefore not implausible to think that *suǒyǒu(de)* 'all' is developed from a relative clause containing the relative clitic *suǒ*, the existential/possessive verb *yǒu* and the modification particle *de*.

There is an obvious morphological connection between *suǒyǒu(de)* 'all' and the conjunction marker *háiyǒu*, which I argued in Chapter 2 is a concord element with a silent Hamblin universal operator: both of them lexically employs the existential verb *yǒu* semantically encode *plurality*.

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[6]For an analysis of the syntax of *suǒ*, see Ting 2003.

I suggest they are related in the sense that (462a) has the same truth-condition as (462b) (in the limited case where Zhangsan, Lisi and Wangwu are the only relevant individuals).

(462)   a.   Wo kanjian-le Zhangsan (haiyou) Lisi haiyou Wangwu.
             I   see-ASP   Zhangsan and   Lisi and   Wangwu
             'I saw Zhangsan, Lisi and Wangwu.'

        b.   Wo kanjian-le suoyou-de ren.
             I   see-ASP   all-DE   person
             'I saw all (of the) people.'

This explains the main difference between *X suǒyǒu(de) Y* being interpreted as "all Y of X" and being interpreted as "the Y of X": only in the former must Y be plural. Put differently, *suǒyǒu(de)* has a relative-like underlying structure but always signals plurality, the reason being that it is also related to a conjunctive structure. Crucially, since neither *háiyǒu* nor a relative clause is a quantificational determiner, it is reasonable to think that *suǒyǒu(de)* should not be, either.

The second observation on the morphology of Mandarin strong QPs is that both *quanbu(de)* 'all' and *dabufen(de)* 'most' contain a size-/quantity-modifier and the nominal head *bu(fen)* 'part,' and that both can take the modification marker *de*, just like *suǒyǒu* can.

(463)   a.   *quan-bu(-de)* = 'all/whole' + 'part' (+ marker of nominal modification)

        b.   *da-bufen(-de)* = 'big' + 'part' (+ marker of nominal modification)

In fact, *quanbu(de)* and *dabufen(de)* are just two elements of a larger paradigm. Notice that *bu(fen)* 'part' can also be preceded by some other numerals or size-adjectives, such as those in (464), each of which looks like a (weak) quantifier.

(464)   a.   *(yi-)bufen(-de)* 'some/partial' = ('one' +) 'part' (+ marker of NP-modification)

        b.   *shao-bufen(-de)* 'small part (of)' = 'few' + 'part' (+ marker of NP-modification)

        c.   *yi-xiao-bufen(-de)* 'small part (of)' = 'one' + 'small' + 'part' (+ marker of NP-modification)

There are also variant quantity expressions that are built from 'few' and 'most,' as shown in (465).

(465)   a.   *shao-shu(-de)* 'minority (of)' = 'few' + 'quantity' (+ marker of NP-modification)

        b.   *duo-shu(-de)* 'majority (of)' = 'many' + 'part' (+ marker of NP-modification)

The anatomy of the QP-like items in from (463) to (465) implies two things. First, *quanbu* 'all' and *dabufen* 'most' are perhaps autonomous NPs, and they become modifiers of the quantity of the modified NP through the particle *de*. The nominal expressions *bu(fen)* 'part' and *shu* 'quantity' can be made analogous to quantity-denoting classifiers or "massifiers" à la Cheng and Sybesma (1998).

Second, the ability to take the particle *de* is indicative of the *modificational* (as opposed to *quantificational*) nature of these expressions. This is somewhat surprising since strong quantifiers typically do not act as modifiers (perhaps except *all*; Brisson 1998). Under the way *quanbu(de)* is decomposed, its meaning is essentially 'all parts (of)' and *dabufen(de)* 'big part (of).'[7]

To summarize, the lexical decomposition of the three strong QPs *suoyou(de)*, *quanbu(de)* and *dabufen(de)* is schematized in (466).

(466) a. *suǒ-yǒu(-de)* = relative clitic + 'have' (+ marker of NP-modification)

b. *quan-bu(-de)* = 'all/whole' + 'part' (+ marker of NP-modification)

c. *da-bufen(-de)* = 'big' + 'part' (+ marker of NP-modification)

5.3.2 The meaning of strong QPs

Earlier we mentioned that Mandarin NumPs as well as strong QPs (disregarding those headed by *mei* 'every' for now) have a peculiar syntactic property: they can appear in postverbal position but require the co-occurrence of *dōu* when occurring preverbally, as in (467a) and (467b).[8] Note moreover that these expressions all sound odd under negation unless with contrastive focus and meta-linguistic negation, as in (467c). In contrast, (467d) is very natural.

(467) a. Lisi mai-le   {suoyou-de / dabufen-de / san-ben} shu.
            Lisi buy-PERF all-DE   most-DE   three-CL book
            'Lisi bought all/most/three books.'

b. {Suoyou-de / Dabufen-de / San-ben} shu   Lisi *(dou) mai-le.
     all-DE   most-DE   three-CL book Lisi   DOU buy-PERF
     'Lisi bought all/most/the three books.'

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[7]One further morphological indication that this might indeed be the case is that *dabufen(de)* 'most' can be modified by *jue* 'absolute' in the form *jue-dabufen(de)* 'the absolute majority (of).'

[8]Keep in mind that some speakers report different judgments on postverbal strong QPs (e.g. Lin 1996 and Cheng 2009), as well as the fact that whether they are interpreted with contrastive focus or not has impact on acceptability.

c. ?? Lisi mei-you mai {suoyou-de / dabufen-de / san-ben} shu.
   Lisi not-have buy all-DE   most-DE   three-CL book
   Intended: 'Lisi didn't buy all/most/three books.'

   (Okay with stress on negation: 'It is not the case that Lisi bought ... ')

d. {Suoyou-de / Dabufen-de / San-ben} shu   Lisi *(dou) mei-you mai.
   all-DE   most-DE   three-CL book Lisi   DOU not-have buy
   'Lisi didn't buy all/most/the three books.'

Such similar behavior of Mandarin NumPs and strong QPs calls for a parallel treatment of these two types of expressions.

I argue that, contra much of the literature, *suǒyǒu(de)* 'all' and *dabufen(de)* 'most' are not quantificational determiners per se. Instead, they denote *sets of individuals* in the same way as *wh*-phrases and NumPs do (see Section 5.2). Unlike NumPs, however, the size of the domain of individuals denoted by *suǒyǒu(de)* or *dabufen(de)* is not lexically specified, but rather context-dependent. In particular, that of *suǒyǒu(de)* refers to the "maximal" number of individuals in a contextually given set, whereas that of *dabufen(de)* refers to a proportion that is considered "large" with respect to another given set.

(468)   a. $[\![\text{san-ben shu}]\!] = \{x \in C : \mathbf{book}(x) \wedge |C| = 3\}$ ('three books')

      b. $[\![\text{sǔoyǒu(de) shu}]\!] = \{x \in C : \mathbf{book}(x) \wedge |C| = \text{MAX}\}$ ('all books')

      c. $[\![\text{dabufen(de) shu}]\!] = \{x \in C : \mathbf{book}(x) \wedge |C| = \text{LARGE}\}$ ('most books')

As (468) suggests, the quantity expressions *suǒyǒu*(de) and *dabufen(de)* have the same status as the numeral in the NumP—they are all *modifiers* of the "size" of the domain of alternatives. The same can be said for *quanbu(de)* 'all,' which is akin to *dabufen(de)* 'most' and differs from the latter only in the quantity expression.

The proposed treatment for *suǒyǒu(de)* is reminiscent of Brisson's (1998) analysis of English *all*. Brisson argues that *all* is a modifier on the size of "covers" in the denotation of a distributivity operator (Schwarzschild 1996). Without getting into the technical details, the basic idea is that while *The boys are swimming* is felicitous in the scenario where 8 out of 10 boys are swimming, *All the boys are swimming* is not. The presence of *all* thus ensures that the number of the boys who are swimming is "maximized," but exactly how many is determined by the context.

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In the case of *suǒyǒu(de) shu* 'all books,' the function of *suǒyǒu(de)* is to "maximize" the domain of individuals denoted by this QP. For instance, if the relevant context contains five books a, b, c, d and e, suoyou*(de) shu* would denote the set in (469a). In the same scenario, *dabufen(de) shu* 'most books' may denote the set of books in (469b), where the number of alternatives must be considered "large" enough compared to the total number of relevant books, i.e. five.

(469) a. $[\![\text{sǔoyǒu(de) shu}]\!] = \{a, b, c, d, e\}$ (‘all books’)

     b. $[\![\text{dabufen(de) shu}]\!] = \{a, b, c, d\}$ (‘most books’)

This uniform alternative-based treatment across the semantics of NumPs and QPs in Mandarin allows us to capture not only the parallel syntax between them but also why their morphology looks so much like that of NP-modifiers, as shown in the previous subsection.

With this setup, the meaning of a sentence containing a strong QP can be derived in a similar manner to a NumP. The meaning of (470a), for example, is analyzed as (470c).

(470) a. Lisi kan-le   suoyou-de shu.
        Lisi read-PERF all-DE   book
        'Lisi read all (the) books.'

     b. $[\![\text{sǔoyǒu(de) shu}]\!] = \{x \in C : \mathbf{book}(x) \wedge |C| = \text{MAX}\}$

     c. $[\![(470a)]\!] = \forall\{\lambda w[\text{Lisi read } \textit{LGB} \text{ in } w], \lambda w[\text{Lisi read } \textit{MP} \text{ in } w], \lambda w[\text{Lisi read } \textit{Aspects} \text{ in } w]\}$

What (470c) says is that every proposition of the form [Lisi read x] is true, where x is filled by the book-alternatives denoted by the strong QP. The set of propositions is obtained by the expansion of the set of book-alternatives, and the Hamblin $\forall$-operator establishes a concord relation with the aspectual marker *-le* (cf. Section 5.2). The number of propositional alternatives collected by $\forall$ will be the maximal one in the relevant context.

Note also that the semantic representation of (470c) is identical to the case where the object phrase in (470a) is substituted by the *háiyǒu*-conjunction with three conjuncts, as shown in (471) (cf. (147c)).

(471) Lisi kan-le   LGB haiyou MP haiyou Aspects.
      Lisi read-PERF   and   and
      'Lisi read *LGB*, *MP* and *Aspects*.'

Under this proposal, the fact that *dōu* becomes obligatory when the QP headed by *suǒyǒu(de)* appears preverbally is due to the set of alternative denoted by the QP being not closed, as in (472a), assuming that the propositional ∀-operator is inserted at the same height as the aspectual *-le* and is therefore lower than the QP. The presence of *dōu* "licenses" the preverbal strong QP in the same way as it does for *wh*-phrases and NumPs, namely by introducing the ∀-operator it agrees with to close the alternatives.

(472) a. Suoyou-de shu   Lisi *(dou) kan-le.
           all-DE   book Lisi   DOU read-ASP
           'Lisi read all (the) books.'

      b. *$\{\lambda w[\text{Lisi read } LGB \text{ in } w], \lambda w[\text{Lisi read } MP \text{ in } w], \lambda w[\text{Lisi read } Aspects \text{ in } w]\}$
          (alternatives not closed if without *dōu*)

This also holds true if the QP is replaced by a *háiyǒu*-conjunction, as in (473). This observation further supports the parallelism between these two expressions.[9]

(473)   LGB haiyou MP haiyou Aspects Lisi *(dou) kan-le.
           and   and   Lisi   DOU read-ASP
       'Lisi read (all of) *LGB*, *MP* and *Aspects*.'

The QP headed by *dabufen(de)* 'most' can be dealt with similarly, since its semantics is entirely on a par with *suǒyǒu(de)*.

The fact that Mandarin strong QPs are morphologically more like modifying expressions and syntactically require the co-occurrence of *dōu* in preverbal position suggests they should not be inherently quantificational. Rather, they introduce a set of alternatives into the semantics, which is why *dōu* has to come into play when these "QPs" occurs above the Hamblin ∀-operator. The most important implication of this view is that Mandarin seems to lack "quantificational determiners" of the English-type entirely.

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[9]However, *dōu* seems to be optional when the *háiyǒu*-conjunction is a subject. I have no explanation.

5.4   Unresolved issues

5.4.1   *Wh*-adverbials and the A-not-A question operator

One important issue that is not touched upon in K&S's work and this dissertation is the nominal-adverbial asymmetry of *wh*-phrases (Huang 1982a, Tsai 1994, among others). The following examples show that interrogative adverbial *wh*-phrases, unlike nominal ones, cannot occur inside an island:

(474)   a.   [$_{NP}$ [$_S$ **Shei** xie] de shu] zui youqu?   (Huang 1982a: 526)
              who write REL book most interesting
              'Books that who wrote are the most interesting?'

        b.   [$_{NP}$ [$_S$ Ta taolun **shenme**] de shu] zui youqu?
              he discuss what   REL book most interesting
              'Books in which he discusses what are most interesting?'

        c.   * [$_{NP}$ [$_S$ Ta **weishenme** xie] de shu] zui youqu?   (Huang 1982a: 527)
              he why   write REL book most interesting
              'Books that he wrote why are are the most interesting?'

        d.   * [$_{NP}$ [$_S$ Ta **zenme** xie] de shu] zui youqu?
              he how   write REL book most interesting
              'Books that he wrote how are most interesting?'

This asymmetry is accounted for in Tsai's (1994) unselective binding approach by analyzing nominal *wh*'s as providing a Heimian variable without any quantificational force. Adverbial *wh*'s, in contrast, are inherently quantificational and subject to covert *wh*-movement/QR. This dichotomy, unfortunately, does not appear to follow straightforwardly from Hamblin semantics or K&S's version of it.

In addition, alternative questions marked by an "A-not-A" operator also observe locality constraints (Huang 1982a, 1991), a behavior that differs from alternative questions marked by *háishì*.

(475)   a.   [Wo qu Meiguo haishi bu qu] bijiao hao?   (Huang 1991: 313–314)
              I   go America or$_Q$ not go more good
              'Is it better that I go to America or that I do not go to America?'

        b.   * [Wo qu-bu-qu Meiguo] bijiao hao?
              I   go-not-go America more good

In Section 2.2 I have argued that the disjuncts connected by *háishì* are propositional alternatives; the sentential subject in (475a) contains a set of two such alternatives, which keep expanding by combining with the main predicate pointwise and form two larger propositions '(that) I go to America is better' and '(that) I don't go to America is better.' In contrast, (475b) does not allow this structure and interpretation. For whatever reason it may be, the Hamblin-style analysis of *háishì*-disjunctions does not explain (475b).

Although I do not have a full account, we may attribute the asymmetry of *wh*-nominals and *wh*-adverbials to the fact that the latter simply cannot introduce alternatives. Note that conceptually there is no obstacle to think of *why*, for instance, as denoting a set of abstract reasons. In fact, the adverb *weishenme* 'why' has a phrasal variant *wei-le shenme* 'for what' that is close to a PP (Tsai 1994) and free of island effects.

(476) Ni zui xihuan [[wei(-le) shenme gongzuo] de ren]?   (Tsai 1994: 119)
       you most like   for   what   work   REL people
       'What is the purpose *x* such that you like best [people [who work for *x*]]?'

What the Hamblin theory of Mandarin *wh*-phrases needs to allow for, then, is the exception of a subset of *wh*-adverbials which do not have Hamblin denotation at all and should instead be analyzed as genuine quantifiers that take scope. Tsai (1994) proposes that these cases are exceptional due to their morphosyntax: they do not contain a nominal variable for unselective binding. Something similar may well be said for the Hamblin semantics approach, e.g. the *wh*-items that contain no nominal component do not denote sets of alternatives. As Kratzer (2005) has argued, these two approaches are in some sense similar to each other as they both capture the "in-situness" of indefinites (at least). However, in Hamblin semantics there is no variable binding, because the indefinite/indeterminate that has a Hamblin denotation may expand to a set of propositions. The concept of "variable" thus becomes inapplicable.

As for A-not-A operators, the Hamblin approach also needs to allow for the existence of certain disjunction markers which do not introduce alternatives. How exactly the LF of an A-not-A alternative question and that of a *háishì*-question should differ is an issue I cannot address here.

5.4.2 Two other types of *dōu*-constructions

There are two types of *dōu*-constructions that I do not discuss in this dissertation. The first type is exemplified below:

(477) a. Ni   dou renshi shei?   (J. Li 1995: 318)
           you DOU know who
           'Who exactly do you know?'

       b. Lao Zhang dou mai-le   shenme?   (X. Li 1997: 142)
           Lao Zhang DOU buy-PERF what
           'What are all the things that Lao Zhang bought?'

Unlike the *dōu*-constructions discussed in Chapter 4 where *dōu* interacts with some expression to its left, in (477a) and (477b) there is nothing interacting with *dōu* at that position. It is clearly not the subjects, because the universal quantification associated with *dōu* in these cases has nothing to do with the subjects per se. Rather, what is quantified over seems to be a set of implicit (stative) events (cf. X. Li 1997). The problem that such examples may pose for my analysis of *dōu* is that there is no way to rephrase them using a *dōu*-unconditional, as the following is ungrammatical:

(478)   * Lao Zhang wulun   na-yi-ci   dou mai-le   shenme?
           Lao Zhang no.matter which-one-time DOU buy-PERF what
           Intended: 'What are all the things that Lao Zhang bought (each time)?'

Further, whether the concept of *free choice*, which I have argued to be central to *dōu*-unconditionals, can be implemented for these *dōu*-sentences is also not quite clear, even though there is an obvious sense of universal quantification being operative.

The second type of *dōu*-construction I have not addressed is demonstrated in the examples below:

(479) a. Dou (yijing) ji   dian ne? Ni   zenme hai mei shui.   (Xiang 2008: 238)
           DOU already what time Q   you how   still not sleep
           'What time is it already? How come you haven't gone to bed yet!'

       b. Mingtian zhe-huir   wo dou zai SHANGHAI le.   (Hole 2004)
           tomorrow this-moment I   DOU at Shanghai   PRT
           'Tomorrow by this time, I will be in SHANGHAI already.'

Like the *dōu*-construction just mentioned, there is no interacting expression that precedes *dōu* in (479a)/(479b). However, in this latter type, *dōu* is frequently associated with a temporal inter-

pretation that may be made explicit by the adverb *yijing* 'already.' In addition, *dōu* does seem to be interacting with some expression but one that *follows* it. In (479a) it is the *wh*-phrase *ji-dian* 'what time' and in (479b) the location *Shanghai*. This pattern is the opposite of what we have seen in Chapter 4 where *dōu* consistently follows the *wh*-phrase/focus. As the syntax and semantics of (479a)/(479b) both diverge from those discussed, I conclude that these *dōu*-sentences must be treated separately.

5.4.3   Other licensing conditions of strong QPs

In Section 4.3.1 we mentioned that strong QPs display a dispreference in object position for many speakers, and Section 5.4.3 indicated that preverbal strong QPs generally require the co-occurrence of *dōu*. This section provides a descriptive survey on the conditions that have been reported to exceptionally license strong QPs (in particular, those headed by *mei* 'every'). It will be shown that (i) postverbal strong QPs may be allowed when contrastive focus or modification is employed, and (ii) there is a variety of conditions under which preverbal strong QPs are possible without *dōu*.

Licensing postverbal 'every'-QPs

In her discussion of (480) below, Cheng (1991: 162) points out that "NPs such as *mei-ge-ren* 'every person' cannot occur in object positions as in [(480)] *unless we give it a contrastive focus*" (emphasis mine).

(480)   * Qiaofong renshi mei-ge   xuesheng.   (Cheng 1991: 162)
         Qiaofong know every-CL student
         Intended: 'Qiaofong knows every student.'

In the footnote right after this illustration, she says ". . . in [(480)], if we read the sentence as follows, then it is much better: it is not the case that Qiaofong only knows some students; instead, he knows *every student*."

Not coincidentally, Dong (2009: 177–178) also makes a similar remark: "In [(481a)], without the accent on *mei*, the sentence is definitely odd, while on the other hand, an accent that indicates contrast can make the sentence quite acceptable, as shown in [(481b)]. The contrastive meaning in

[(481b)] can be paraphrased as: I do not just like this student, or that one, and I do not just like a few of these students, but I like ALL of them."

(481)   a.   * Wo xihuan mei-yi-ge   xuesheng. (without stress on *mei*)   (Dong 2009: 177)
           I   like   every-one-CL student
           Intended: 'I like every student.'

        b.   Wo xihuan MEI-yi-ge   xuesheng.   (bold capitals indicate stress)
           I   like   every-one-CL student
           'I like every student.'

Contrastive focus (on the determiner expression), then, appears to be what makes strong QPs in object position possible, according to Cheng and Dong.

In this connection, notice that there is a similar pattern in NumPs: as mentioned in Section 1.4.3, the NumP in (482) is degraded in object position, but such sentence is fine with a "direct denial" interpretation that requires "heavy contrastive stress" on the negation (Huang 1981).

(482)   ? Ta mei-you xie   yi-ge   zi.   (Huang 1981: 228)
        he not-have write one-CL word
        Intended: 'He did not write a word.'

Contrastive stress/focus, then, can function as a "licensor" of in-situ strong QPs and NumPs embedded under negation. Crucially, contrastivity is a discourse-sensitive phenomenon; for (482) to be felicitous, there must be a preceding proposition like "he wrote one word" for (482) to deny. The negation in this sentence is therefore a meta-linguistic one (i.e. "it is not the case that. . . "), rather than a VP-/IP-level negation. Not incidentally, this is precisely the felicitous interpretation of (481b): it is also a direct denial of a preceding sentence such as "you do not like every student" or "you only like some students."

I believe it is safe to conclude that cases like (481b) and (482) are actually exceptions to the distribution of *every*-QPs and NumPs. They are exceptions in more or less the same way as echo questions in English are, which do not force *wh*-movement but require an aforementioned sentence in the discourse that corresponds to the form of the echo question.

More exceptions have also been observed to this ban on postverbal strong QPs. Cheng (1991) notes that the following examples in (483) are fine without the strong QP moved to a preverbal position. It seems that an *every*-QP can either stay in the relative clause of a complex object as in (483a), be part of a possessor of an object as in (483b), or be an indirect object as in (483c).

(483)   a. Wo xihuan [$_{NP}$ [$_{CP}$ ta piping **mei-ge-zongtong** de wenzhang]].   (Cheng 1991: 166)
        I   like   he criticize every-CL-president DE article
        'I like the article in which he criticizes every president.'

        b. Hufei mai-le   **mei-yi-ben   jinyong de shu**.
            Hufei buy-PERF every-one-CL Jinyong DE book
            'Hufei bought every one of Jinyong's books.'

        c. Wuji gei-le   **mei-ge-ren   yi-ben shu**.
            Wuji give-PERF every-CL-person one-CL book
            'Wuji gave everyone a book.'

The judgment is shared by both Cao (2008) and Dong (2009), both of whom consider similar data such as (484) and (485) acceptable, respectively.

(484)   Wo xihuan ta daoyan de **mei-bu   dianying**.   (Cao 2008: 10)
        I   like   he direct   of every-CL film
        'I liked every film directed by him.'

(485)   Wo xihuan ta xie   de **mei-ben shu**.   (Dong 2009: 178)
        I   like   he write DE every-CL book
        'I like every book he wrote.'

Cao (2008: 10) further remarks that although (484) rescues (352c) by adding modifiers, (484) is "rare in conversations" compared to its counterpart where the object QP is fronted.

    Note finally that an *eveny*-QP is not always good in a double object construction. Huang (1996) deems (486) to be "highly awkward" (cf. (483c)).

(486)   * Women jingli   gei-le   yi-ge daibiao **mei-yi-ge   liwu**.   (Huang 1996: 56)
          we   manager give-PERF one-CL delegate every-one-CL gift
          'Our manager gave a delegate every gift.'

What can be generalized from the observations above seems to be that contrastive focus or modification on strong QPs can improve their grammaticality in object position. It is not clear if all speakers that disallow object strong QPs accept this condition, but the rescue effects by contrastive focus/modification may be important clues to understanding the nature of Mandarin strong QPs. This issue requires further investigation.

Preverbal strong QPs without *dōu*

There are a few contexts in which the generalization that a preverbal strong QP in Mandarin demands the co-occurrence of *dōu* need not hold. First, Huang (1996) notes that *dōu* is optional when there is a variable in the scope of *mei* 'every', which may be lexically introduced by an indefinite, a reflexive or an indefinite adverbial phrase within the VP, as in (487a), (487b) and (487c), respectively.

(487) a. Mei-yi-ge   chushi zuo   yi-ge   cai.   (Huang 1996: 3)
           every-one-CL chef   make one-CL dish
           'Every chef makes a dish.'

       b. Mei-yi-ge   haizi you ziji de chuang.
           every-one-CL child has self DE bed
           'Every child has his own bed.'

       c. Mei-yi-ge   ge-xing   hong-le yi-nian.
           every-one-CL singing-star red-PERF one-year
           'Every singing star was popular for a year.'

This observation is corroborated by Zhang (1997), for whom whether the object is an indefinite or not has impact on the obligatoriness of *dōu* for preverbal *every*-QPs, as shown in (488).

(488) a. Ta gei mei-ge   keren (dou) chang-le   yi-shou ge.   (Zhang 1997: 184)
           he for every-CL guest DOU sing-PERF one-CL song
           'He sang a song for each guest.'

       b. Ta gei mei-ge   keren *(dou) chang-le   nei-shou ge.
           he for every-CL guest   DOU sing-PERF that-CL   song
           'He sang that song for each guest.'

    Second, Zhang (1997) observes that certain universally quantified adverbials do not require *dōu*, as the examples in (489) indicate. Notice that the form of the main VP is not a factor here.

(489) a. Ta mei-tian   (dou) kan nei-zhang zhaopian.   (Zhang 1997: 186)
           he every-day DOU look that-CL   photo
           'He looks at that photo everyday.'

       b. Ta daochu   (dou) chuiniu.
           he everywhere DOU brag
           'He brags everywhere.'

c. Ta dabufen shijian (dou) kan xiaoshuo.   (Zhang 1997: 188)
   he most   time   DOU read novel
   'He reads novels most of the time.'

Chen (2008) also considers *dōu* only optional for preverbal *most*-QPs.

(490)   Dabufen xuesheng (dou) tongguo-le kaoshi.   (Chen 2008: 48)
        most   student   DOU pass-PERF exam
        'Most students have passed the exam.'

The third kind of environment where *dōu* is not required is discussed in Cao (2008), which includes certain modal contexts (cf. Tsai 2001).

(491)   a. Mei-ge   bubing keyi dai   jiu-fen kouliang.   (Cao 2008: 11)
           every-CL soldier able carry nine-CL ration
           'Every soldier is allowed to carry nine rations.'

        b. Mei-zhang chuang gou   san-ge ren   shui.
           every-CL   bed   enough three-CL person sleep
           'Every bed is able to contain three persons.'

Interestingly, when the object phrase contains the reflexive *ziji* 'self', (491a) is degraded, as in (492). This observation (or judgment) contradicts Huang's (1996) claim that *dōu* can be dropped if there is a variable in the scope of an *every*-QP (cf. (487b)). Li (1997: 157–158) also disagrees with Huang (1996) on this data point.

(492)   * Mei-ge   bubing keyi dai ziji-de   jiu-fen kouliang.   (Cao 2008: 11)
          every-CL soldier able carry self-POSS nine-CL ration
          'Every soldier is allowed to carry self's nine rations.'

Finally, Li (1997) presents two other cases where *dōu* is not needed for preverbal *every*-QPs. The first is where the *eveny*-QP is an adverbial right above VP, as in (493a) (cf. (489)); however, if the adverbial is sentential-initial, *dōu* becomes obligatory again, as in (493b). When the adverbial is in a subordinate clause, *dōu* is also required, as in (493c).

(493)   a. Lao Li mei-tian   (dou) chi rou.   (Li 1997: 159)
           Lao Li every-day DOU eat meat
           'Lao Li eats meat every day.'

        b. Mei-tian   Lao Li *(dou) chi rou.
           every-day Lao Li   DOU eat meat
           'Lao Li eats meat every day.'

c. Lao Li mei-tian lai kan wo, *(dou) dai liwu.
   Lao Li every-day come see I   DOU bring gift
   'Every day Lao Li came to see me, he brought some gift.'

The second case is exemplified by sentences such as (494a), which Li attributes to Jim Huang (p.c.). According to Li (1997: 160), the subtle difference between (494a) and (494b) with *dōu* present is that while the former emphasizes the price per house, the latter states that all the houses are sold (or will be sold) at $200,000 each.[10]

(494)   a.   Mei-yi-dong fangzi mai ershi-wan.   (Li 1997: 160)
             every-one-CL house sell twenty-ten.thousand
             'Every house sells at $200,000.'

         b.   Mei-yi-dong fangzi dou mai ershi-wan.
             every-one-CL house DOU sell twenty-ten.thousand
             'Every house sells at $200,000.'

The evidence that suggests that cases like (494a) involve quantification of a different kind than universal quantification using *mei* 'every' is that *mei* is actually optional in (494a) (Li 1997: 160), as shown in (495a). The omission of *mei* does not change the meaning. By contrast, (495b) is simply ungrammatical.[11]

(495)   a.   Yi-dong fangzi mai ershi-wan.   (Li 1997: 161)
              one-CL   house sell twenty-ten.thousand
              'Every house costs $200,000.'

         b.   * Yi-ge ren lai-le.
              one-CL person come-PERF
              Intended: 'Everyone came.'

To summarize, we find that *dōu* is optional in the following environments: (i) sentences where there is a NumP expression, (ii) sentences where an *every*-QP is a post-subject adverbial, (iii) certain modal contexts, and (iv) sentences where *mei* 'every' is construed as 'per' rather than a true universal quantifier. These facts will have to be left as puzzles and challenges to any theory of Mandarin quantification, including the one I am proposing.

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[10]See Luo 2011: 135–136 and Liao 2011: 209–213 for related data and discussions.

[11]Li's (1997: 161) original sentence of (495b) contains *dōu*, which is removed here in order to make (495a) and (495b) more on a par.

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