Free choice, discourse structure, and Mandarin *dou*

Cheng-Yu Edwin Tsai

1. Introduction

The Mandarin preverbal focus/quantificational particle *dou* has been a frequent topic in generative grammar since Huang (1982). It is widely known as a universal/distributive quantifier (Lee 1986, F.-h. Liu 1997, Lin 1998), as in (1a), but it can also function as an *even*-like scalar item (Shyu 1995, Badan 2007, M. Xiang 2008), as in (1b).

(1) a. Tamen dou hua-le yi-zhang hua. ∀/distributive *dou*
they DOU draw-ASP one-CL picture
'They all drew a picture.'

b. (Lian) Aming dou hua-le yi-zhang hua. *even*-like scalar *dou*
LIAN Aming DOU draw-ASP one-CL picture
'Even Aming drew a picture.'

This paper begins with the following near-minimal pair in (2), the contrast of which has not been addressed before. In particular, while both (2a) and (2b) imply free-choiceness, i.e., Aming is allowed to pick A and is also allowed to pick B, only (2a) is a felicitous response to the question (3a), which includes three alternatives, and only (2b) is a felicitous response to (3b), which includes just A and B.

(2) a. Aming keyi tiao A huo B.
Aming can pick A or B
'Aming can pick A or B.' ($\rightsquigarrow \Diamond A \wedge \Diamond B$)

b. A huo B, Aming dou keyi tiao.
A or B Aming DOU can pick
'A or B, Aming can pick (it).' ($\rightsquigarrow \Diamond A \wedge \Diamond B$)

(3) a. 'Among A, B and C, which one can Aming pick?' (Ans: ✓(2a) / #(2b))

b. 'Between A and B, which one can Aming pick?' (Ans: #(2a) / ✓(2b))

Moreover, when a focus adverb such as *zhi* 'only' or *shenzhi* 'even' is inserted to a post-*dou* position, the *dou*-less construction remains grammatical and retains free-choiceness, as in (4a), whereas the *dou*-construction is ruled out, as in (4b).

(4) a. Aming zhi/shenzhi keyi tiao A huo B.
Aming only/even can pick A or B
'Aming can only/even pick A or B.' ($\rightsquigarrow \Diamond A \wedge \Diamond B$)

b. * A huo B, Aming dou zhi/shenzhi keyi tiao.
A or B Aming DOU only/even can pick
Intended: Same as (4a)

In what follows, I will briefly review two recent semantic accounts (M. Liu 2017, 2021, 2023 and Y. Xiang 2020), both of which attempt to unify ∀/distributive and scalar *dou*, and then introduce a new proposal according to which *dou* is a particle that signals a particular discourse structure and a particular way discourse questions are answered (in the sense of Roberts 2012).

* Cheng-Yu Edwin Tsai, University of Macau, cytsai@um.edu.mo. I would like to thank Dorothy Ahn, Ka-Fai Yip, and the participants at WCCFL 41 for their feedback. This project was supported by the Start-up Research Grant of the University of Macau (grant number SRG2023-00009-FAH).

2. Two recent accounts

2.1. Dou *as* even*: M. Liu (2017, 2021, 2023)*

In a series of papers, M. Liu (2017, 2021, 2023) argue that *dou*'s semantics is on a par with English *even*, defined as in (5): *Dou* simply asserts its prejacent, while presupposing that its prejacent is the least likely proposition among relevant alternatives.

(5) $[\![dou_C]\!] = \lambda p \lambda w : \forall q \in C[\neg(p = q) \rightarrow p \prec_{likely} q].p(w) = 1$ (M. Liu 2017: 68)

Liu shows that the ∀-use of *dou* follows from this treatment. The key is the following: If p entails q, p is at least as unlikely as q. Thus, if *dou*'s prejacent entails all alternative propositions, *dou*'s presupposition can be met. Assuming Aming, Amei and Akiu are the relevant individuals, the proposition (6a), where an independent Dist(ributive) operator (Link 1983) occurs at the VP-level and the associate of *dou* is the maximal sum-based individual "Aming ⊕ Amei ⊕ Akiu", is less likely than all alternative propositions in (6b). This explains the distributive effect of *dou*: *Dou* itself is not Dist, but only when the *dou*-clause applies to a maximal sum (in the presence of Dist) can *dou*'s presupposition be satisfied. At the same time, *dou*'s *even*-reading is trivialized by Dist, because the scalar presupposition is automatically satisfied by the maximal sum.

(6) a. 'Aming, Amei and Akiu each drew a picture.'
b. { 'Aming drew a picture', 'Amei drew a picture', 'Aming and Amei each drew a picture', 'Akiu drew a picture', 'Aming and Akiu each drew a picture', … }

This *dou*-as-*even* account not only unifies the two major uses of *dou* but also provides insight for the discourse conditions of *dou* (including the pattern in (3); see M. Liu 2021, 2023 for details). However, it assumes sentential scope for *dou* and does not explain why ∀ and scalar *dou*-constructions involve syntactic movement to escape *dou*'s scope (observable when *dou*'s associate is an object phrase); hence, it remains a puzzle why (4b) cannot be interpreted in the same way as (4a) (i.e., why the moved disjunction cannot be interpreted in-situ, in the scope of *dou*). The account also seems to wrongly predict that, when responding to the question (7a), the *dou*-sentence (7c) will block (7b) per *Maximize Presupposition* (Heim 1991). Assuming that the subject 'they' (or null *pro*) is anaphpric to 'the students in your office' in (7a), (7b) amounts to stating that every student has left (note that 'leave' is an inherently distributive predicate); since this satisfies *dou*'s presupposition, (7c) must be chosen over (7b). But both (7b) and (7c) are felicitous responses. What's more, (7d) can serve as an informative, non-redundant confirmation question following (7b), which indicates that (7b) and (7c) are not even truth-conditionally equivalent.

(7) a. Have the students in your office left?
b. Tamen/*pro* likai le.
they/*pro* leave ASP
'They/*pro* have left.'
c. Tamen/*pro* dou likai le.
they/*pro* DOU leave ASP
'They/*pro* have all left.'
d. Tamen/*pro* dou likai le ma?
they/*pro* DOU leave ASP SFP
'Have they/*pro* all left?'

2.2. Dou *as a special (anti-exhaustive) exhaustifier: Y. Xiang (2020)*

A different direction is pursued by Y. Xiang (2020), which defines *dou* as in (8). In words, *dou* presupposes that there is at least one sub-alternative of the prejacent p (where a sub-alternative is a weaker alternative of p in terms of logical strength, likelihood, or some contextually determined measurement), and asserts that the exhaustification of each sub-alternative is false. (*O* is the covert *only*; Chierchia et al. 2012).

(8) $[\![dou_C]\!] = \lambda p \lambda w : \exists q \in \textsc{Sub}(p, C).p(w) = 1 \wedge \forall q \in \textsc{Sub}(p, C)[O_C(q)(w) = 0]$
(Y. Xiang 2020: 183)

Unlike Liu's approach, which identifies *dou* as *even* and derives *dou*'s ∀-force/distributivity as a by-product, Xiang's treatment goes the other way around by taking *dou* to ∀-quantify over relevant alternatives, thus directly capturing the intuition about *dou*'s ∀/distributive use, while accounting for the scalar use of *dou* through weakening O to a likelihood-based exhaustifier JUST, defined in (9).

(9) $\textsc{just}_C(q) = \lambda w : q(w) = 1 \wedge \forall r \in C[r(w) = 1 \rightarrow q \leq_{likely} r]$ (Y. Xiang 2020: 200)

The special-exhaustifier account elegantly deals with not only the distributive and scalar uses of *dou*, but also FC cases like (2b), which is not discussed in M. Liu (2017, 2021, 2023). Nevertheless, this account assumes reconstruction for *dou*'s associate (at least on the scalar use), thus also unable to explain why the disjunction in (4b) cannot simply be reconstructed to the postverbal object position. Note also that applying (8) to (2b) yields the result that Aming is allowed to not only pick A and is allowed to not only pick B, which seems to be exactly the same FC inference of (2a). But (2a) and (2b) are subtly different in the way mentioned earlier; *dou*'s presence has effect on the exhaustiveness of the disjunction (i.e., whether the disjuncts exhaust the space of alternatives).

3. Proposal

3.1. Overt movement and contrastive topic in Mandarin

The kind of overt syntactic movement associated with *dou* isn't unique to it in Mandarin. It has been noticed that movement to a preverbal position yields a *contrastive topic* (CT) construction (Paul 2005, Badan 2007, Badan & Gobbo 2010, Shyu 2014), e.g., (10b) as an answer to (10a). If the second conjunct has the same polarity as the first, as in (10c), or if the second conjunct is removed, as in (10d), infelicity results. Note that the fronted objects *A* and *B* are necessarily stressed/accented.

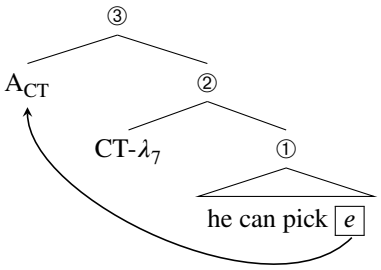
(10) a. What can Aming pick?
b. A, ta keyi tiao, B, ta bu neng tiao.
A he can pick B he not can pick
'A, he can pick; B, he cannot pick.'
c. A, ta keyi tiao, B, ta #(ye) keyi tiao.
A he can pick B he also can pick
'A, he can pick; B, he can #(also) pick.'
d. # A, ta keyi tiao.
A he can pick
#'A, he can pick.' (not complete)

The above pattern is very much reminiscent of English CT, except that in English CT is typically marked with a fall-rise pitch accent, not syntactic movement. I propose to derive the meaning of the first conjunct in (10b) using Büring's (2003) framework along with a version of Constant's (2014) CT-raising analysis. The gist is that the moved object *A* is CT-marked, and CT-marking yields a CT-value, namely the set of subquestions in (11) as part of a strategy to resolve the larger question under discussion (QUD; Roberts 2012) in (10a).

(11) {Can he pick A?, Can he pick B?} CT-value of 'A_{CT}, he can pick'

The simple tree diagram in (12a) below illustrates how the CT-value can be achieved compositionally. In particular, CT-movement is triggered by an IP-level functional head, called CT-operator or "CT-λ" in Constant 2014: 94, which creates a set containing a function from an individual to a singleton set of propositions. The CT-marked object *A* activates a set of alternatives $\{A, B\}$, and this set combines in a pointwise manner with the denotation of ②, yielding (12d). I adopt Biezma & Rawlins's (2012) view that a polar question p? denotes a singleton proposition $\{p\}$ (rather than a set of propositions with opposite polarity, $\{p, \neg p\}$), hence the set of polar questions in (12d). This derives the CT-value of 'A_{CT}, he can pick'. Finally, the ordinary semantic value of this CT-marked proposition is simply (12e).

(12) a.



b. $[\![①]\!]$ = He can pick $g(7)$

c. $[\![②]\!] = \{\lambda x.\{\text{He can pick } x\}\}$

d. $[\![③]\!]^{ct} = \{\{\text{He can pick A}\}, \{\text{He can pick B}\}\} = \{\text{Can he pick A?}, \text{Can he pick B?}\}$

e. $[\![③]\!]^{o}$ = He can pick A

In the analysis just sketched, the role of CT-λ is critical: It is very much akin to the English interrogative C^0 in being a functional head, triggering phrasal movement, and possessing a particular semantics to generate a question meaning of some sort (e.g., Karttunen 1977), except that CT-λ is designed to combine with a set of alternatives through pointwise functional application to output a *set* of polar questions.

Given the CT-value (12d), the infelicity/incompleteness of (10d) falls out naturally as its ordinary semantic value ('He can pick A') (positively) answers only one subquestion ('Can he pick A?') in its CT-value, leaving one subquestion unaddressed. Note, however, that the infelicity of (10c) in the absence of the additive particle *ye* 'also' remains a puzzle, because the subquestions in (12d) are both answered by the two conjuncts in (10c). I content that CT-constructions like (10d) are actually "CT+F" constructions, where F-marking may fall on some overt constituent or an implicit polarity projection. The pattern exhibited by the examples in (10) is parallel to that in (13), where the subject in each clause is CT-marked and the object in each clause is F-marked. The additive particle 'also' is obligatory if F-marked constituents are the same across the conjuncts, as in (13b), but not if otherwise, as in (13c).

(13) a. Who bought what?

b. Aming_{CT} mai-le $[\text{liang-jian waitao}]_F$, Amei_{CT} #(ye) mai-le $[\text{liang-jian waitao}]_F$.
Aming buy-ASP two-CL coat Amei also buy-ASP two-CL coat
'Aming bought two coats, and Amei #(also) bought two coats.'

c. Aming_{CT} mai-le $[\text{liang-jian waitao}]_F$, Amei_{CT} mai-le $[\text{liang-shuang wazi}]_F$.
Aming buy-ASP two-CL coat Amei buy-ASP two-pair sock
'Aming bought two coats, and Amei bought two pairs of socks.'

What these examples show is that both CT-marking and F-marking impose exhaustivity (van Rooij & Schulz 2017), e.g., the first clause in (13b) implies that *only* Aming bought two coats, and Aming bought *only* two coats, if the additive 'also' is absent. This is why (13c) is felicitous but (13b) is not: Only the former observes the exhaustivity requirements of CT- and F-marking. Now, suppose a function head encoding polarity (e.g., Laka 1990) can be F-marked. Such an F-marked clause would convey that it represents the only proposition among a set of alternatives that has the F-marked polarity, i.e., the exhaustivity on its polar value. This seems a plausible explanation for the behavior of (10d), which conveys that he can pick *only* A (see (10b)) and that it is the *only* proposition with positive polarity, unless the additive 'also' is inserted (see (10c)). Since the exhaustivity induced by CT-marking can be "canceled" by the additive particle *ye*, the former should be treated as an implicature (following Büring 2003 and van Rooij & Schulz 2017).

In short, Mandarin CT-constructions such as (10b) have a fronted constituent that is CT-marked, in addition to some other (implicit) constituent that is F-marked. CT-marking activates a set of subquestions as well as the exhaustivity on the CT, while F-marking also imposes exhaustivity on the F-marked expression. This analysis explains the whole range of facts in (10) and (13).

3.2. From contrastive topic to the universal/distributive dou

I now argue that *dou* (on the ∀ and scalar uses) is closely related to the CT-operator in Mandarin CT-constructions. Like CT-λ, *dou* appears at the IP-level, triggers overt phrasal movement to its left, and is associated with a set of subquestions (though not exactly identical to Büring's CT-value; see below). But unlike CT-constructions, *dou*-sentences do not express exhaustivity on the CT; for reasons to be made clear, *dou* requires that the associated CT expression be "anti-exhaustive". In terms of Roberts's (2012) discourse structure, *dou* signals that a QUD has at least two subquestions (varying in the reference of the CT) and that the answers to the subquestions have the same polarity.

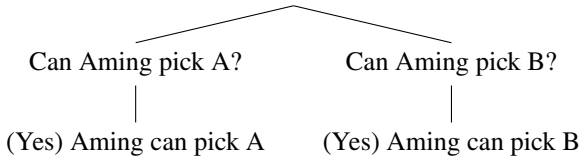
Starting with the ∀/distributive *dou* (hereafter $dou_{\forall}$) in (2b), repeated below, the basic idea is that the fronted disjunction *A huo B* is CT-marked and triggers a set of subquestions of some relevant QUD. Diverging from Büring (2003), however, $dou_{\forall}$'s CT-value includes subquestions that involve only the disjuncts, namely those in (14) (which happens to be identical to the CT-value of (10d)). I take this property to be a presupposition of $dou_{\forall}$. For clarity, I will label the subquestions in (11) as "CT-value^{D}", where the superscript ^{D} stands for "(sub)domain" in Chierchia's (2013) account of FC disjunction, to indicate that the CT-value triggered by $dou_{\forall}$ contains only "(sub)domain subquestions".

(2b) [A huo B]$_{CT}$, Aming dou$_{\forall}$ keyi tiao.
A or B Aming DOU can pick
'A or B, Aming can pick (it).'

(14) {Can Aming pick A?, Can Aming pick B?} CT-value^{D} of (2b)

In addition, $dou_{\forall}$ introduces the ∀-quantification that every subquestion is positively answered. That is, $dou_{\forall}$ indicates a ∀-quantifier operating on discourse subquestions which demands that they all have a positive answer. This is what "anti-exhaustive" above means: For each subquestion Q, it is not the case that only Q is positively answered. Whereas the exhaustivity of CT-marking in Mandarin CT-constructions is pragmatic in nature, the "anti-exhaustivity" of $dou_{\forall}$ is grammaticalized into the semantics of the *dou*-construction. The discourse structure of (2b) can be visualized through the Büring-style d-tree in (15).

(15) d-tree of (2b)



Technically, the ∀-operator under discussion needs to scope over the disjunction, the level where a set of subquestions are formed, in order to yield the desired ∀-quantification of subquestions. This means $dou_{\forall}$, which appears below the disjunction, cannot be the ∀-operator itself; rather, the latter must be independently introduced into the *dou*-construction, perhaps through an agreement relation with $dou_{\forall}$. A candidate of such a ∀-operator is the covert counterpart of the negative predicate *bulun* 'no matter/regardless of' (Cheng & Huang 1996, Lin 1997), which can optionally precede the disjunction, as shown in (16).

(16) Bulun A huo B, Aming dou$_{\forall}$ keyi tiao.
no.matter A or B Aming DOU can pick
'Regardless of A or B, Aming can pick (it).'

Intuitively, *bulun* conveys that the *dou*-clause holds true of each alternative, and this cannot be changed by the identity of choice of the alternative. In the current treatment, this translates to the following: *Bulun* collects a set of subquestions and asserts that the positive-answerhood of every subquestion does not depend on the choice of the subquestion (i.e., "regardless of the subquestion one asks, the answer is yes"). Under this perspective, $dou_{\forall}$ is nothing more than a special variant of CT-λ which morphologically reflects agreement with the subquestion-sensitive ∀-operator *bulun*; $dou_{\forall}$'s core semantics is to simply generate a CT-value^{D} for *bulun* (overt or covert) to operate on.

One supporting observation for the claim that (2b) expresses the discourse structure in (15) is that when each subquestion is explicitly answered positively, $dou_{\forall}$ is not licensed in a follow-up confirmation

question. The reason is simple: Since $dou_{\forall}$ already indicates that every subquestion has a positive response, there is nothing to confirm.

(17) a. Aming, Amei he Akiu hui shuo Riyu ma?
Aming Amei and Akiu can speak Japanese SFP
'Can Aming, Amei and Akiu speak Japanese?'

b. Aming hui shuo Riyu, Amei hui shuo Riyu, Akiu ye hui shuo Riyu.
Aming can speak Japanese Amei can speak Japanese Akiu also can speak Japanese
'Aming can speak Japanese, Amei can speak Japanese, and Akiu can also speak Japanese.'

c. # Tamen $dou_{\forall}$ hui ma?
they DOU can SFP
'Can they all (speak Japanese)?'

On the other hand, if the subquestions are not explicitly addressed individually, $dou_{\forall}$ can be licensed, since its function of ∀-quantifying over subquestions remains informative.

(18) a. 'Can Aming, Amei and Akiu speak Japanese?' (same as (17a))

b. 'Yes, they can (speak Japanese).'

c. Tamen $dou_{\forall}$ hui ma?
they DOU can SFP
'Can they all (speak Japanese)?'

This is the right point to return to the data in Section 1 and see how the proposal handles the differences. First, (2b) ('A or B, Aming can pick (it)') cannot felicitously respond to (3a) because $dou_{\forall}$ requires that every subquestion of a relevant QUD be positively answered. Since (3a) contains a third salient alternative, *C*, (2b) is infelicitous. As for the infelicity of (2a) in the context of (3b), the reason may be that (2a) obligatorily merges an exhaustifier above the disjunction, which must exclude some alternative. By contrast, (2b) is a perfect response to (3b) because *A* and *B* exhaust the space of alternatives supplied by the QUD, satisfying $dou_{\forall}$'s requirement. Overall, the proposed analysis provides a rationale for how the two FC constructions differ: Whereas the free-choiceness of (2a) is standardly derived via exhaustification of modal propositions (Fox 2007, Chierchia 2013), that of (2b) results from ∀-quantification over discourse subquestions.

Second, the ungrammaticality of (4b) follows straightforwardly from the proposal. With 'only' and 'even', the *dou*-sentence is associated with the CT-value^{D} in (19a) and (19b), respectively. Clearly, given the focus meanings of these adverbs, the subquestions in (19a) and (19b) cannot be all positively answered. This is why (4b) is illicit.

(19) a. {Can Aming only pick A?, Can Aming only pick B?} CT-value^{D} of (4b) with 'only'

b. {Can Aming even pick A?, Can Aming even pick B?} CT-value^{D} of (4b) with 'even'

3.3. Extension to scalar dou

It has been claimed that the scalar *dou* (hereafter dou_{σ}) is a ∀-quantifier, just like $dou_{\forall}$, but one whose domain of quantification consists of members ordered by likelihood scales (Shyu 1995). This idea is arguably the predecessor of Y. Xiang (2020), who posits the likelihood-based exhaustifier in (9) in place of *O* for the semantics of dou_{σ}. I, however, maintain that dou_{σ} signals a special strategy of inquiry where a QUD is completely resolved by the positive answer of just one subquestion, and such a strategy is possible only if the unique subquestion is one that is less likely to have a positive answer than all other subquestions. Hence, dou_{σ} is also "anti-exhaustive" in the sense that no subquestion is exclusively answered positively. In each of (20)–(22) below, the dou_{σ}-sentence in (b) completely resolves the QUD in (a), and thus the follow-up question in (c) becomes infelicitous. By contrast, the dou_{σ}-less sentence (23b) does not impose anti-exhaustivity in the same way, thus making room for (23c).

(20) a. Who can speak Japanese?

b. (LIAN) Aming DOU_{σ} can. $\rightsquigarrow$ everyone else can

c. #Can Amei speak Japanese?

(21) a. Can Amei speak Japanese?

b. (LIAN) Aming DOU$_\sigma$ can. $\rightsquigarrow$ everyone else can

c. #Can Amei speak Japanese?

(22) a. Can the students speak Japanese?

b. (LIAN) Aming DOU$_\sigma$ can. $\rightsquigarrow$ everyone else can

c. #Can Amei speak Japanese?

(23) a. Who can speak Japanese?

b. Aming can.

c. Can Amei speak Japanese?

Specifically, the d-tree of (24a) is (24b), where the QUD dominates only one subquestion and gets resolved by the positive response of the latter. This strategy is successful only if the presupposition in (24c) is met. In effect, both *dou*$_\forall$ and *dou*$_\sigma$ serve to exclude the possibility that some subquestion is answered negatively—this is where they are unified in the present approach—but they do so in different manners: *Dou*$_\forall$ assigns a positive response to every subquestion, whereas *dou*$_\sigma$ assigns a positive response to the unique "least-likely-yes" subquestion.

(24) a. (Lian) Aming$_{\text{CT}}$ dou$_\sigma$ hui shuo Riyu.
LIAN Aming DOU can speak Japanese
'Even Aming can speak Japanese.'

b. Who can speak Japanese? — d-tree of (24a)
|
Can Aming speak Japanese?
|
(Yes) Aming can speak Japanese

c. Presupposition: 'Can Aming speak Japanese?' is less likely to be positively answered than all subquestions varying in the denotation of the CT 'Aming'.

One may wonder whether the proposal is just another way of paraphrasing previous unifying accounts, since the presupposition (24c) comes quite close to that of *even*. In fact, the optional element *lian* is a good candidate for a variant of *even* that operates on not propositions but subquestions: *Lian* only occurs with *dou*$_\sigma$, and when it does, the *dou*-construction is unambiguously interpreted with the sort of d-tree in (24b) but not (15). I suggest, as I did in Section 3.2 for the relation between *dou*$_\forall$ and *bulun*, that *dou*$_\sigma$ is an allomorph of CT-λ which morphologically agrees with *lian*, an *even*-like scalar operator over subquestions. In other words, the difference between *dou*$_\forall$ and *dou*$_\sigma$ boils down to the difference between *bulun* and *lian*. While I have to leave the formal definitions of *bulun* and *lian* for another occasion, it is clear that the two elements are not semantically equivalent. As Sybesma (1996) observes, there are indeed a few differences between *dou*$_\forall$ and *dou*$_\sigma$, including their stress patterns and whether they can alternate with the additive *ye* 'also'. The current proposal that both *dou*$_\forall$ and *dou*$_\sigma$ serve to exclude negatively answered subquestions of a QUD while achieving this effect through different strategies of inquiry provides a possibility of unification that tolerates certain variation, and moreover makes a stronger connection to Mandarin CT-constructions to treat all these phenomena as interrelated from the perspective of discourse structure.

4. Conclusion

This paper argues that *dou* signals a subquestion-based discourse strategy and a particular constraint on the answers to the subquestions—they are all positively answered. This is the major innovation of this study: *Dou* introduces quantification over subquestions, not propositions, because it is a morphological variant of the clausal CT-operator that is independently needed for Mandarin CT-constructions. While certain details outlined in this paper share the insights from M. Liu (2017), Y. Xiang (2020) and other

works, the present analysis derives the semantics of *dou* based on that of CTs, and thus has the potential to bring CTs and *dou* into a larger picture (along with the optionally co-occurring elements *bulun*/*lian*), without needing to stipulate a special semantics for *dou* which misses its connection to CT-constructions.

References

Badan, Linda. 2007. *High and low periphery: a comparison between Italian and Chinese*. Padua: Università degli Studi di Padova dissertation.

Badan, Linda & Francesca Del Gobbo. 2010. On the syntax of topic and focus in Chinese. In Paola Benincà & Nicola Munaro (eds.), *Mapping the left periphery*, 63–90. Oxford University Press.

Biezma, María & Kyle Rawlins. 2012. Responding to alternative and polar questions. *Linguistics and Philosophy* 35(5). 361–406.

Büring, Daniel. 2003. On d-trees, beans, and B-accents. *Linguistics and Philosophy* 26(5). 511–545.

Cheng, Lisa L.-S. & C.-T. James Huang. 1996. Two types of donkey sentences. *Natural Language Semantics* 4(2). 121–163.

Chierchia, Gennaro. 2013. *Logic in grammar: polarity, free choice, and intervention*. Oxford: Oxford University Press.

Chierchia, Gennaro, Danny Fox & Benjamin Spector. 2012. Scalar implicature as a grammatical phenomenon. In C. Maienborng, K. von Heusinger & P. Portner (eds.), *Semantics: an international handbook of natural language meaning, Vol 3*, 2297–2331. Berlin: Mouton de Gruyter.

Constant, Noah. 2014. *Contrastive topic: meanings and realizations*. Amherst: University of Massachusetts dissertation.

Fox, Danny. 2007. Free choice and the theory of scalar implicatures. In Uli Sauerland & Penka Stateva (eds.), *Presupposition and implicature in compositional semantics*, 71–112. New York: Palgrave Macmillan.

Heim, Irene. 1991. Artikel und Definitheit. In A. von Stechow & D. Wunderlich (eds.), *Semantik: ein internationales handbuch der zeitgenössischen forschung*, 487–535. Berlin: de Gruyter.

Huang, C.-T. James. 1982. *Logical relations in Chinese and the theory of grammar*. Cambridge: MIT dissertation.

Karttunen, Lauri. 1977. Syntax and semantics of questions. *Linguistics and Philosophy* 1(1). 3–44.

Laka, Miren Itziar. 1990. *Negation in syntax: on the nature of functional categories and projections*. Cambridge: MIT dissertation.

Lee, Thomas H.-T. 1986. *Studies on quantification in Chinese*. Los Angeles: University of California dissertation.

Lin, Jo-Wang. 1997. On *wh … dou* construction. *Tsing Hua Journal of Chinese Studies* 27(1). 51–81.

Lin, Jo-Wang. 1998. Distributivity in Chinese and its implications. *Natural Language Semantics* 6(2). 201–243.

Link, Godehard. 1983. The logical analysis of plurals and mass terms: a lattice-theoretical approach. In C. Schwarze, R. Bauerle & A. von Stechow (eds.), *Meaning, use, and the interpretation of language*, 302–323. deGruyter.

Liu, Feng-hsi. 1997. *Scope and specificity*. Amsterdam: John Benjamins.

Liu, Mingming. 2017. Varieties of alternatives: Mandarin focus particles. *Linguistics and Philosophy* 40(1). 61–95.

Liu, Mingming. 2021. A pragmatic explanation of the *mei-dou* co-occurrence in Mandarin. *Journal of East Asian Linguistics* 30(3). 277–316.

Liu, Mingming. 2023. Cong "dou" de yujing shiyong tiaojian kan shenme shi zongkuo [On the felicity conditions of *dou*]. *Dangdai Yuyanxue [Contemporary Linguistics]* 25(1). 29–55.

Paul, Waltraud. 2005. Low IP and left periphery in Mandarin Chinese. *Recherches Linguistiques de Vincennes* 33. 111–134.

Roberts, Craige. 2012. Information structure in discourse: towards an integrated formal theory of pragmatics. *Semantics and Pragmatics* 5(6). 1–69.

van Rooij, Robert & Katrin Schulz. 2017. Topic, focus, and exhaustive interpretation. In Ferenc Kiefer Chungmin Lee & Manfred Krifka (eds.), *Contrastiveness in information structure, alternatives and scalar implicatures*. Springer.

Shyu, Shu-ing. 1995. *The syntax of focus and topic in Mandarin Chinese*. Los Angeles: University of Southern California dissertation.

Shyu, Shu-ing. 2014. Topic and focus. In C.-T. James Huang, Y.-H. Audrey Li & Andrew Simpson (eds.), *The handbook of Chinese linguistics*, 100–125. New Jersey: John Wiley Sons.

Sybesma, Rint. 1996. Review of *The syntax of focus and topic in Mandarin Chinese*. *Glot International* 2(4). 13–14.

Xiang, Ming. 2008. Plurality, maximality and scalar inferences: a case study of Mandarin *dou*. *Journal of East Asian Linguistics* 17(3). 227–245.

Xiang, Yimei. 2020. Function alternations of the Mandarin particle *dou*: distributor, free choice licensor, and 'even'. *Journal of Semantics* 37. 171–217.