

Chinese NPs: Quantification & Distributivity

Rong Yang
Rutgers University

In this paper, I discuss some characteristics of Chinese quantified NPs that are distinct from those of standard quantifiers (Section 1), and argue for an analysis of these NPs as generalized quantifiers built up over plural individuals (Section 2). In effect, I am suggesting a compositional approach with quantifiers contributing quantificational force and distributive operators introducing distributivity. This proposal is, in many ways, similar to Lin's (1998) account, but the crucial difference has to do with the status of the classifier. While Lin does not make any reference to the classifier, its semantic contribution is essential for me. This will become obvious when I discuss two major consequences of the proposed approach, one having to do with distributivity in Chinese universal quantifiers (Section 3) and the other with the semantics of definite NPs (Section 4).

1. The Problem

To begin with, let's consider two rather puzzling facts concerning the distribution and scope interaction of Chinese quantified NPs. First, Chinese quantified NPs in preverbal position have to occur with *dou* 'all'¹, as shown in (1).

- (1) Mei-ge / Dabufen-de / Suoyou²-de xueshen *(dou) lai-le.
every-CL most-DE all-DE student all come-LE
'Every / Most / All student(s) came.'

This is surprising, because standard quantifiers such as English quantified NPs can and must occur without *all*, as shown in (2).

- (2) Every / Most / All student(s) (*all) came.

Dou 'all' can also occur optionally with plural definites, and semantically functions as an overt distributive (D-)operator (cf. Liu 1990, Lin 1998). This is illustrated by the contrast in (3a-b), where a distributive reading on the subject NP is possible only when *dou* also occurs in the sentence.

- (3) a. Yuehan he Mali mai-le yi-ben shu. *distributive reading impossible*
John and Mary buy-LE 1-CL book
'John and Mary (together) bought a book.'

- b. Yuehan he Mali dou mai-le yi-ben shu. *distributive reading possible*
 John and Mary all buy-LE 1-CL book
 ‘John and Mary (each) bought a book.’

Such a D-operator is generally assumed to be covertly available in an English sentence involving plural subjects such as (4). So the sentence is ambiguous between a collective and a distributive reading.

- (4) John and Mary wrote a book. *collective/distributive*

Another fact about Chinese quantified NPs has to do with their *scope interaction* with other quantifiers. At first glance, examples (5a-b) seem to suggest that the scope of a quantifier is determined by its own surface position, as the universal appears to scope higher when *mei* ‘every’ occurs before the existential NP in (5a), and vice versa in (5b).

- (5) a. Mei-yi-ben shu dou you yi-ge ren mai-le³. [mei dou one] $\forall > \exists$
 every-1-CL book all have 1-CL man buy-LE
 ‘Every book is such that someone bought it.’
- b. You yi-ge ren mei-yi-ben shu dou mai-le. [one mei dou] $\exists > \forall$
 have 1-CL man every-1-CL book all buy-LE
 ‘Someone is such that he bought every book.’

However, the sentence in (6) makes it clear that what really fixes the scope of the quantifier is the D-operator *dou*, not the quantifier itself, because the universal force has a lower scope than the existential NP, even though *mei* appears before the existential NP.

- (6) Mei-yi-ben shu you yi-ge ren dou mai-le. [mei one dou] $\exists > \forall$
 every-1-CL book have 1-CL man all buy-LE
 ‘Someone is such that he bought every book.’

Given the above characteristics of Chinese quantified NPs, it has been suggested in recent literature that these NPs are not quantificational by nature, but have gained their apparent quantificational force from peripheral operators like *dou*. Lee (1986), for example, proposes a variable-based approach along the lines of Lewis (1975). I have provided a brief discussion on Lee’s approach as well as some of its problems in Appendix 1.

The above discussion raises many questions about Chinese quantifiers, but in Section 2 I would like to address the following three: 1) Why are Chinese quantifiers compatible with *dou*, while English quantifiers are not with *all*? 2) Where does the difference in quantificational force between Chinese quantified NPs come from? And 3) how is scope fixed by *dou*?

2. The Analysis

As shown in (7a-c) below, I propose that all Chinese quantifiers should be analyzed as generalized quantifiers built up from plural individuals, whose internal compositions vary from one to another.

- (7) a. $\| mei \text{ 'every'} \| = \lambda P \lambda Q [\exists X (\forall x (x \in X \leftrightarrow P(x)) \wedge Q(X))]$
 b. $\| suoyou \text{ 'all'} \| = \lambda P \lambda Q [\exists X (\forall Y (Y \subseteq X \leftrightarrow P(Y)) \wedge Q(X))]$
 c. $\| dabufen \text{ 'most'} \|$ (Following Yabushita 1989, Lin 1998)
 $= \lambda P \lambda Q [\exists Z \exists X (\forall Y (Y \subseteq X \leftrightarrow P(Y)) \wedge Z \subseteq X \wedge Q(Z) \wedge |Z| > |X| - |Z|)]$

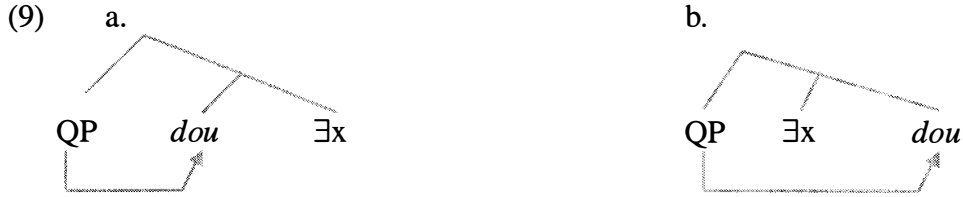
While I assume the semantics in (7c) for *dabufen* ‘most’, following a suggestion by Lin (1998) (who, in turn, adopts a proposal by Yabushita 1989), my proposal departs from that of Lin’s (1998) mostly in the analysis of the universal quantifier *mei* ‘every’. Whereas I analyze *mei* as a generalized quantifier, parallel to other Chinese quantifiers, Lin treats *mei*-NPs semantically on a par with definite plurals and attributes their universal force solely to *dou*. See Yang (to appear) for a more detailed discussion on Lin’s approach to *mei*⁴.

Given the above semantics, let’s consider the three questions raised earlier. First, Chinese quantified NPs are all built up from plural individuals, and thus can combine with *dou* the same way English plural NPs combine with *all*. By contrast, English quantifiers are inherently distributive, and do not make available any plural individual for *all* to be associated with.

Secondly, although Chinese quantified NPs introduce plural individuals, the internal composition of these plural individuals differ from each other, giving rise to the variation in their quantificational force. For example, while *dabufen* introduces a majority sum individual with a certain property, *mei* introduces the greatest of such sums. As a result, the quantificational force we get for *dabufen* is “most”, and for *mei* is universal.

As for the third question, recall our earlier examples (repeated as (8a-b) below). Schematically they are represented in (9a-b), where the scope of a quantifier is always determined by *dou*, regardless of the surface position of the quantifier itself. Let’s take *mei* as an example to see how this may be derived under the current analysis.

- (8) a. Mei-yi-ben shu dou you yi-ge ren mai-le. [mei dou one] $\forall > \exists$
 every-1-CL book all have 1-CL man buy-LE
 ‘Every book is such that someone bought it.’
 b. Mei-yi-ben shu you yi-ge ren dou mai-le. [mei one dou] $\exists > \forall$
 every-1-CL book have 1-CL man all buy-LE
 ‘Someone is such that he bought every book.’

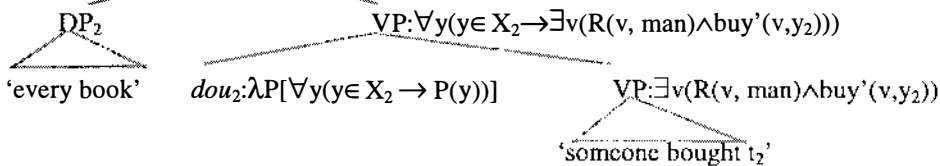


First of all, let us flesh out the meaning of the full quantified NP. Following the well-known approach to Chinese common nouns as kinds and classifiers as individuating instantiations of kinds (cf. Krifka 1995, Chierchia 1998), the complement of *mei*, i.e. *yi-ben shu* ‘1-CL book’, denotes the set of individuals that are instantiations of the book-kind. When this combines with *mei*, we get (10), which denotes the set of properties of the greatest sum of books. Note that in the formula, OU stands for ‘Object-Unit’ and R for ‘the realization function’ (along the lines of Krifka 1995).

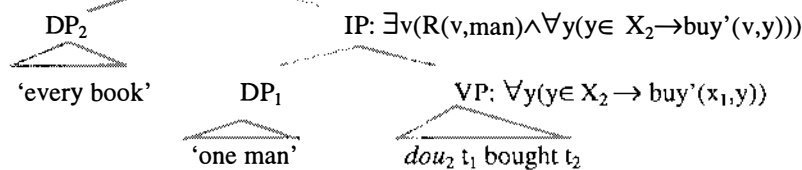
$$(10) \quad \llbracket mei-yi-ben \ shu \rrbracket = \lambda Q[\exists X(\forall x(x \in X \leftrightarrow (R(x, \text{book}) \wedge OU(x)=1)) \wedge Q(X))] \\ \text{every-1-CL book}$$

The final meanings for (8a-b) can then be derived as in (11a-b), respectively.

$$(11) \quad a. \quad IP: \exists X(\forall x(x \in X \leftrightarrow (R(x, \text{book}) \wedge OU(x)=1)) \wedge \forall y(y \in X \rightarrow \exists v(R(v, \text{man}) \wedge \text{buy}'(v, y))))$$



$$b. \quad IP: \exists X(\forall x(x \in X \leftrightarrow (R(x, \text{book}) \wedge OU(x)=1)) \wedge \exists v(R(v, \text{man}) \wedge \forall y(y \in X \rightarrow \text{buy}'(v, y))))$$



(12) The meanings for (8a-b):

$$a. \quad \exists X(\forall x(x \in X \leftrightarrow (R(x, \text{book}) \wedge OU(x)=1)) \wedge \forall y(y \in X \rightarrow \exists v(R(v, \text{man}) \wedge \text{buy}'(v, y)))) \quad (\exists max > \forall book > \exists man) \\ b. \quad \exists X(\forall x(x \in X \leftrightarrow (R(x, \text{book}) \wedge OU(x)=1)) \wedge \exists v(R(v, \text{man}) \wedge \forall y(y \in X \rightarrow \text{buy}'(v, y)))) \quad (\exists max > \exists man > \forall book)$$

As shown by the formulas in (12a-b), both sentences in (8) introduce a maximal sum of books *X*, such that every book in that sum is bought by the same person in (8b), but by someone possibly different in (8a). The scope effects are, therefore, due to the fact that while *mei* functions as a quantifier contributing the

universal force, distributivity is introduced by *dou*. Although the final meaning of a Chinese *mei*-sentence appears similar to that of an English *every*-sentence, it is built up rather differently.

Note that for the derivation in (11b) above, I have to modify the standard meaning for the D-operator *dou* so that it contains a free variable X_2 , as shown in (13) below. And to make sure that the free variable gets bound only by its appropriate antecedent, we can appeal to coindexation, which triggers λ -abstraction over the free variable in *dou*. One advantage of this semantics is that it allows for the derivation of non-local associations between *dou* and its antecedent. As shown in (11b), ‘every book’ and *dou* are separated by another intervening NP. So the free variable X_2 in *dou* should be bound after the subject trace x_1 gets bound.

- (13) $\|dou\| = \lambda P[\forall y(y \in X_2 \rightarrow P(y))]$
 cf. $D \Rightarrow \lambda P \lambda X[\forall y(y \in X \rightarrow P(y))]$ (cf. Link 1987)

Now, it should be fairly clear how this approach can be extended to other quantifiers in Chinese. Under the assumption that all quantified NPs introduce a plural individual, and distributivity comes in only when they combine with *dou*, it is predicted that all Chinese quantifiers should behave identically in terms of scope interactions. This is indeed true, as shown in (14a-b) and (15a-b).

- (14) a. Dabufen-de shu dou you yi-ge ren mai-le. $most > \exists$
 most-DE book all have 1-CL man buy-LE
 ‘Most books are such that for each one of them, someone bought it.’
- b. Dabufen-de shu you yi-ge ren dou mai-le. $\exists > most$
 most-DE book have 1-CL man all buy-LE
 ‘Someone is such that he bought most books.’
- (15) a. Suoyou-de shu dou you yi-ge ren mai-le. $all > \exists$
 all-DE book all have 1-CL man buy-LE
 ‘All books are such that for each one of them, someone bought it.’
- b. Suoyou-de shu you yi-ge ren dou mai-le. $\exists > all$
 all-DE book have 1-CL man all buy-LE
 ‘Someone is such that he bought all (the) books.’

In sum, I have shown that the scope interaction facts do not entail lack of quantificational force in Chinese quantifiers, but follow from the suggested relation between these quantifiers and the D-operator *dou*. The answers I have given here to the earlier three questions would also be available, modulo differences in detail, in Lin’s (1998) approach to some quantifiers such as *dabufen* ‘most’. In the following two sections, however, we will look at some facts where our approaches make different predictions.

3. Contrast in Distributivity: *Mei* vs. *Suoyou*

Recall that under the current analysis, the two universal quantifiers *mei* ‘every’ and *suoyou* ‘all’ are defined very similarly, as shown in (7a-b) (repeated below). This is fine as far as their scope interactions are concerned, because we have seen that the patterns are very similar in the last section.

- (7) a. $\| mei \text{ ‘every’} \| = \lambda P \lambda Q [\exists X (\forall x (x \in X \leftrightarrow P(x)) \wedge Q(X))]$
 b. $\| suoyou \text{ ‘all’} \| = \lambda P \lambda Q [\exists X (\forall Y (Y \subseteq X \leftrightarrow P(Y)) \wedge Q(X))]$

However, the two quantifiers differ in distributivity. As shown in (16a-b), in a context where *suoyou* allows for both distributive and collective readings, *mei* forces distributive readings.

- (16) a. Mei-yi-ge ren dou kang-zhe yi-ge xiangzi. *distributive only*
 every-1-CL man all carry-ZHE 1-CL box
 ‘Every person was carrying a box.’
 b. Suoyou-de ren dou kang-zhe yi-ge xiangzi. *distributive/collective*
 all-DE man all carry-ZHE 1-CL box
 i. ‘All the people were carrying a box (together).’
 ii. ‘All the people were carrying a box (each).’

I’d like to suggest that the difference comes not from any real semantic difference between the two quantifiers, but from the fact that while *suoyou*, like *dabufen* ‘most’, only combines with a bare noun, *mei* combines with a full-fledged NP that contains a numeral-classifier complex. And since the numeral in the complex is always understood to be *yi* ‘one’, whether it is overt or covert, this forces the strict distributivity in the final meaning of the *mei*-NP. Let’s consider this idea in some detail.

First, in order to derive the ambiguity in (16b), I follow Lin (1998) to assume a generalized D-operator meaning for *dou*, that is, a D-operator sensitive to contextual covers in the sense of Schwarzschild (1996), except that the variable X_2 is still left free, as shown in (17).

- (17) $\| dou \| = \lambda P [\forall y ((y \in \|cov\| \wedge \|cov\| \subseteq X_2) \rightarrow P(y))]$ (cf. Lin 1998)

Then the final meanings for (16a-b) can be derived as in (18a-b).

- (18) a. $\exists X (\forall x (x \in X \leftrightarrow (R(x, \text{man}) \wedge OU(x)=1))$
 $\wedge \forall u ((u \in \|cov\| \wedge \|cov\| \subseteq X) \rightarrow \exists v (R(v, \text{box}) \wedge \text{carry}'(u, v))))$
 b. $\exists X (\forall Y (Y \subseteq X \leftrightarrow R(Y, \text{man}))$
 $\wedge \forall u ((u \in \|cov\| \wedge \|cov\| \subseteq X) \rightarrow \exists v (R(v, \text{box}) \wedge \text{carry}'(u, v))))$

Let's now consider what readings may be available for each of the sentences, depending on the value of the covers that are made salient by the context. As shown in (18b), the *suoyou*-sentence is predicted to be ambiguous, because in virtue of mentioning the bare noun *ren* 'man', its context can make salient not only the cover containing individual men, but also a single-cell cover containing all the individuals as a group. Therefore, in a situation like (19), where a, b, c are the only three men in the context, the sentence will allow for (at least) Cov-1 and Cov-2 to be picked up by the D-operator *dou*. Given the right discourse, the mixed Cov-3 is also a potentially possible cover to be made salient.

- (19) Cov-1 = {{a}, {b}, {c}}
 Cov-2 = {{a b c}}
 Cov-3 = {{a b}, {c}}...
 in a situation where $\parallel ren \text{ 'man' } \parallel = \{a, b, c\}$.

In the *mei*-sentence, however, an additional numeral-classifier complex is mentioned, whose semantic function is to individuate the level of quantification and in a way constrain the choice of covers. As the *yi*-classifier complex in the *mei*-NP makes salient only one-membered sets, a cover like Cov-2 or Cov-3 that has multiple cardinality could not also be salient. As a result, any reading that is not strictly distributive is impossible.

The proposed analysis, therefore, shows compositionally how the above contrast between a *mei*-sentence and a *suoyou*-sentence can be derived. A puzzle still remains, though, as for why, among the quantifiers discussed so far, *mei* should be the only one that takes a numeral-classifier complex. I do not know the exact reason for this, but I suspect that it is correlated with another fact. Namely, *mei* is the only quantifier that is strictly distributive in the context of *dou*. If the two facts are indeed correlated, it should lend some support to the current hypothesis that the strict distributivity in *mei*-NPs has to do with the semantic function of the numeral-classifier complex.

4. Individual-Level and Set-Level Classifiers

Another interesting consequence of the current account concerns the distinction between individual-level and set-level classifiers. As shown by the contrast between (20a) and (20b), which differ only by the choice of classifier in the *mei*-NP, it is clear that the classifier plays a crucial role in dictating the level of distribution by *dou*.

- (20) a. Mei-yi-tao shu dou you yi-ge ren mai-le.
 every-1-CL^{set} book all have 1-CL man buy-LE
 'For every set of books, there is someone who bought that set.'

- b. Mei-yi-ben shu dou you yi-ge ren mai-le.
 every-1-CL^{copy} book all have 1-CL man buy-LE
 ‘For every book, there is someone who bought that book.’

So (20a) can be uttered felicitously in a situation where there are many *sets* of books and for each set there is someone who bought that set. But in (20b), we are talking about *individual* books being bought by someone possibly different. As shown in the formulas in (21), the current account derives this contrast, by allowing the classifier to contribute to the meaning of the universal NP. Here, SU stands for ‘Set-Unit’ (extending the notion of “object unit” in Krifka 1995).

- (21) a. $\exists X(\forall x(x \in X \leftrightarrow (R(x, \text{book}) \wedge \text{SU}(x)=1))$
 $\wedge \forall u(u \in X \rightarrow \exists v(R(v, \text{man}) \wedge \text{buy}'(v, u))))$
- b. $\exists X(\forall x(x \in X \leftrightarrow (R(x, \text{book}) \wedge \text{OU}(x)=1))$
 $\wedge \forall u[u \in X \rightarrow \exists v(R(v, \text{man}) \wedge \text{buy}'(v, u))])$

Recall that a crucial difference between Lin’s (1998) approach and mine has to do with the status of the classifier. It should be evident by now that the numeral-classifier complex makes significant semantic contributions, both in dictating the level of distribution here and in constraining the choice of Cov earlier (in Section 3) and. This could not be handled by Lin’s approach.

So far the universal quantifier *mei* seems rather like a definite determiner. But in point of fact there is a crucial meaning difference between the two. When they are combined with a set-level classifier, it becomes obvious that the two determiners give rise to distinct interpretations with respect to distributivity, as shown in (22a). This sentence minimally differs from (20a) in the choice of determiner, a demonstrative in (22a) as opposed to *mei* in (20a).

- (22) a. Nei-yi-tao shu dou you yi-ge ren mai-le.
 that-1-CL^{set} book all have 1-CL man buy-LE
 ‘For every book in that set, there is someone who bought that book.’
- b. $\forall u(u \in \iota X.(R(X, \text{book}) \wedge \text{SU}(X)=1) \rightarrow \exists v(R(v, \text{man}) \wedge \text{buy}'(v, u)))$

Take a situation with ten books, with each half making up a set. (20a) requires that for each set x , x be bought by someone, while (22a) says that one of the sets is the unique set of books that is salient in the context, and each book in that set is bought by someone. Intuitively, we want the universal *mei* to have the effect of blocking the D-operator *dou* from looking into the unit denoted by the classifier, while the demonstrative *nei* seems completely transparent in that capacity. This is predicted by the current analysis.

5. Occurrence of Chinese Quantified NPs with D-Operators

Finally, let's consider the requirement that Chinese quantified NPs occur with a D-operator. We have seen earlier that when a quantifier occurs preverbally, *dou* is required (cf. (23b)). But as shown in (23a), there is no such requirement when a quantifier occurs postverbally⁵. In this section, I will suggest an account that derives the distribution of Chinese quantifiers at both preverbal and postverbal positions.

- (23) a. Wo renshi (zheli) mei-ge / dabufen-de / suoyou-de xueshen.
 I know here every-CL most-DE all-DE student
 'I know every / most / all student(s) (here).'
- cf. b. Mei-ge / Dabufen-de / Suoyou-de xueshen *(dou) lai-le.
 every-CL most-DE all-DE student all come-LE
 'Every / Most / All student(s) came.'

5.1. D-on-V & D-on-VP

First, Lasersohn (1998) suggests that a D-operator on plural arguments can occur at both the VP- and V-level. As shown below, (24a) is ambiguous because the covert D-on-VP distributes the VP *built a raft* over the plural subject *the boys*, and (24b) is ambiguous because the covert D-on-V distributes the verb *kiss* over the object *the three girls*.

- (24) a. The boys built a raft. *Covert D-on-VP*
 i. The boys built a raft together.
 ii. The boys each built a raft.
- b. That boy kissed the three girls. *Covert D-on-V*
 i. That boy kissed the three girls together as a group.
 ii. That boy kissed the three girls individually.

Recall our earlier discussion on (3a-b) (repeated below) that Chinese *dou* is an overt D-operator, without which distributive readings are impossible.

- (3) a. Yuehan he Mali mai-le yi-ben shu. *distributive reading impossible*
 John and Mary buy-LE 1-CL book
 'John and Mary (together) bought a book.'
- b. Yuehan he Mali dou mai-le yi-ben shu. *distributive reading possible*
 John and Mary all buy-LE 1-CL book
 'John and Mary (each) bought a book.'

So the contrast shows that Chinese lacks a covert D-operator on the VP level, and *dou* is needed in order to express distributivity on plural subjects.

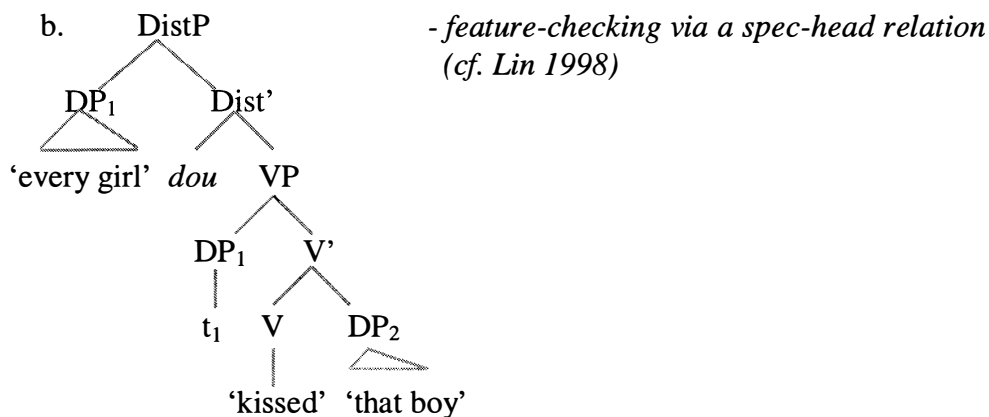
What about the D-operator on the V-level, then? We need to examine sentences involving plural objects. As shown in (25), a sentence involving a plural object is ambiguous between a collective and a distributive reading.

- (25) Zhuotian ta baifang-le Yuehan he Mali. *collective/distributive*
 yesterday he visit-LE John and Mary
 i. 'Yesterday he visited John and Mary together.'
 ii. 'Yesterday he visited John and Mary individually.'

Therefore, it seems that while *dou* functions as an overt D on the VP level, Chinese also has a covert D-operator operating on the V-level.

Let's now consider the question why these D-operators are required by a quantified NP, beginning with the preverbal case, as illustrated in (26a-b).

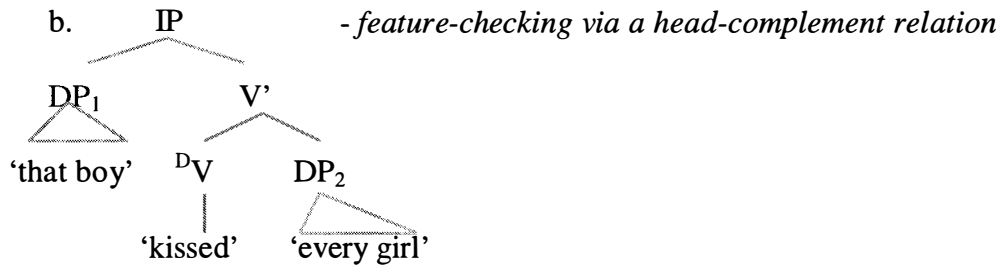
- (26) a. Mei-yi-ge nuhai dou qin-guo nei-ge nanhai. *Overt D-on-VP*
 every-1-CL girl all kiss-GUO that-CL boy
 'Every girl kissed that boy.'



According to Lin (1998), the quantified NP has a distributive-quantificational feature that needs to be checked. As *dou* projects a DistP (following Beghelli & Stowell's 1997 proposal), it can thus check the feature of the quantifier via a spec-head relation.

But, what about the postverbal case? As discussed earlier, Chinese quantified NPs also occur in postverbal position, and they do so without *dou*. I assume that this fact has to do with the covert D-operator on the V-level. Just as *dou* can license a preverbal quantifier via feature checking, the covert D-on-V can license a postverbal quantifier by checking its feature within a head-complement configuration, as illustrated in (27a-b).

- (27) a. Nei-ge nanhai qin-guo mei-yi-ge nuhai. *Covert D-on-V*
 that-CL boy kiss-GUO every-1-CL girl
 'That boy kissed every girl.'



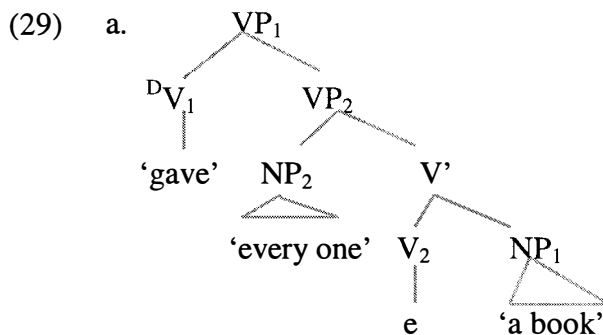
As for the semantic interpretation, postverbally quantifiers work in exactly the same way as they do preverbally, in that they contribute various quantificational force, with the D-operator contributing distributivity⁶.

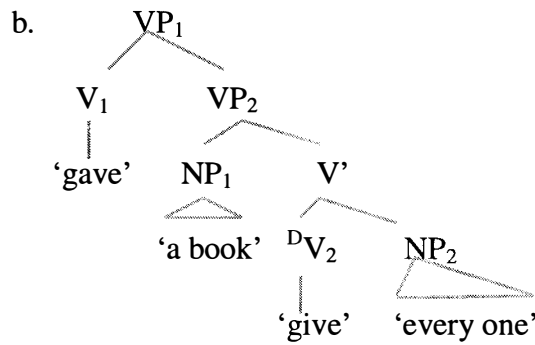
5.2. Evidence from Scope Interactions between Postverbal Quantifiers

Witness the following scope relations between the universal *mei*-NP and an existential NP in a double object sentence and a dative sentence:

- (28) a. Wo song-le mei-ge ren yi-ben shu. [mei one] $\forall > \exists$
 I give-LE every-CL man 1-CL book
 'Every one is such that I gave him/her a book.'
- b. Wo song-le yi-ben shu gei mei-ge ren. [one mei] $\exists > \forall$
 I give-LE 1-CL book give every-CL man
 'A book is such that I gave (a copy of) it to every one.'

The initial observation is that at a postverbal position, the scope of a quantified NP matches its own surface position. This is somewhat surprising, considering that at a preverbal position, the scope of a quantifier is determined by *dou*, not by itself. However, if we examine the syntactic structures for (28a-b) given in (29a-b), it should become clear that this is exactly what the suggested account predicts.





In (29a-b), I assume a VP-shell structure for the Chinese double object and dative construction, mainly because Chinese sentences are generally assumed to be subject to a so-called “Postverbal Constraint” (cf. (30)), prohibiting the occurrence of more than one syntactic constituent after each verb. The VP-shell structure correctly satisfies this constraint.

- (30) The “Postverbal Constraint”: *(cf. Huang 1982, Li 1990, etc.)*
 At most one constituent may follow a verb in Chinese.

The “Postverbal Constraint” and the VP-shell structures have a particularly interesting consequence for our case. This is because in a sentence with two postverbal quantifiers, each quantifier will necessarily occur *locally* to a verb, and also to the covert D-operator on that verb, as shown in the tree structures in (29). As a result, in the postverbal context, the position of a quantifier is indistinguishable from that of a D-operator, which determines the scope. Therefore, it is predicted that the scope of a quantifier in the postverbal context should match its own position.

In sum, to express distributivity, Chinese uses an overt D-operator on the VP-level, but a covert D-operator on the V-level. This hypothesis is, of course, not the first instance of a language using zero-vs.-overt morphology to mark two opposite grammatical or semantic features. It is a crosslinguistic fact that a language may use zero morphology for some default value of a feature, and special morphology for others. Just as English uses zero-vs.-special morphology to mark the present-vs.-past tense, and to mark Agr.O-vs.-Agr.S as suggested in some syntactic framework, I am suggesting that Chinese happens to use zero morphology for the D-on-V, and overt morphology for the D-on-VP.

6. Conclusion

This paper argues for a generalized quantifier approach to Chinese quantified NPs, in which quantifiers contribute quantificational force and distributive operators introduce distributivity. In doing so, it brings to light both the key differences between Chinese and English quantifiers, and the semantic

contributions of classifiers within a classifier language. It also presents a plausible explanation for the strict distributivity in the universal quantifier *mei* ‘every’, and the asymmetric distribution of quantified NPs between preverbal and postverbal contexts.

Appendix

1. Lee (1986): A Variable-Based Approach

Wh-words in Chinese are known to have two possible uses: as *interrogatives* or *indefinites*, depending on the context in which they occur (cf. Lee 1986, Li 1992, etc.). While Wh-indefinites are polarity-sensitive items that need to be licensed by an operator like *dou*, Wh-interrogatives occur in the absence of any licensing operator, as shown by the contrast in (1):

- (1) a. Shei lai-le ? (as an interrogative)
 who come-LE
 ‘Who came?’
- b. Shei dou lai-le. (as an indefinite)
 who all come-LE
 ‘Everybody came.’

Interestingly, Chinese quantified NPs display a similar asymmetry between their preverbal and postverbal uses. As shown in (2a-b), while a universal NP at a preverbal position needs to be licensed by *dou*, the same NP at a postverbal position seems to occur without such a requirement.

- (2) a. Mei-ge ren *(dou) lai-le. (preverbal QPs)
 every-CL man all come-LE
 ‘Every man came.’
- b. Wo jiandao-le mei-ge ren. (postverbal QPs)
 I see-LE every-CL man
 ‘I saw everybody.’

By drawing on the above parallel with Wh-indefinites, Lee (1986) proposes that Chinese quantified NPs should be analyzed as *variables* that need to be bound by operators such as *dou*, on a par with Wh-indefinites. According to Lee, just like a conditional operator, *dou* functions as “a genuine natural language equivalent of an unselective quantifier in the sense of Lewis (1973)” (pp.29), and hence can bind Wh-phrases, quantified NPs, plural NPs, or time/event adverbials within its domain, regardless of their syntactic categories.

2. Problems with Lee's Approach

While Lee's account provides a possible explanation for the puzzling facts about Chinese quantified NPs discussed in Section 1 of this paper, it also runs into a number of problems, particularly in its treating quantified NPs and Wh-indefinites semantically on a par. First and foremost, such a non-quantificational approach overlooks the important fact that unlike *true* variables such as Wh-indefinites, which invariably get a universal construal in the context of *dou* (cf. (3a)), quantified NPs, in combination with *dou*, give rise to a variety of quantificational force (cf. (3b)).

- (3) a. In the case of Wh-indefinites:
- | | | | |
|----------------------|--------------------|----|--|
| <i>shei</i> 'who' | + <i>dou</i> 'all' | => | Quantificational force \forall 'anybody' |
| <i>shenme</i> 'what' | + <i>dou</i> 'all' | => | Quantificational force: \forall 'anything' |
| <i>heshi</i> 'when' | + <i>dou</i> 'all' | => | Quantificational force: \forall 'anytime' |
- b. In the case of quantified NPs:
- | | | | |
|-----------------------|--------------------|----|--------------------------------------|
| <i>mei</i> 'every' | + <i>dou</i> 'all' | => | Quantificational force: every |
| <i>dabufen</i> 'most' | + <i>dou</i> 'all' | => | Quantificational force: most |
| <i>henduo</i> 'many' | + <i>dou</i> 'all' | => | Quantificational force: many |
| <i>suoyou</i> 'all' | + <i>dou</i> 'all' | => | Quantificational force: all |

In order to derive the quantificational variability illustrated in (3b), a non-quantificational approach would have to posit a large-scale ambiguity on *dou*. A more plausible alternative, however, is to assume that the quantified NPs each contribute a quantificational force of their own.

Secondly, as shown in (4-5) below, Wh-indefinites can be bound by other unselective operators such as a conditional operator, a modal operator, a yes-no or Wh-question operator, while quantified NPs can only be licensed by *dou*, contrary to what is expected under an analysis of these NPs as pure variables.

- (4) a. Ruguo shei zhao wo, qing gaosu wo yixia.
if who look.for me please tell me once
'If anybody looks for me, please let me know.'
- b. Keneng shei zhao-guo ni.
maybe who look.for-GUO you
'Perhaps somebody looked for you.'
- c. Shei kanjian ni le ma?
who see you LE Q
'Did anybody see you?'

- (5) a. Ruguo mei-ge ren *(dou) zhao wo, qing gaosu wo yixia.
if every man all look.for me please tell me once
'If everybody looks for me, please let me know.'
- b. Keneng mei-ge ren *(dou) zhao-guo ni.
maybe every-CL man all look.for-GUO you
'Perhaps everybody looked for you.'
- c. Mei-ge ren *(dou) kanjian ni le ma?
every-CL man all see you LE Q
'Did everybody see you?'

Thirdly, the variable binding relation between Wh-indefinites and an operator like *dou* is subject to a more strict set of *locality* conditions than the licensing of quantified NPs by *dou* (see Cheng 1995 for more details). As illustrated in (6-7) below, intervening NPs are allowed in the latter case, but not in the former⁶.

- (6) a. You yi-ge ren shenme-shu dou kan. [one what *dou*]
have one-CL man what-book all read
'There is a man who reads any book.'
- b. Shenme-shu you yi-ge ren dou kan. [what one *dou*]
what-book have one-CL man all read
'What are the books that a man read them all?'
* 'There is a man who reads any book.'
- (7) a. You yi-ge ren mei-ben shu dou kan. [one every *dou*]
have one-CL man every-CL book all read
'There is a man who reads every book.'
- b. Mei-ben shu you yi-ge ren dou kan. [every one *dou*]
every-CL book have one-CL man all read
'There is a man who reads every book.'

In sum, a variable-based approach as proposed in Lee (1986) does not account for many facts about Chinese quantified NPs, including their quantificational variability, exclusive dependency on *dou* and their long-distance association with *dou*. All these argue against treating quantified NPs as pure variables, on a par with Wh-indefinites.

Endnotes

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1. Not all quantifiers require the occurrence of *dou*. One such exception is *henduo* ‘many’, which could be due to its lexical ambiguity between a cardinal and a quantificational reading.

2. Though both are glossed as ‘all’, *suoyou* is a determiner while *dou* is an adverb.

3. Examples (5a-b) are adapted from Lin’s (1998, pp.239) original examples (69a-b). I omitted the negation for the sake of simplicity.

4. According to Lin (1998), (a) is another potentially possible meaning for the universal quantifier, parallel to the semantics of *dabufen* ‘most’ (in (b)):

(a) $\parallel mei\text{-}yi\text{-}ge \text{ ‘every-1-CL’ } \parallel = \lambda P\lambda Q\exists X[P(X)\&\forall Y(P(Y)\rightarrow Y\subseteq X)\&Q(X)]$

Cf.(b) $\parallel dabufen \parallel = \lambda P\lambda Q\exists Z\exists X[P(X)\&\forall Y(P(Y)\rightarrow Y\subseteq X)\&Z\subseteq X\&Q(Z)\&|Z|>|X|-|Z|]$

But Lin rejects this alternative for the following reason. As shown in (b), this approach is based on the assumption that the common noun combined with *dabufen* is a pluralized predicate. The same cannot be true for *mei*, because *mei* always combines with a singular common noun in the *mei*-‘one’-CL-N combination. It should be noted, however, that my definition of *mei* (in (c) below) does not have this problem, because it requires that *mei* combine with a singular property P that holds of every atomic part of a maximal sum X: (c) $\parallel mei \text{ ‘every’ } \parallel = \lambda P\lambda Q[\exists X(\forall x(x\in X\leftrightarrow P(x)) \wedge Q(X))]$.

5. Lin (1998) does not consider postverbal occurrence of Chinese quantifiers, due to the marginality of sentences such as (a).

(a) ??Wo kan-le mei-yi-ben shu. - Example (29a), Lin (pp.217)

I read-LE every-1-CL book

‘I read every book.’

However, I agree with Lee (1986) that Chinese sentences containing postverbal quantifiers are grammatical and will thus include these sentences in my account of Chinese quantifiers.

6. The suggested account also makes some predictions about Chinese sentences containing multiple plural NPs. For example, it seems that English sentences containing a plural NP at both preverbal and postverbal positions can be many-way ambiguous depending on whether or not each of the plural NPs is interpreted distributively, as shown in (a). However, similar Chinese sentences without *dou* are predicted to lack distributivity on the subject, but not on the object. This prediction seems to be borne out by (b).

(a) The three boys bought two cars.

(b) Nei-san-ge nanhai mai-le liang-bu che.

that-3-CL boy buy-LE 2-CL car

‘The three boys together bought two cars.’

*‘The three boys each bought two cars.’

I’m grateful to Uli Sauerland for a question he raised at the conference concerning this point.

7. The association between quantified NPs and *dou* is clause-bound (cf. (a)), as noted by Lee (1986).

- (a) *Mei-ge ren shuo ta dou lai-le.
 every-CL man say he all come-LE
 'Every one said that he came.'

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