

**The Semantics of Mandarin *Dou*:  
Lin (1998) and Chen (2005, 2008)**

**1. Some Basic Facts About *Dou* in Mandarin (Lin 1998, Chen 2008)**

At first glance, the word *dou* in Mandarin seems rather similar to floated “each” in English, in that it forces distributive readings of plural subjects.

**(1) *Dou* and Distributivity (Lin 1998)**

- a. Tamen            mai-le            yi-bu            chezi.  
they            buy-ASP            one-CL            car  
*They bought a car.*            (Collective Reading Only)
- b. Tamen            **dou**    mai-le            yi-bu            chezi.  
they            DOU    buy-ASP            one-CL            car  
*They each bought a car.*            (Distributive Reading Only)

**(2) Side-Question**

- Lin (1998) reports that sentence (1a) in Mandarin only allows a collective reading.
- However, distributive readings of unmarked sentences are very ‘difficult’ even in languages that allow them (e.g. English).
- It’s not clear that Lin (1998) attempted contexts that draw such readings in English:

Example:    Context:    We’re having a potluck. John brought cookies. Mary brought a cake.  
                  Question:    Who brought a dessert?  
                  Answer:     John and Mary brought a dessert.

*However, there are some striking ways in which “dou” differs from “each” and “all” ... Each of these raise difficult puzzles about what “dou” means, exactly...*

**(3) Difference 1: Interaction with Quantificational DPs (Chen 2008)**

Strikingly, “dou” is possible – even *obligatory* – with (seemingly) quantificational DPs .

- a. Dabufen            yinger **\*(dou)**            zhang de            hen    xiang  
most            baby    DOU            grow    DE            very    alike  
*Most babies (\*each / \*all) look alike.*
- b. Meige haizi    **\*(dou)**            hua-le            yifu    hua  
every child    DOU            draw-ASP            one    picture  
*Every child (\*each / \*all) drew a picture.*

(4) **Difference 2: Licensing by Focus (Chen 2008)**

Strikingly, “dou” is possible with singular DPs, if that DP is focused. The resulting sentence seems to have the scalar presuppositions of “even”.

- a. [ John ]<sub>F</sub>      **dou**    hua-le      yifu    hua  
    John          DOU   draw-ASP    one    picture  
    *Even JOHN drew a picture.*  
    *(John drew a picture, and he’s the least likely to do so)*

Note: There seems to be a consensus that the “dou” in (4a) is a different, homophonous item from the ones in (1) and (3). (Chen 2008)

(5) **Difference 3: Preposed Direct Objects as Restrictors (Lin 1998)**

In order to obtain an *object* distributive reading with “dou”, (i) the “dou” must remain pre-verbal, and (ii) the direct object undergoes fronting to a preverbal position.

- a. \* Wo    kan-guo      **dou**    naxie    shu  
    I    read-ASP      DOU    those    books
- b. \* Wo    **dou**    kan-guo      naxie    shu  
    I    DOU    read-ASP      those    books
- c. Naxie    shu      wo      **dou**    kan-guo.  
    those    books    I      DOU    read-ASP  
    *I read all / each of those books.*      (*cf. Those books, I (\*all / \*each) read.*)

(6) **Difference 4: Possibility with Singular DPs (Lin 1998)**

Strikingly, “dou” is possible with singular DPs that are either (i) complex objects, or (ii) mass nouns.

- a. Naben    shu      wo      **dou**    kan-wan-le.  
    that    book    I      DOU    read-finish-ASP  
    *I finished reading (\*each / all) of that book.*
- b. Na      peng                  shui      **dou**    liu-guan-le  
    that    container      water    DOU    run-out-ASP  
    *That container ran out of water.*

Note: While this is unlike English “each”, this is a property of English “all.” However, English “all” doesn’t force distributive readings as in (1).

Note: No one seems to have anything interesting to say about cases like (6a,b). Thus, like (2a), we’ll leave them aside in our discussion.

(7) **Difference 5: Interactions with Free Choice Items (Chen 2008)**

“Dou” co-occurs (obligatorily?) with Free Choice Items.

- a. Renheren **dou** dei zunshou jiaotongguize.  
any person DOU must obey traffic rules.  
*Anyone (\*all / \*each) must obey traffic rules.*
- b. Shui **dou** dei zunshou jiaotongguize.  
who DOU must obey traffic rules  
*Anyone (\*all / \*each) must obey traffic rules*

Note: The phenomenon in (7a,b) looks like a straightforward subcase of that in (3). But, Chen (2008) points out that the matter can be difficult. He argues that the “dou” in (7a) is an instance of that in (3), while the “dou” in (7b) is an instance of that in (4)

(8) **Difference 6: Interactions with Generics (Chen 2008)**

Unlike English “each” (but like English “all”), Mandarin “dou” is possible in generics.

- a. Gou **dou** yijing jue zhong le.  
dog DOU alreadyextinct ASP  
*Dogs are (all / \*each) are extinct.*

Note: The only work I’m aware of that discusses this is Chen (2005). Though no clear answer is offered, Chen clearly assumes that the “dou” in (8) is the same as that in (1).

(9) **Summary: “All”, “Each” and “Dou”**

<u>Property</u>	<u>All</u>	<u>Each</u>	<u>Dou</u>
a. Forces distributive reading (1)	NO	YES	YES
b. Can / Must co-occur with quantificational DPs (3)	NO	NO	YES
c. Allows distributive readings of preposed objects (5)	NO	NO	YES
d. Can co-occur with singular mass nouns (6)	YES	NO	YES
e. Can (Must?) co-occur with FCIs (7)	NO	NO	YES
f. Can Appear in Generics	YES	NO	YES

Note: It looks like “dou” has more in common with “all” than with “each”. However, given that “dou” undoubtedly forces a distributive reading with plural DPs, it’s usually compared to the latter (to my limited knowledge)...

## 2. An Initial Analysis, A Problem, and a Solution (Lin 1998)

Let's begin by considering the notion that *dou* has essentially the semantics of the *DIST* operator.

### (10) An Initial Hypothesis

$$[[ \text{dou} ]] = [ \lambda P: [ \lambda x: \forall y. y \leq x \ \& \ \text{atom}(y) \rightarrow P(y) ] ]$$

### (11) A Problem How are we to analyze the property in (5)?

In order to obtain an *object* distributive reading with “*dou*”, (i) the “*dou*” must remain pre-verbal, and (ii) the direct object undergoes fronting to a preverbal position.

a. \*Wo kan-guo **dou** naxie shu  
I read-ASP DOU those books

b. \*Wo **dou** kan-guo naxie shu  
I DOU read-ASP those books

c. Naxie shu wo **dou** kan-guo.  
those books I DOU read-ASP  
*I read all / each of those books. (cf. Those books, I (\*all / \*each) read. )*

- Why is the movement in (11c) obligatory?
- How do we derive the right T-conditions from the LF for (11c)?

*Lin (1998) appeals to a composition rule similar (but not identical) to the following, originally developed by Bittner (1994)...*

### (12) New Rule for Predicate Abstraction

If X bears the index *i* or its sister bears the index *i*, then  $[[X]]^g$  can (but need not) be:  
 $[ \lambda x_e: [[ X ]]^{g(i/x)} ]$ .

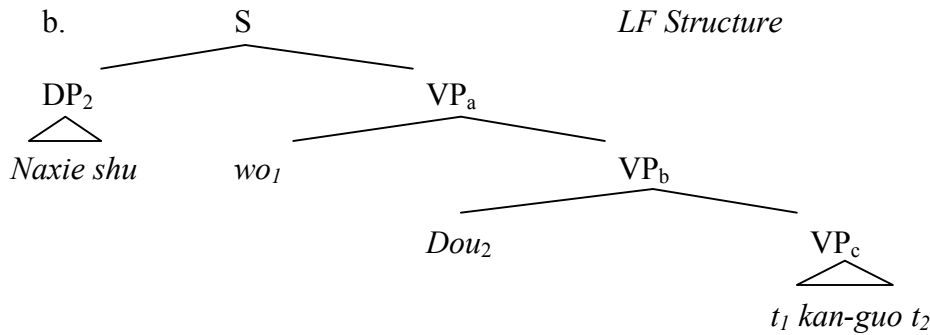
### (13) Further Syntactic Assumptions

- The VP Internal Subject Hypothesis
- “*Dou*” bears an index, and must bind some pronominal.



(16) The Analysis of Cases of Object Distribution (5c)

- a. Sentence: Naxie shu wo **dou** kan-guo.  
 those books I DOU read-ASP  
*I read all / each of those books.*



c. *Semantic Computation*

- (i)  $[[VP_c]]^{g(1/x)} =$  (by special rule (12))  
 $[\lambda y_e : [[VP_c]]^{g(1/x)(2/y)}] =$  (by regular rules)  
 $[\lambda y_e : x \text{ read } y]$
- (ii)  $[[VP_b]]^g =$  (by special rule (12))  
 $[\lambda x_e : [[VP_b]]^{g(1/x)}] =$  (by function application)  
 $[\lambda x_e : [[dou]]^{g(1/x)} ([[VP_c]]^{g(1/x)})] =$   
 $[\lambda x_e : \lambda z_e : \forall y . y \leq z \ \& \ \text{atom}(y) \rightarrow x \text{ read } z]$
- (iii)  $[[S]]^g =$  (by function application)  
 $[[VP_a]]^g ([[DP_2]]^g) =$  (by function application)  
 $[[VP_b]]^g ([[wo_1]]^g) ([[DP_2]]^g) =$   
 $[\lambda x_e : \lambda z_e : \forall y . y \leq z \ \& \ \text{atom}(y) \rightarrow x \text{ read } z](I)(\text{those.books}) =$   
 $\forall y . y \leq \text{those.books} \ \& \ \text{atom}(y) \rightarrow I \text{ read } z$

(17) True Prediction: Ambiguity of Sentences with Two Plural DPs

- In sentences where the object undergoes fronting, *dou* could in principle bind either the subject trace or the object trace.
- Thus, we predict that, in such cases, the plural argument of *dou* could be either the subject *or* the proposed object.
- Lin (1998) claims that this prediction is correct, citing data like the following.

(18) **Dou Can Bind Either Subject Trace or Object Trace**

- a. *Mandarin Sentence:* Naxie shu women **dou** kan-guo.  
those books we DOU read-ASP
- b. *Possible Reading:* We read each of those books.
- (i) LF For Reading: [ Naxie shu<sub>2</sub> [ women<sub>1</sub> [ **dou**<sub>2</sub> [ t<sub>1</sub> kan-guo t<sub>2</sub> ]... ] ] ]
- (ii) Derived T-Conditions:  $\forall y . y \leq \text{those.books} \ \& \ \text{atom}(y) \rightarrow \text{we read } z$
- c. *Possible Reading:* We each read those books.
- (i) LF For Reading: [ Naxie shu<sub>2</sub> [ women<sub>1</sub> [ **dou**<sub>1</sub> [ t<sub>1</sub> kan-guo t<sub>2</sub> ]... ] ] ]
- (ii) Derived T-Conditions:  $\forall y . y \leq \text{we} \ \& \ \text{atom}(y) \rightarrow y \text{ read those.books}$

(19) **A Problem For This Argument**

- The T-conditions in (18bii) and (18cii) seem to be logically equivalent:
  - *I.e.*, each of us read these books *iff* each of these books was read by us.
- To really test for the ambiguity, we could try a verb like “judge”. The following seems to be logically independent:
  - We each judged them (as a group).
  - We (as a group) judged each of them.

(20) **False Prediction: Multiple *Dou*'s In One Clause**

In sentences where the object undergoes fronting, *dou* selectively binds one of two traces inside the VP. Thus, nothing would seem to rule out ill-formed sentences like (20a), where each *dou* binds a different trace.

- a. \* Naxie shu<sub>2</sub> women<sub>1</sub> **dou**<sub>1</sub> **dou**<sub>2</sub> t<sub>1</sub> kan-guo t<sub>2</sub>  
those books we DOU DOU read-ASP

- *Possibility 1:* Maybe these are due to the haplology of *dou dou*?
- *Possibility 2:* Maybe *dou* is the head of a DistP (Szabolsci 1997), and you can only have one DistP per clause?

(21) True Prediction: *Dou* Binding Pronouns

In sentences where the object is *dislocated*, it is possible for *dou* to bind a pronoun.

- a. [ Na sange xiaohai]<sub>2</sub> wo<sub>1</sub> **dou**<sub>2</sub> yijing ba **tamen**<sub>2</sub>  
that three children I DOU already BA them  
  
song hui jia le  
send return home ASP  
“Those three children, I have already sent **each / all of them** home.”

However, Lin (1998) also notes that sentences like the following seem to be possible, where the antecedent of the pronoun is not adjoined to the clause containing *dou*.

- b. Suiran **naxie ren**<sub>2</sub> kao de bing bu lixiang,  
since those men exam DE actually not ideal  
  
laoshi hai shi **dou**<sub>2</sub> ran **tamen**<sub>2</sub> tongguo.  
teacher still be DOU let them pass  
“Although those people actually did not perform well on their exams, the teacher still let **each / all of them** pass.”

Lin (1998) proposes in that in sentences like (21b), there is a null topic pronoun *pro*<sub>2</sub> adjoined just above *laoshi* ‘teacher’.

(22) Some Quick Questions

- a. Is it possible to have discourses like the following?

**Naxie ren**<sub>2</sub> kao de bing bu lixiang.  
those men exam DE actually not ideal

Laoshi hai shi **dou**<sub>2</sub> ran **tamen**<sub>2</sub> tongguo.  
teacher still be DOU let them pass

“Those people actually did not perform well on their exams. The teacher still let **each / all of them** pass.”

- b. Is left dislocation like (21a) still possible in Mandarin embedded clauses? If not, is *dou* in embedded clause still able to bind pronouns?



### 3. Some Consequences Relating to the Syntax/Semantics Interface

#### (23) A Classic Generalization: Clause-Mate Condition on *Dou*

The plural argument of *dou* must be a clause-mate. Embedded *dou* can't take as argument a matrix DP (23a), and a matrix *dou* can't take as argument an embedded DP (23b).

a. \* **Tamen**<sub>1</sub> shuo [ zhege laoshi<sub>2</sub> **dou**<sub>1</sub> t<sub>2</sub> likai-le ]  
they say this teacher DOU leave-ASP  
(Not: "They each said that this teacher left")

b. \* **Naxie shu**<sub>1</sub> wo<sub>2</sub> **dou**<sub>1</sub> t<sub>2</sub> tingshuo [ ta kan-guo t<sub>1</sub> ]  
these books I DOU hear he read-ASP  
(Not: "I heard he read each / all of these books")

c. Prediction of Lin (1998): Sentences like (23a) are ill-formed.  

- There only trace in (23a) that *dou* can bind is the subject trace *t*<sub>2</sub>
- Thus, the only possible entity argument for *dou* in (23a) is 'this teacher'
- Since that's singular, the resulting sentence will be anomalous.

d. Potential Problem for Lin (1998): Sentence like (23b) should be *well*-formed.  

- Nothing prevents *dou* from binding the embedded trace.
- The LF in (23b) would thus be interpretable, and would be mapped to the following T-conditions:

$$\forall y . y \leq \text{these.books} \ \& \ \text{atom}(y) \ \rightarrow \text{I heard that he read } y$$

e. Lin's (1998) Response to (23d): Actually, sentences like (23b) *are* well-formed.  

- The minimally different sentences in (f) and (g) below are (reportedly) OK.
- The issue with (23b) might be that *tingshuo* 'hear' isn't a bridge verb.

f. **Naxie shu**<sub>1</sub> Zhangsan<sub>2</sub> **dou**<sub>1</sub> t<sub>2</sub> shuo [ t<sub>1</sub> xie de bu gao ]  
these books Zhangsan DOU say write DE not good  
*Zhangsan says that each / all of these books are not well written.*

g. **Na san-ben shu**<sub>1</sub> mama **dou**<sub>1</sub> bu zhun [ wo mai t<sub>1</sub> ]  
that three-CL book mother DOU not allow I buy  
*Mother does not allow me to buy any of those books.*

f. Further Prediction:

If a matrix DP has moved into its position from a subordinate clause, it *can* be the plural argument of an embedded *dou*.

**Naxie shu**<sub>1</sub> Akui shuo [ List **dou**<sub>1</sub> du-guo t<sub>1</sub> ]  
those books Akui said List DOU read-ASP  
*Akui said that List read each / all of those books.*

(24) **Another Classic Generalization: *Dou* and Object Preposing (5)**

- The ill-formedness of (24a) seems to be straightforwardly predicted. There are two imaginable LFs for (24a), those in (24c).

a. \* Wo **dou** kan-guo naxie shu  
I DOU read-ASP those books

b. Naxie shu wo **dou** kan-guo.  
those books I DOU read-ASP  
*I read all / each of those books.*

c. (i) [ W<sub>O</sub><sub>1</sub> **dou**<sub>1</sub> [VP t<sub>1</sub> kan-guo naxie shu<sub>2</sub> ] ]  
(ii) [ W<sub>O</sub><sub>1</sub> **dou**<sub>2</sub> [VP t<sub>1</sub> kan-guo naxie shu<sub>2</sub> ] ]

- However, the T-conditions mapped to (24ci) will be anomalous, since the entity argument of *dou* is not plural.
- Moreover, the LF in (24cii) will not be interpretable. If we try to apply the ‘special rule’ in (12) to interpret [[VP]], we end up creating the vacuous quantification (24d).

d. [[VP]]<sup>g</sup> = (by special rule (12))  
[ λx<sub>e</sub> : [[ VP ]]<sup>g(2/x)</sup> ] =  
[ λx<sub>e</sub> : **g(1) read those books** ]

- Alternately, we could also say that (24cii) violates Principle C...

(25) **Question:** Why can’t we save (24a) via *covert* preposing of the direct object?

**Lin’s Answer, Part 1:** Definite DPs don’t undergo covert movement in Mandarin.

**Lin’s Answer, Part 2:**

- If a DP *can* undergo covert movement in Mandarin, then we predict that it can be argument to *dou* without undergoing overt preposing.
- Given that *wh*-words in Mandarin undergo covert movement, the possibility of sentences like the following seems to support this prediction...

a. Ni **dou**<sub>1</sub> mai-le **shenme**<sub>1</sub>?  
you DOU buy-ASP what  
*What are those things which you bought?*  
(≈ *What all did you buy?*)

- A Challenge to This: (25a) seems to have an idiomatic meaning. It’s not reported to mean “Each / all of what did you buy”?

#### 4. Interactions Between *Dou*, Quantificational DPs, and Collective Predicates

One of the most striking ways that *dou* differs from English *all* or *each* is its co-occurrence with (what seem to be) quantificational DPs.

##### (26) Quantificational DPs and *Dou*, Part 1

Some quantificational DPs must appear with *dou*, and must be preposed before it.

- |    |                        |  |                 |         |      |
|----|------------------------|--|-----------------|---------|------|
| a. | <i>Meige</i> ‘Every’   | <b>Meige</b> ren                                 | *( <b>dou</b> ) | mai-le  | shu  |
|    |                        | every man  | DOU             | buy-ASP | book |
|    |                        | <i>Everyone (*all / *each) bought a book.</i>    |                 |         |      |
|    |                        |  |                 |         |      |
| b. | <i>Suoyou-de</i> ‘All’ | <b>Suoyou-de</b> ren                             | *( <b>dou</b> ) | mai-le  | shu  |
|    |                        | all men  | DOU             | buy-ASP | book |
|    |                        | <i>All the people bought a book.</i>             |                 |         |      |
|    |                        |  |                 |         |      |
| c. | <i>Dabufen</i> ‘Most’  | <b>Dabufen de</b> ren                            | *( <b>dou</b> ) | mai-le  | shu  |
|    |                        | most men   | DOU             | buy-ASP | book |
|    |                        | <i>Most people (*each / *all) bought a book.</i> |                 |         |      |

##### (27) Quantificational DPs and *Dou*, Part 2

Other quantificational DPs *need* not appear with *dou*, but can. Again, when *dou* is present, the QDP must be preposed before it.

- |    |  |                   |                |                |        |      |
|----|--|-------------------|----------------|----------------|--------|------|
| a. | <b>San-fen-zhi-er</b>                                    | <b>yishang de</b> | ren            | ( <b>dou</b> ) | mai-le | shu  |
|    | two-third  | above             | man            | DOU            | buy    | book |
|    | <i>More than two-thirds of the people bought a book.</i> |                   |                |                |        |      |
|    |  |                   |                |                |        |      |
| b. | <b>Henduo</b>  | ren               | ( <b>dou</b> ) | mai-le         | shu.   |      |
|    | many   | men               | DOU            | buy-ASP        | book   |      |
|    | <i>Many people bought a book.</i>                        |                   |                |                |        |      |

- (28) **Question:** Lin (1998) doesn’t provide examples where the QDP is a direct object. Can we get some, and see that the QDP also has to front before *dou*?

##### (29) **The Central Puzzle** What is *dou* contributing to the propositions in (26)-(27)?

- The QPs *every man* and *most men* in English are usually assumed to be inherently distributive; hence they cannot co-occur with *each* or *all*.
- If *meige* and *dabufen* are not inherently distributive in Mandarin, why do they *have* to co-occur with *dou*? More generally, why/how is *dou* obligatory in (26)?
- What is the effect of adding *dou* to the sentences in (27)?

Lin (1998) points out some further, related puzzles concerning the way in which QDPs with *dou* interact with obligatorily collective predicates.

(30) **Quantificational DPs, *Dou* and Collectivity, Part 1**

Some obligatorily collective predicates can co-occur with *dou* and QDPs in Mandarin.

- a. **Meiyige** yinger **dou** zhang de hen xiang.  
every baby DOU grows very alike  
*All babies look alike (\*Every baby looks alike.)*
- b. **Dabufen-de** yinger **dou** zhang de hen xiang.  
most baby DOU grows very alike  
*Most babies look alike.*
- c. **Henduo** yinger **dou** zhang de hen xiang.  
many baby DOU grows very alike  
*Many babies look alike*

(31) **Quantificational DPs, *Dou* and Collectivity, Part 2**

Other obligatorily collective predicates *cannot* co-occur with *dou* and QDPs in Mandarin.

- a. \* **Dabufen-de** jingcha **dou** ba shudian baowe-le.  
most policeman DOU BA bookstore surround-ASP  
*\*Most policemen surrounded the bookstore.*
- b. **Henduo** jingcha ba shudian baowe-le.  
many policeman BA bookstore surround-ASP  
*Many policemen surrounded the bookstore.*

(29) **Observation:** Recall the similar kinds of contrasts observed with *all* in English.

- (i) **All** babies look alike.  
(ii) ?? **All** the policemen are surrounding the bookstore.

(30) **The Central Puzzle** What accounts for the contrast between (30) and (31)?  
How is *dou* even possible in (30)?

(31) **Lin's (1998) Solution, Part 1: Mandarin 'QDPs' Introduce Pluralities**

- a.  $[[ \textit{dabufen} ]]$  =  $[ \lambda P: [ \lambda Q: \exists z. z \leq \text{MAX}(*P) \ \& \ |z| > |\text{MAX}(*P)| - |z| \ \& \ Q(z) ] ]$
- b.  $[[ \textit{meiyige} ]]$  =  $[ \lambda P_{\text{et}} : [ \lambda Q_{\text{et}} : Q(\text{MAX}(*P)) ] ]$
- c.  $[[ \textit{henduo}_- ]]$  =  $[ \lambda P: [ \lambda Q: \exists z. z \leq \text{MAX}(*P) \ \& \ |z| / |\text{MAX}(*P)| > n \ \& \ Q(z) ] ]$

(32) **Some Comments**

- This is not *exactly* the semantics Lin (1998) gives, but is a fair notational variant of it.
- The key properties of both the entries in (31a,b) is that
  - The Ds are still  $\langle \text{et}, \langle \text{et}, t \rangle \rangle$ , and thus remain (in a sense) quantificational.
  - The second (VP) argument of the DP is predicated of a particular plural individual... Thus, we predict that distributive *dou* can mark that argument.

(33) **Illustration for *Dabufen* ‘Most’**

- a. *Sentence:*     *Dabufen-de ren               dou mai-le shu*  
                      most            person     DOU bought     book  
                      *Most people bought a book.*
- b. *LF:*     [ [ *Dabufen-de ren* ]<sub>1</sub> [ ***dou***<sub>1</sub> [ *t*<sub>1</sub>   *mai-le shu* ] ... ]
- c.  $\exists z. z \leq \text{MAX}(*\text{person}) \ \& \ |z| > |\text{MAX}(*\text{person})| - |z| \ \& \ \forall y. y \leq z \ \& \ \text{atom}(y) \rightarrow \exists x. \text{book}(x) \ \& \ y \text{ bought } x$   
*There is some majority of people such that each of those people bought a book.*

(34) **Illustration for *Meiyige* ‘Every’**

- a. *Sentence:*     *Meige ren               dou mai-le shu*  
                      most person       DOU bought     book  
                      *Everybody bought a book.*
- b. *LF:*     [ [ *Meige ren* ]<sub>1</sub> [ ***dou***<sub>1</sub>     [ *t*<sub>1</sub>   *mai-le shu* ] ... ]
- c.  $\forall y. y \leq \text{MAX}(*\text{person}) \ \& \ \text{atom}(y) \rightarrow \exists x. \text{book}(x) \ \& \ y \text{ bought } x$   
*Every individual person bought a book.*

(35) **Illustration for *Henduo* ‘Many’**

- a. *Sentence:*     *Henduo ren               dou mai-le shu*  
                      most            person     DOU bought     book  
                      *Everybody bought a book.*
- b. *LF:*     [ [ *Henduo ren* ]<sub>1</sub> [ ***dou***<sub>1</sub>     [ *t*<sub>1</sub>   *mai-le shu* ] ... ]
- c.  $\exists z. z \leq \text{MAX}(*\text{person}) \ \& \ |z| / |\text{MAX}(*\text{person})| > n \ \& \ \forall y. y \leq z \ \& \ \text{atom}(y) \rightarrow \exists x. \text{book}(x) \ \& \ y \text{ bought } x$   
*There is a group of people z such that every individual in z bought a book, and the proportion of people who are in z is greater than the ‘contextual standard’ n.*

(36) **Some Questions (To Be Continued)**

- We still don’t know why *dou* is obligatory with *dabufen*, *meige*, and not *henduo*
- Is the contribution of *dou* in (35) truly distributivity? That’s not yet been shown...

But, what about the sentences in (30), where *dou* combines with a collective predicate?...

(37) **Lin's (1998) Solution, Part 2: *Dou* is Sensitive to Contextually Supplied 'Cover'**

$[[\textit{dou}]]^{\text{cov}} = [\lambda P: [\lambda x: \forall y. y \leq x \ \& \ y \in \textit{cov} \rightarrow P(y) ] ]$

(38) **Illustration for *Zhang De Hen Xiang* 'Look Alike'**

a. *Sentence:*      Meiyige          yinger dou      zhang de          hen      xiang.  
                          every              baby      DOU      grows              very      alike  
                          *All babies look alike (\*Every baby looks alike.)*

b. *Truth-Conditions:*       $\forall y. y \leq \text{MAX}(*\textit{baby}) \ \& \ y \in \textit{cov} \rightarrow y \text{ look alike}$   
    *Every contextually salient subgroup of people look alike.*

Note: In a context where  $\text{MAX}(*\textit{baby}) \in \textit{cov}$ , we get a fully collective reading

But what about sentences like (31)/(39), where *dou* can't combine with a collective predicate?...

(39)      \* **Dabufen-de**          jingcha          **dou**      ba      shudian          baowe-le.  
                          most              policeman      DOU      BA      bookstore      surround-ASP  
                          *\*Most policemen surrounded the bookstore.*

(40) **Lin's (1998) Solution, Part 3: The Proper Subset Condition on *Dou***

“ $[\textit{dou VP}]$ ” is well-formed *only if* “VP” satisfies the following ‘proper subset condition’:  
 $[[\textit{VP}]](x) = \text{T} \text{ entails } \exists z. z \leq x \ \& \ [[\textit{VP}]](z) = \text{T}$

- The predicate *zhang de hen xiang* ‘look alike’ satisfies the ‘proper subset condition’
  - If some plurality *x* looks alike, then subparts of *x* also look alike
- The predicate *baowe-le shudian* ‘surround the bookstore’ doesn't.
  - Just because *x* surrounds the police station, it doesn't follow that a subgroup of *x* does...

(41) **Major Unanswered Question:**      Why is *dou* obligatory with *meige* and *dabufen*?

(42) **A Commonly Encountered Answer (Lin 1998; Chen 2008)**

With *meige* and *dabufen*, *dou* has been ‘grammaticalized’.

- *Dou* heads a ‘distributive phrase’ (DistP).
- The plural argument of *dou* has a [+DIST] feature, and must raise to SpecDistP
- *Mei* and *Dabufen* are lexically specified as [+DIST]. Thus, if they are in the sentence, so must be *dou*...

(43) **An Empirical Problem**

- Under Lin's (1998) analysis *meige NP* is basically a definite plural, raised to GQ type
- However, *meige NP* behaves differently from other definite DPs, in a way that Lin's analysis doesn't seem to expect.

Interactions with Generics (Chen 2008: 11)

Definite plurals *cannot* be argument to generic predicates; *meige NP* can.

- a. Meizhi gou **dou** you yi-tiao weiba  
 every dog DOU have one-CL tail  
*Every dog has a tail.* (Generic Reading Possible)
- b. Naxie gou **dou** you yi-tiao weiba  
 those dog DOU have one-CL tail  
*Those dogs have a tail.* (Generic Reading Impossible)

- On the other hand, this might very well be due to the semantics of demonstrative elements like *naxie*...

**5. Another Puzzle Regarding *Dou*: *Dou* 'Disharmony' (Chen 2005, 2008)**

We saw that a key puzzle concerning *dou* is its ability / need to occur with certain (apparently) quantificational DPs (26)-(27).

*However, as noted by Chen (2005, 2008), 'dou' isn't able to occur with all QDPs...*

(44) ***Dou* 'Disharmony' (Chen 2005, 2008)**

- a. **Henshao** bufen laoshi (**\*dou**) mai-le fangzi  
 very.few CL teacher DOU bought house  
*Very few teachers bought their houses.*
- b. **Yishao** bufen laoshi (**\*dou**) mai-le fangzi  
 small CL teacher DOU bought house  
*Very few teachers bought their houses.*
- c. **Yixie** bufen laoshi (**\*dou**) mai-le fangzi  
 some CL teacher DOU bought house  
*Some teachers bought their houses.*

(45) **The Key Puzzle**

*Henshao* ‘few’ could be given the semantics in (45a). But, under this semantics, no anomaly is predicted for (44a), which will be assigned the T-conditions in (45b).

a.  $[[henshao]] = [ \lambda P: [ \lambda Q: | \text{MAX} ( \{ x: P(x) \ \& \ Q(x) \} ) | < n ] ]$

b.  $| \text{MAX} ( \{ x : *teacher(x) \ \& \ \forall y. y \leq x \ \& \ y \in cov \rightarrow \exists z. house(z) \ \& \ y \text{ bought } z \} ) | < n$

*The largest group of teachers, each of which bought their own house, is less than the contextually determined ‘standard’ n.*

Note: (45a) is not exactly what Chen (2005) gives as the semantics of *henshao*, but is a notational variant thereof.

(46) **Some Further Observations (Chen 2005)**

The contrast between *henduo* ‘many’ / *meige* ‘every’ and *henshao* ‘few’ / *yixie* ‘some’ cannot be attributed to:

- Quantifier Strength: because both *henduo* and *henshao* are ‘weak’.
- Monotonicity: because *henshao* and *yixie* do not share monotonicity properties.

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5.1 **Chen’s (2005, 2008) Analysis: The Basic, Informal Intuition**

(47) **The Basic, Informal Idea**

- Following the semantics in (45), “*henshao* NP VP” is true if the number of ‘NPs’ that ‘VP’ falls *below* the threshold *n*
- Following the semantics in (31), “*henduo* NP VP” is true if the number of ‘NPs’ that ‘VP’ falls *above* the threshold *n*.
- The meaning of *dou* contains a ‘requirement’ (presupposition/entailment) that the number of ‘NPs’ that ‘VP’ falls above the threshold *n*.
  - Thus, it is compatible with *henduo*, but not with *henshao*.

Question: What about the incompatibility of *dou* with *yixie* ‘some’?...



(48) **Supporting Observation 1**

In sentences with obligatorily distributive VPs, the presence of *dou* seems (reportedly) to signal that the number of ‘NPs’ that ‘VP’ falls above the speaker’s expectations.

a. Sentence:

You 10 ge xuesheng (dou) xuanle zhe men ke.  
exist 10 CL student DOU sign.up this.CL course  
*10 students signed up for this course.*

b. Judgment:

With *dou*, this suggests that the speaker is surprised as many as 10 signed up.

(49) **Supporting Observation 2**

If sentences like (48a) contain *dou*, they are not felicitous with continuations that state that the number of ‘NPs’ that ‘VP’ falls below the speaker’s expectations.

You 10 ge xuesheng dou xuanle zhe men ke...  
exist 10 CL student DOU sign.up this.CL course  
*10 students signed up for this course.*

#... den hai yuanyuan bu gou.  
but still far not enough  
*...but that’s still not enough (for us to have the course).*

(50) **Supporting Observation 3**

If sentences like (48a) contain *dou*, they are not felicitous in contexts where it’s clear that the number of ‘NPs’ that ‘VP’ falls below the expectations of the speaker.

a. Context: We need 6 students to enroll for the course to be held.

b. Judgments: (48a) with *dou* is acceptable. The following (50c) is not.

c. # You 4 ge xuesheng dou xuanle zhe men ke.  
exist 4 CL student DOU sign.up this.CL course  
*4 students signed up for this course.*

(51) **A Question**

- In the examples above, there is an implicit assumption that the speaker expects that a sufficient number of students will enroll...
- If we drop that assumption, can we affect the judgment for sentences like (50c)?

(52) **Supporting Observation 4**

The acceptability of *dou* does seem to track the acceptability of *henduo* ‘many’.

a. Context 1: We need 6 students to enroll in the class. 10 have done so.

(i) **Henduo** de xuesheng (**dou**) xuanle zhe men ke  
many DE student DOU sign.up this CL course  
*Many students have signed up for this course.*

(ii) You **10** de xuesheng (**dou**) xuanle zhe men ke  
exist 10 DE student DOU sign.up this CL course  
*Ten students signed up for this course.*

(iii) # **Henshao** de xuesheng xuanle zhe men ke  
few DE student sign.up this CL course  
*Few students have signed up for this course.*

b. Context 2: We need 6 to enroll in the class. We expect 20 to, but only 10 did.

(i) # **Henduo** de xuesheng (**#dou**) xuanle zhe men ke  
many DE student DOU sign.up this CL course  
*Many students have signed up for this course.*

(ii) You **10** de xuesheng (**#dou**) xuanle zhe men ke  
exist 10 DE student DOU sign.up this CL course  
*Ten students signed up for this course.*

(iii) **Henshao** de xuesheng xuanle zhe men ke  
few DE student sign.up this CL course  
*Few students have signed up for this course.*

(53) **Conclusions (Informal)**

- *Henduo* ‘many’, *henshao* ‘few’, and *dou* are all sensitive to the same contextual parameter, this ‘threshold of expected cardinality’ *n*.
- *Henshao* carries the information that the number of ‘NPs’ that ‘VP’ falls below *n*, while *henduo* and *dou* carry the information that it falls above *n*.
  - Thus, *henshao* will always be infelicitous with *dou*.
- Chen (2008) notes that this ‘scalar’ component to the meaning of *dou* seems quite similar to its meaning in ‘licensing-by-focus’ cases like (4), where it seems to clearly have the scalar semantics of English *even*.
  - Unfortunately, Chen (2008) is unable to completely unify the uses of *dou* in (4) and (52)...

## 5.2 Chen's (2005, 2008) Analysis: The Formal Implementation

### (54) New Semantics for *Dou*

$$[[ dou ]]^{cov} = [ \lambda P: [ \lambda x: |x| > n \ \& \ \forall y. y \leq x \ \& \ y \in cov \rightarrow P(y) ] ]$$

### (55) Interaction with *Henduo* 'Many'

#### a. Modified Semantics for *Henduo*

$$[[ henduo ]] = [ \lambda P: [ \lambda Q: \exists z. z \leq MAX(*P) \ \& \ |z| > n \ \& \ Q(z) ] ]$$

#### b. Sentence:

<b>Henduo</b>	bufen	laoshi	<b>dou</b>	mai-le	fangzi
many	CL	teacher	DOU	bought	house

*Many teachers bought their houses.*

#### c. Predicted T-Conditions

$$\exists z. z \leq MAX(*teacher) \ \& \ |z| > n \ \&$$

$$|z| > n \ \& \ \forall y. y \leq z \ \& \ y \in cov \rightarrow \exists z. house(z) \ \& \ y \text{ bought } z$$

*There's a group of teachers z whose cardinality exceeds the contextual standard n and every element in z bought a house.*

#### d. Observation: The added cardinality condition in *dou* has no effect.

### (56) Interaction with *Henshao* 'Few'

#### a. Semantics for *Henshao*

$$[[ henshao ]] = [ \lambda P: [ \lambda Q: | MAX ( \{ x: P(x) \ \& \ Q(x) \} ) | < n ] ]$$

#### b. Sentence:

<b>Henshao</b>	bufen	laoshi	<b>dou</b>	mai-le	fangzi
few	CL	teacher	DOU	bought	house

*Many teachers bought their houses.*

#### c. Predicted T-Conditions

$$| MAX ( \{ x : *teacher(x) \ \&$$

$$|x| > n \ \& \ \forall y. y \leq x \ \& \ y \in cov \rightarrow \exists z. house(z) \ \& \ y \text{ bought } z \} ) | < n$$

*The biggest plurality of teachers, with cardinality greater than n, each member of which bought their own house, has cardinality less than n.*

#### d. Observation:

- These truth-conditions are contradictory!
- Indeed, we can see that any LF of the form “*Henshao* NP *dou* VP” is going to be contradictory.
- Thus, such sentences will be perceived to be ill-formed (Gajewski 2009)<sup>1</sup>

<sup>1</sup> “L-Triviality and Grammar” (<http://gajewski.uconn.edu/papers/Logic.pdf>)

### 5.3 Some Final Issues

#### (57) What About *Yixie* ‘Some’?

a. Question: What’s wrong with sentences like (44c), with *yixie* ‘some’?

* <b>Yixie</b>	bufen	laoshi	<b>dou</b>	mai-le	fangzi
some	CL	teacher	DOU	bought	house

b. Predicted T-Conditions:

$\exists x . *teacher(x) \ \& \ |x| > n \ \& \ \forall y . y \leq z \ \& \ y \in cov \rightarrow \exists z . house(z) \ \& \ y \text{ bought } z$   
*There is a group of teachers x of cardinality greater than n, each of which bought their own house.*

c. The Explanation by Chen (2008: 53), In a Nutshell

Sentences like (57a) always lead to a violation of the Maxim of Quantity.

- Following the T-conditions in (57b), if (57a) is truthfully asserted, then the speaker must know that | NP and VP | > n
- ... *in which case*, the Maxim of Quantity demands that they use the stronger determiner *henduo* ‘many’.

d. A Criticism:

We need something stronger than the classic, Gricean Quantity Maxim to make this kind of explanation work, since we actually predict that (57a) and sentences like the following are *logically equivalent*.

<b>Henduo</b>	bufen	laoshi	<b>dou</b>	mai-le	fangzi
many	CL	teacher	DOU	bought	house

*Many teachers bought their own house.*

#### (58) Why is *Dou* Always Acceptable with *Meige* ‘Every’?

a. Chen’s (2005) Answer:

- If ‘EVERY NP *dou* VP’ were ever *unacceptable*, this would mean that the speaker expected more ‘NPs to VP’ than actually did.
- But, it’s impossible to expect that *more than every* NP to VP!...

b. A Criticism:

- This kind of explanation has to be handled very carefully, since people can have mistaken expectations about *how many* ‘NPs’ there are!...
- Also, this doesn’t explain why *dou* is *obligatory* with *meige* ‘every’

c. Chen’s (2008) Answer: It’s just grammaticalized (see (42))

## 6. Summary, And Further Reading

### (59) A Picture of *Dou* That Emerges from These Works (Lin 1998; Chen 2005, 2008)

- a. *Dou* denotes a *DIST* operator sensitive to covers.
- b. *Dou* is (amazingly) able to bind the traces of DPs that cross over it, allowing preposed direct objects to provide its plural argument.
- c. Mandarin DPs that are translatable as *every NP* and *most NPs* are actually either plural definites (*meige NP*) or plural indefinites (*dabufen NP*)
- d. Mandarin *meige* ‘every’ and *dabufen* ‘most’ are syntactically stipulated to co-occur with *dou*.
- e. *Dou* has a scalar component built into its meaning, rendering it consistent with *henduo* ‘many’, but inconsistent with *henshao* ‘few’.

### (60) Outstanding Puzzles

Of the properties in (9), repeated below, we still don’t have a real handle on (d)-(f), nor its behavior in ‘licensed-by-focus’ cases like (4).

Property	All	Each	Dou
a. Forces distributive reading (1)	NO	YES	YES
b. Can / Must co-occur with quantificational DPs (3)	NO	NO	YES
c. Allows distributive readings of preposed objects (5)	NO	NO	YES
d. Can co-occur with singular mass nouns (6)	YES	NO	YES
e. Can (Must?) co-occur with FCIs (7)	NO	NO	YES
f. Can Appear in Generics	YES	NO	YES

Noah Constant has compiled a list of other works on the syntax/semantics of Mandarin *dou*. I have those listed below for you, along with a brief blurb (by myself) on each.

Cheng, Lisa, and Anastasia Giannakidou. To appear. “The Non-Uniformity of WH-Indeterminates with Free Choice in Chinese.” In Gill, K. and G. Tsoulas (eds) *Quantificational Structures*. Oxford University Press.

Cheng, Lisa and Anastasia Giannakidou. 2006. “(In)definiteness, Polarity, and the Role of Wh Morphology in Free Choice.” *Journal of Semantics* 23: 135-183.

- Both these works focus largely on the use of *dou* in FCIs (7), particularly cases like (7b).
- It isn’t immediately apparent how their analysis applies to distributive cases like (1).

Cheng, Lisa. 2009. "On *Every* Type of Quantification Expression in Chinese." In Rathert, M. and A. Giannakidou (eds) *Quantification, Definiteness, and Nominalization*. Oxford University Press. 53-75

- Discusses the use of *dou* with *meige* 'every', in light of Cheng & Giannakidou (2006).
- Argues that *dou* is not actually a distributive operator, and that *mei* doesn't actually mean 'every'.
- No fully formalized analysis is provided, but many very tantalizing observations...

Cheng, Lisa. 1995. "On *Dou*-Quantification." *Journal of East Asian Linguistics* 4: 197-234.

- Though mainly a syntax paper, arguing against a 'Q-float' analysis of *dou*, it contains tons of great data and observations.

Shyu, Shu-ing. 1999. *The Syntax of Focus and Topic in Mandarin Chinese*. PhD Dissertation. University of Southern California.

- This work focuses largely on 'scalar' uses of *dou*, where it is accompanied by the particle *lian*, producing the well-studied '*lian...dou*' construction.

Wu, Jianxin. 1999. "A Minimal Analysis of *Dou*-Quantification. MS. University of Maryland, College Park.

Wu, Jianxin. 1999. *Syntax and Semantics of Quantification in Chinese*. PhD Dissertation. University of Maryland.

- These are largely syntactic works, further developing the notion that *dou* is the head of a dedicated DistP, and providing evidence from various sorts of 'blocking effects'.