The Scalarity of Dou in Focus Structure[1]

Liping Chen
University of Pittsburgh

This paper studies the semantics of scalar *dou* 'roughly all' in what is called *lian...dou/ye* 'even...all/also' construction in Mandarin Chinese. The dominant view in the literature is to assume that the scalar meaning is structural and scalar *dou* is treated on a par with distributive *dou* in the context of plural definites (e.g.Shyu1995, Wu1999, Portner 2002). In this paper, I address some rarely discussed issues such as the *dou* / *ye* alternation and the optionality of *lian*. I conclude that the scalarity comes from both *lian* and *dou* and I propose a way to capture their scalarity. In addition, a compositional semantics to *lian...dou/ye* is provided based on the semantics of each piece. Finally, some implications of the analysis are discussed.

0. Introduction

We know that *dou* as a distributive operator goes with a plural NP but not with a singular NP, as in the examples below[2].

---

[1] This is a part of chapter 3 of my dissertation (Chen, 2008). For more detailed discussions of the issue, I refer readers to the dissertation.

[2] But plurality is neither sufficient nor necessary to license *dou*. For example, a quantifier phrase such as *yixie*-NP 'some' doesn't go with *dou* even if it is plural, as shown in (i).

(i)   * Youxie haizi   dou hua le   yifuhua.
          some kid   dou draw –ASP one-CL picture
          'Some kids drew a picture.'

In addition, as has been noticed by Lin (1998), Wu (1999), etc., *dou* is perfect with a singular NP, as in (ii), because the predicate *reading* may be said to hold of each salient part of a book: pages, units, chapters etc. This contrasts with (iii) where the use of *dou* is not acceptable because you normally buy a book as a whole but not any part of it. In other words, there are no contextually plausible parts for *dou* to quantify over.

(ii)   Zheben shu,   ta dou dule
          this-CL book,   he dou read-ASP
          'He has read all of the book.'

(iii)   *Zheben shu,   ta dou maile
          this-CL book,   he dou buy-ASP
          'He has bought this book.'

(1)   [John he Mary]   dou hua le   yifuhua.
        John   and Mary   dou draw -ASP   one-CL picture
        (i) 'John and Mary each drew a picture.'
        (ii) * 'John and Mary together drew a picture.'

(2)   [John]   (* dou) hua le   yifuhua.
        John   dou   draw -ASP   one-CL picture
        'John drew a picture.'

In sharp contrast to (2), a singular NP, when focused, is fully acceptable with *dou*, as shown in (3). Interestingly, the combination of focus and *dou* leads to a scalar reading, similar to English sentences with *even*. For instance, (3) may be uttered by a preschool teacher expressing her surprise about John's drawing a picture, given that John has never been cooperative in doing what the teacher has told him to do.

(3)   [John]f   dou hua le   yifuhua.
        John   dou draw –ASP   one-CL picture
        'Even John drew a picture.'

The above scalar reading has generally been taken to involve the '(*lian*)...*dou*' 'even...*dou*' construction with a silent *lian,* according to Chinese traditional grammars. For example, (3) is assumed to be (4). And a well-known feature about this structure is that *dou* may be replaced by *ye* 'also' without changing the meaning of the sentence. This is shown in (5).

(4)   (Lian) [John]f   dou   hua le   yifuhua.
        even   John   dou   draw –ASP one-CL picture
        'Even John drew a picture.'

(5)   (Lian) [John]f   dou/ye   hua le   yifuhua.
        even   John   dou / also draw –ASP one-CL picture
        'Even John drew a picture.'

However, when *lian* is overtly present, *dou* or *ye* has to be present, as shown in (6). This is in parallel to *mei*-NP and quantificational *dou,* as illustrated in (7). [3]

(6)   Lian   [John]f   *(dou/ ye)   hua le   yifuhua.
        even   John   dou / also   draw –ASP one-CL picture
        'Even John drew a picture.'

---

[3] See Lin (1998) and Yang (2001) for analyses of *dou* with *mei-NP*.

(7)   Meige haizi   * (dou)   huale   yifuhua
       Every-CL kid   dou   draw-ASP   one-CL picture
       'Every kid drew a picture.'

Below I will address the following issues: What is the contribution of the various particles? Or what is the source of the scalar reading? And how can we capture the scalarity observed in sentences with focus and *dou*?

1. The sources of the scalar reading

We show below that the scalarity comes from two sources: from *dou* and from *lian*. The scalarity of *dou* can be seen by comparing it with *ye* and the scalarity of *lian* can be identified by comparing *ye* with *lian…ye*. In addition, it is suggested that the scalarity of *dou* comes from its presupposition that makes reference to the speaker's expectation. The scalarity of *lian*, on the other hand, is suggested to be inherent, in the way that the scalarity is inherent in the meaning of English *even*.[4]

1.1. The scalar reading of *dou*

The scalar reading of *dou* is seen clearly in the examples below, where *lian* is absent. In (8) and (9), the object *problem 2* is preposed before *dou* and *ye* in order to be focused.[5]

(8)   John   [di'er ti]$_f$ dou   zuochulai le.
       John   2nd problem   dou   figure out ASP
       'John solved even problem 2.'

(9)   John   [di'er ti]$_f$ ye   zuochulai le.
       John   2nd problem   also   figure out ASP
       'John solved also problem 2.'

(8) with *dou* minus *lian* has the *even* meaning: John's solving problem 2 is less likely or less expected. In other words, problem 2 is considered difficult. But (9) with *ye* minus *lian* has the *also* meaning without implicating whether the problem is difficult or not. Suppose the alternative problems to problem 2 are problem 1, 3, and 5, then (9) holds as long as John also solved problem 1 or problem 3 or problem 5, but this is not the case for (8). For (8) to be felicitous, problem 2 has to be a difficult problem with respect to the

---

[4] According to Karttunen and Peters (1979), *even* is associated with two presuppositions: scalarity and existentiality. We will introduce the differences between the two readings in section 3.3.1 when we discuss the semantics of *even*.   But in the following discussion of *dou, lian* and *ye*, I use the terms scalarity and existentiality in the sense of Karttunen and Peters (1979).
[5] Object preposing in Chinese is considered as a case of focalization in the literature. See Shyu (1995) and Zhang (1997) for detailed discussions about it.

alternatives to it. In other words, *dou* in (8) invokes a ranking between the NP in focus and its alternatives but *ye* in (9) doesn't.

The above contrast between *dou* and *ye* is corroborated by the fact below. When a scale is explicitly expressed between *problem 2* and *problem 5* such that the imposed ranking is destroyed, as in A in (10), (8) becomes inappropriate as an answer. But (9) with *ye* is acceptable. This is because the latter is felicitous as long as there is at least one alternative that is true in the context without imposing any order between the NP in focus and its alternatives.

(10)   A: John solved problem 5, which was the most difficult problem. Did he solve problem 2?
        B: (8) ^{BAD}/ (9) ^{OK}

In addition, the claimed *dou/ye* contrast resembles that of *even/also*. As discussed in Rullmann (1997), who gives credit to Horn (1972), the replacement of *even* by *also* in B's answer in (11) leads to the infelicity of the sentence.

(11)   A: Is Claire an [assistant] $_f$ professor?
   .   B: Assistant professor? She is even/ *also an [associate] $_f$ professor!

According to him, this is because *also* carries an existential presupposition which is either in conflict with the asserted content of the sentence or with our knowledge of the world. For instance, the answer in B with *also* would presuppose that Claire is an associate professor in addition to being an assistant professor, which is in conflict with our knowledge of the academic profession. In contrast, the felicity of *even* in this context shows that *even* doesn't commit us to the sort of existentiality claimed to hold for *also*.

Turning to Chinese, the corresponding sentence with *dou* is good but the sentence with *ye* is not.

(12)   A: Is Claire an [assistant] $_f$ professor?
        B: Zhuli   jiaoshou?   ta   [fu]$_f$ jiaoshou ^{OK}dou / * ye   shi le.
             assistant professor?   she associate professor   dou/also   be ASP

This shows that independently of *lian*, *dou* is scalar but *ye* is not. The *dou*-statement imposes an order or a scale between the NP in focus and its alternatives; the *ye*-statement introduces only existentiality. This explains their contrasting behavior in (10) and (12) above. In (10), when the required scale for the *dou*-statement doesn't exist any more, the *dou* sentence becomes odd, but the *ye* sentence is acceptable. On the other hand, in (12), when the existential interpretation conflicts with our world knowledge, the *ye* statement becomes odd but the *dou* statement is good.

1.2 The scalar reading of *lian*

Lian has been claimed to be an optional element in obtaining a scalar reading for a sentence containing *dou* or *ye*. Below I present two arguments against this claim.

First, the *dou/ye* difference with respect to scalarity in (10) disappears with the addition of *lian*. In particular, while the *ye* statement in B's answer in (10) is felicitous in a context that doesn't support the expected scalarity, this is no longer the case when *lian* is added to it. As shown in (13), the addition of *lian* forces a scalar reading for the sentence, making the *ye* statement similar to the *dou* statement with respect to scalarity. As a result, it is no longer a felicitous answer to (10), as shown in (14).

(13) John lian [di'er ti]$_f$ ye zuochulai le.
      John even 2nd problem also figure out ASP
      'John solved even problem 2.'

(14) A: John solved problem 5, which was most difficult. Did he solve problem 2?
      B: *(13)

The above contrast between the *ye* statement and the *lian...ye* statement indicates that *lian* is the source of scalarity. It implies that *lian* is not fully optional as has been commonly assumed, because otherwise the above difference between *ye* and *lian...ye* would be unexpected. The contribution of *lian* to scalarity is also seen in (15), where the *dou/ye* difference with respect to existentiality still exists when *lian* is added to them.

(15) A: Is Claire an [assistant]$_f$ professor?
      B: Zhuli jiaoshou? ta lian [fu]$_f$ jiaoshou ^{OK}dou / * ye shi le.
          assistant professor? she even associate professor dou/also be ASP

Given that *lian* is scalar, the infelicity of *lian...ye* indicates that the existentiality claimed to be part of the meaning of *ye* is still there. That is, *lian + ye* has both scalarity and existentiality. This contrast with *lian...dou* that seems to have only the scalar meaning. As mentioned earlier, the *even/also* difference in English led Rullmann to claim that *even* has only the scalar presupposition but not the existential one. The difference between *lian...dou* and *lian...ye* suggests that *lian,* like *even*, has only the scalar presupposition but not the existential one. [6]

To reiterate, *lian* is the source of scalarity and it doesn't involve the existential presupposition.[7] In addition, *lian...dou* is not identical to *lian...ye*. The former has only

---

[6] As we will see shortly, this differs from the analysis of *even* in Karttunen and Peters (1979), which assumes that *even* has both scalarity and existentiality.

[7] That *lian* is like *even* is indirectly supported by *lihn* 'include' in Cantonese. As discussed in Shank (2004), Cantonese *dou*, as in (i), can mean either 'also' or 'even'. But the two readings can be disambiguated by using *lihn* before the focused item, as in (ii), where *lihn* forces the scalar

scalarity, but the latter has both scalarity and existentiality. Below I provide one more evidence for the claimed difference between *lian…dou* and *lian…ye*. [8]

In (16), both *dou* and *ye* are good with a scalar reading. But in a situation where there are only two problems under consideration, the difference between *dou* and *ye* shows up. As in (17), the *lian…dou* statement is ok with the continuation that *John didn't solve the other problem* but the *lian… ye* statement is no longer acceptable.

(16)   John lian [di'er ti]   dou /ye   zuo chulaile   *lian…dou/ lian…ye*
         John   lian problem 2 dou /also   figure out ASP.
         'John solved even problem 2'

(17)   John lian [di'er ti]   dou / * ye zuo chulaile,   *lian…dou/ *lian…ye*
         John   lian problem 2 dou /also   figure out ASP.
         buguo ta   mei zuochulai   lingyidao.
         but   he not work out   another one-CL
         'John solved even problem 2, but he didn't solve the other problem.'

(17) with *lian…dou* conveys the idea that John is a careless type of person. He solved the difficult problem, but failed to work out the less difficult one. In this context, *lian…ye* is not felicitous. This is because *ye* has the existential presupposition that requires that there

---

even reading.
(i)   Ngoh a-John   dou   jin-jo
        I   par-John   also see-pfv
        (a)   I even saw John
        (b)   I saw John too.
(ii)   Ngoh lihn   [a-John]$_f$ dou jin-jo
        I   include par-John   also see-pfv
        (a)   I even saw John
        (b)   *I saw John too.
        This shows that Mandarin is different from Cantonese in that Cantonese *dou* is ambiguous between the existential and the scalar reading, Mandarin *dou* is not. The latter is always scalar and it is lexically distinct from the non-scalar *ye*. In addition, in Cantonese, the use of *lihn* may disambiguate the two readings of *dou*, Mandarin *lian* forces a scalar reading for the *ye* statement. Given the difference between *dou* and *ye* in Mandarin Chinese, this seems to support our view that it is *lian* that provides the scalarity to *ye* in Mandarin Chinese.
        However, it is not clear to me whether existentiality stays in *lihn…dou* in Cantonese. From what I know about Mandarin *dou*, I would not expect Cantonese *dou* to appear in the assistant/associate professor example if, as claimed by Shank, it always carries an existential presupposition. However, if *lihn…dou* is acceptable in the above context, it implies that existentiality is not involved.
[8] This potential difference between *lian…dou* and *lian…ye* here is brought to my attention by Veneeta Dayal.

be at least one alternative that is true in addition to the proposition that John solved problem 2. Since the only available alternative is denied in the second conjunct, the *lian…ye* statement becomes infelicitous.
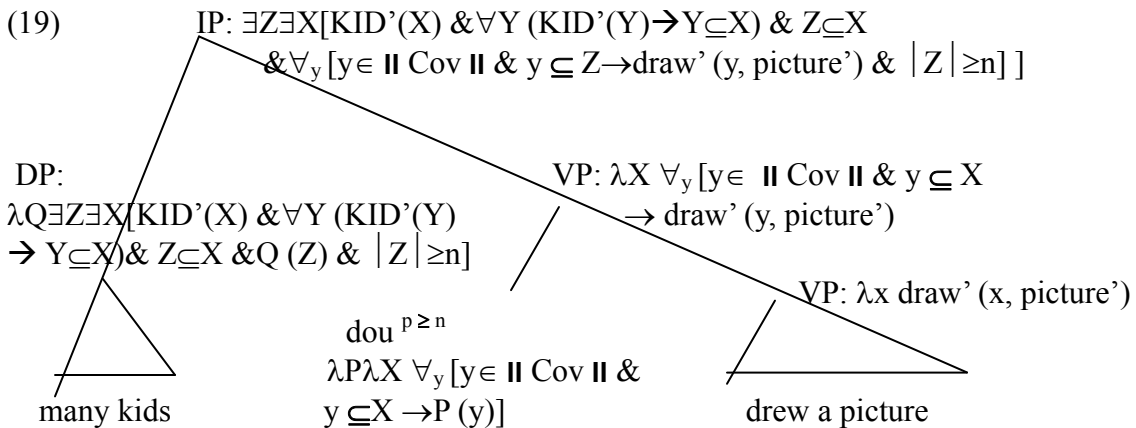
To sum up, the scalar reading in *lian…dou/ye* might come from either *dou* or *lian* and the scalarity of the latter is inherent to its meaning much as scalarity is inherent to the meaning of *even*. But where does the scalarity of *dou* come from? We turn to this topic next.

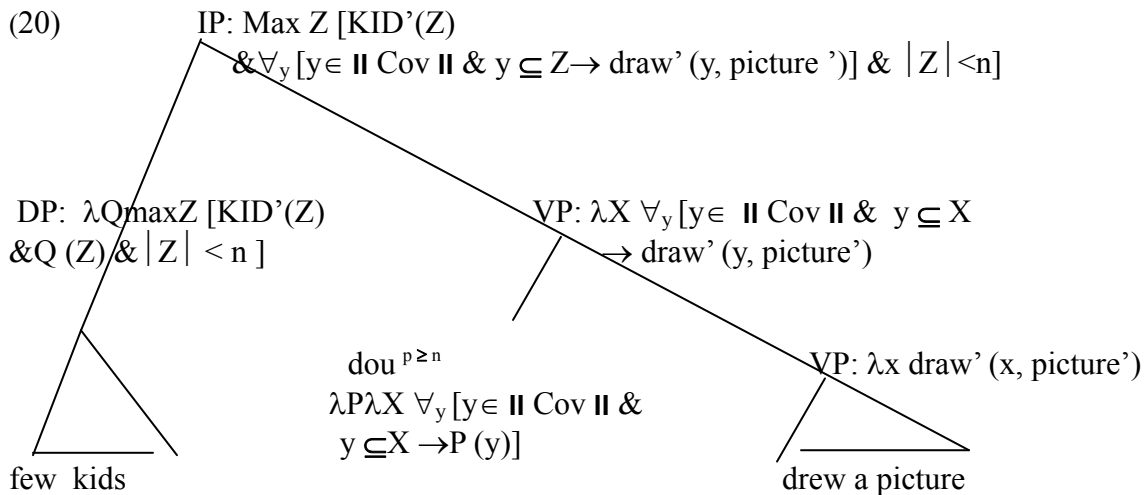### 1.3. The source of the scalarity of *dou*

In this section, I discuss the scalarity of *dou*, suggesting that it arises from its presupposition of high expectation following Chen's (2005) analysis of *dou* for quantified statements.

In Chen (2005), to account for the *dou* (dis)harmony effect such as that in (18), she proposes that *dou* has a presupposition relative to the speaker's expectation. That is, *dou* is felicitously used only when the assertion of the sentence meets or exceeds the speaker's expectation about the predication. In this view, the (dis)harmony in (18) follows from the match or mismatch between the presupposition of *dou* and the semantics of the quantifier concerned. This is shown in (19) and (20), where $dou^{p \geq n}$ stands for the presupposition of *dou*.[9]

(18)   *many NP…dou/ *few NP…dou*
        Henduode / *Henshaode haizi dou   huale   hua
        many /few   kid   dou   draw-ASP picture
        'Many / Few kids drew a picture.'

(19)   IP: $\exists Z \exists X[KID'(X) \& \forall Y (KID'(Y) \rightarrow Y \subseteq X) \& Z \subseteq X$
                    $\& \forall_y [y \in \| Cov \| \& y \subseteq Z \rightarrow draw'(y, picture') \& |Z| \geq n]]$

 DP: VP: $\lambda X \forall_y [y \in \| Cov \| \& y \subseteq X$
$\lambda Q \exists Z \exists X[KID'(X) \& \forall Y (KID'(Y)$ $\rightarrow draw'(y, picture')$
$\rightarrow Y \subseteq X) \& Z \subseteq X \& Q (Z) \& |Z| \geq n]$

                                                          VP: $\lambda x\ draw'(x, picture')$
                        $dou^{p \geq n}$
                        $\lambda P \lambda X \forall_y [y \in \| Cov \| \&$
  many kids $y \subseteq X \rightarrow P (y)]$ drew a picture

---

[9] $dou^{p \geq n}$ stands for the following: (a) An assertion that the number of individuals denoted by the common noun with the property denoted by the verb phrase is equal to or greater than n. (b) A presupposition that the speaker expected that the number of individuals denoted by the common noun with the property denoted by the verb phrase would be less than or equal to n.

(20)

IP: Max Z [KID'(Z)
&$\forall_y$ [y∈ ‖ Cov ‖ & y ⊆ Z→ draw' (y, picture ')] & $|Z|$ <n]

DP: λQmaxZ [KID'(Z)
&Q (Z) & $|Z|$ < n]

VP: λX $\forall_y$ [y∈ ‖ Cov ‖ & y ⊆ X
→ draw' (y, picture')

dou $^{p \geq n}$
λPλX $\forall_y$ [y∈ ‖ Cov ‖ &
y ⊆X →P (y)]

VP: λx draw' (x, picture')

few kids

drew a picture

In (19), the semantics of *many* requires that the cardinality of the set of kids who drew a picture is equal to or above the speaker's expectation. So suppose 12 out of 20 kids meets the speaker's expectation, the sentence is true when the cardinality of the plurality is 12 or above. This high expectation requirement of *many* matches well with that of *dou,* because in the assertion of the proposition with *dou,* the speaker's expectation must have been met or exceeded. In other words, the felicity of the *dou* statement in this context entails that the speaker had a low expectation about the number of the kids who have the relevant property.

However, in (20), the semantics of *few* clashes with the presupposition of *dou* with respect to the speaker's expectation. In particular, the semantics of *few* requires that the cardinality of Max Z should be smaller than the expectation *n.* In the context set above, this means that the number of kids who drew a picture should be below 12. But this is in conflict with the presupposition of *dou,* which requires that the number of kids be 12 or above in this context. Therefore, *dou* and *few* cannot co-occur because the presupposition of *dou* is not satisfied.

Against this background, now we turn back to *dou* in *lian…dou* constructions and see if the scalarity of *dou* can be handled along the same lines.
As discussed above, (21) implies that John's solving problem 2 is not expected. Concretely, if there are two alternative problems, problem 3 and 4 in this context, (21) is felicitous only when problem 2 is a problem that is more difficult than its alternative problems. Assuming *dou* here also has the expectation-oriented presupposition, this means that the assertion of the proposition with *dou* exceeds the expectation of the speaker. If the expectation is a proposition that makes reference to the alternative set such as that in (22), then *dou* has the presupposition that relates the proposition to the speaker's prior expectation by separating the set into two subsets, those that exceed the

expectation and those that fall below.[10] In other words, (21) entails that the speaker had expected that John might solve problem 3 or problem 4. [11, 12] Thus an analogy can be drawn between *dou* in quantified statements and *dou* in *lian...dou* if we assume that the speaker's expectation for the latter can be established through the alternative propositions induced by focus.

(21)   John (lian) [di'er ti]$_f$ dou   zuochulai le.
        John   even   2nd problem   dou   figure out ASP
        'John solved even problem 2.'

(22)   {John solved problem 2, John solved problem 3, John solved problem4}

Having identified the functions of *dou, ye* and *lian*, our goal next is to provide a compositional semantics for them. 2.1 briefly introduces focus semantics and the semantics for *even* on which we build our analysis. 2.2 shows how the particles are combined. 2.3 is a summary.

---

[10] The alternative semantics of focus will be introduced in the next section.

[11] The claimed implication is also available in the negative context, as shown in (i). It asserts that John didn't solve problem 2. The use of *dou* expresses that the assertion exceeds the speaker's expectation. That is, the speaker had expected that John would not solve problem 3 or problem 4.
(i)   a. John   [di'er ti]$_f$ dou mei zuochulai le.
          John   2nd problem   dou not figure out ASP
          'John even didn't solve problem 2.'
       b. {John didn't solve problem 2, John didn't solve problem 3, John didn't solve problem 4}
    In addition, it is impossible to put the negation *mei* in front of *dou*, just as in the case of *dou* in quantified statements, as mentioned in section 2.4.1 in chapter 2. This is shown in (ii) and (iii) below.
(ii)   * John   [di'er ti]$_f$ mei dou zuochulai le.   * [not...dou]
          John   2nd problem   not dou figure out ASP
          Intended: 'John even didn't solve problem 2.'
(iii) * You 10 ge xuesheng   mei dou xuan zhemenke   *[not...dou]
          exist 10 CL student   not dou   choose this CL course
          Intended: 'There are 10 students who didn't sign up for the course.'
[12]   Like it is in the positive sentence, *ye* in this context doesn't have the scalar reading either:
(i)   John   [di'er ti]$_f$ ye   mei   zuochulai le.
        John   2nd problem   also   not   figure out ASP
        'John didn't solve problem 2, either.'

2. Combining focus sensitive particles
2. 1. Background on focus semantics

  In the alternative semantics of Rooth (1985, 1992), focus expresses a semantic value $[\![\alpha]\!]^{f}$ in addition to its ordinary semantic value $[\![\alpha]\!]^{0}$. The former is a set of propositions from which the ordinary semantic value is drawn. For example, the ordinary semantic values for the two sentences in (23) are the same: *Mary like Sue*, the proposition that denotes the set of worlds in which Mary likes Sue. However, the focus semantic values for them are different depending on whether the focus is on *Mary* or on *Sue*.

(23) a. [Mary]$_f$ likes Sue.
    b. Mary likes [Sue] $_f$

The focus semantic value for (23a) is the set of propositions of the form 'x likes Sue', while the focus semantic value for (23b) is the set of propositions of the form 'Mary likes y'. Suppose the domain of individuals includes Mary, Linda, Sue, and Lisa, the alternative propositions for the above sentences may be the following:

(24) a. $[\![$ [Mary] $_f$ likes Sue $]\!]^{f}$ = {Mary likes Sue, Linda likes Sue, Lisa likes Sue}
    b. $[\![$Mary likes [Sue] $_f]\!]^{f}$ = {Mary likes Sue, Mary likes Linda, Mary likes Lisa}

  The scalar particle *even* shows association with focus. According to Karttunen and Peters (1979) & Rooth (1985), among others, *even* doesn't affect the truth condition of the sentences in which it appears, but it introduces presuppositions that bear on the semantic value expressed by focus. Specifically, it expresses a relation between the truth-conditional content of the sentence and the focus semantic value of the sentence. For example, for both sentences in (25), the truth conditional content or the assertion is (26). What *even* contributes to each sentence are presuppositions that relate the assertion to the focus semantic values. What this means is that the role of *even* in (25a) is to relate the assertion to the set of propositions in (24a) and that of *even* in (25b) is to relate the assertion to the set of propositions in (24b).

(25) a. Even [Mary]$_f$ likes Sue.
    b. Mary likes even [Sue] $_f$
(26)   Mary likes Sue.

Karttunen and Peters (1979) assumes that *even* builds in existentiality and scalarity. The former requires that at least one of the alternative propositions other than the assertion be true, and the latter requires that the assertion is the least likely among all of the alternative propositions. Following the notation of Rooth (1985), this is done in (27), where *even* quantifies over propositions that are restricted by the context variable C:

(27)   a. Existentiality: $\exists p\ [C\ (p)\ \&\ ^{\vee}p\ \&\ p \neq\ ^{\wedge}\mathbf{a}]$
           b. Scalarity: $\forall p\ [[C\ (p)\ \&\ p\neq\ ^{\wedge}\mathbf{a}]\ \rightarrow$ likelihood' (p) > likelihood' $(^{\wedge}\mathbf{a})]]$

The existential implicature in (27a) says that there is some proposition p that is restricted by C, which is true, and it is distinct from the assertion, $^{\wedge}\mathbf{a}$. The scalar implicature in (27b) says that for all true propositions of the form p that are restricted by C and they are distinct from the assertion, $^{\wedge}\mathbf{a}$, the likelihood of p exceeds that of $^{\wedge}\mathbf{a}$. Under this view, the presuppositions of *even* in (25a), for example, are as follows:

(28)   a. Existential presupposition:
            $\exists p\ [\exists x\ [p=\ ^{\wedge}$like' (x, Sue) $\&^{\vee}p\ \&\ p \neq\ ^{\wedge}$ like' (Mary, Sue)]]
        b. Scalar presupposition:
            $\forall p\ [\exists x\ [[p =\ ^{\wedge}$ like' (x, Sue) & $p\neq\ ^{\wedge}$ like'(Mary, Sue)] $\rightarrow$ likelihood'(p) > likelihood (like' (Mary, Sue))]]

In (28), (a) says that a proposition of the form *x likes Sue* is true and it is not identical to the assertion *Mary likes Sue*. (b) says that for all true alternative propositions in the form of *x likes Sue* , which are distinct from the assertion, they are more likely than the assertion *Mary likes Sue*. This amounts to saying that *Mary likes Sue* is the least likely among all the alternative propositions.

Having introduced focus semantics and the semantics of *even*, below we show how the particles in Chinese are combined following this approach.

2.2. Combining the particles

Recall that in previous section, we made the following claims. First, both *dou* and *lian* are scalar and *ye* is existential. Second, following Rullmann, we claimed that *lian* has only the scalar presupposition but not the existential one. Third, the scalarity of *dou* was assumed to come from its expectation-oriented presupposition. Here I propose to represent the claimed presuppositions of *lian, dou* and *ye* as follows:

(29)   a. The scalar presupposition ^{lian}
            $\forall q\ [[C\ (q)\ \&\ \&\ q\neq\ ^{\wedge}p\ ]\ \rightarrow q >_{likely}\ ^{\wedge}p\ ]$
        b. The existential presupposition ^{ye}
            $\exists q\ [C\ (q)\ \&\ ^{\vee}q\ \&\ q \neq\ ^{\wedge}p]$
        c. The scalar presupposition ^{dou}
            $\forall q\ [[C\ (q)\ \&\ q\neq\ ^{\wedge}p\ ]\ \rightarrow\ ^{\wedge}p >_{speaker\text{-}expectation}\ q]$

The presuppositions of *lian* and *ye* in (a) and (b) are identical to the scalar presupposition and the existential presupposition of *even* respectively. The former imposes a scalar relationship between the assertion and the alternative propositions. The latter requires that there be another true alternative that is distinct from the assertion. The presupposition of *dou* in (c) says that for all true propositions of the form q that are

restricted by C, which are distinct from the assertion, the assertion exceeds the speaker's expectation q.

In this approach, *lian...dou* and *lian…ye* are combined as follows. First, we look at a case with *dou* in (30). As discussed earlier, this sentence may have the ordinary semantic value and focus semantic value in (31a) and (31b) respectively, assuming there are only two alternative problems, problem 3 and problem 4, in this context.

(30)　　　John　[di'erti]$_f$ dou zuochulaile　　　　　[NP $_f$ + *dou*]
　　　　　'John solved even problem 2.'

(31)　　　a.　⟦John　[di'erti]$_f$ dou zuochulaile ⟧ ^{0} = John solved problem 2
　　　　　b.　⟦John [di'erti]$_f$ dou zuochulaile ⟧ ^{f} = {John solved problem 2, John solved
　　　　　　　　　　　　　　　　　　　　　　problem 3, John solved problem 4 }

What *dou* introduces to the sentence will be the presupposition in (32) that relates the above ordinary semantic value to the focus semantic value via the expectation of the speaker:

(32)　　　The scalar presupposition ^{dou}
　　　　　$\forall q [[C (q) \& q \neq {^\wedge}p] \rightarrow {^\wedge}p >_{speaker\text{-}expectation} q]$

This says that for all propositions of the form q that are restricted by C, which are true, and they are not identical to the assertion, $^\wedge$ p. That is, the assertion exceeds the expectation of q. In the case of (30), this means that the speaker expected that John would solve problem 3 or problem 4, but John's solving problem 2 exceeded the expectation of the speaker. This gives rise to the scalar reading of the sentence.

Now we look at (33) that involves *lian...dou.* As shown in (34), when the *dou* statement combines with *lian*, its assertion (ordinary semantic value) and the alternative propositions (focus semantic value) remain the same as in the earlier case without *lian*. But *lian* here imposes a scalar relationship between the assertion and the alternative propositions: the assertion is less likely than the alternatives that are not identical to the assertion. Concretely, this says that *John solved problem 2* is less likely than *John solved problem 3 or problem 4*. This implies that problem 2 is a difficult problem. This is compatible with the presupposition of *dou,* which requires that the assertion *John solved problem 2* exceeds the speaker's expectation. This is because the requirement can only be satisfied when problem 2 is a difficult problem.

(33)　　　John　*lian* [di'erti]$_f$ *dou* zuochulaile　　　　[*lian* NP$_f$ + *dou*]
　　　　　'John solved even problem 2.'

(34)　a.　⟦John lian [di'erti]$_f$ dou zuochulaile⟧ ^{0} = John solved problem 2
　　　b.　⟦John lian [di'erti]$_f$ dou zuochulaile ⟧ ^{f} = {John solved problem 2, John solved problem 3, John solved problem 4 }
　　　c.　The scalar presupposition ^{dou}
　　　　$\forall q [[C (q) \& q\neq {}^\wedge p] \rightarrow {}^\wedge p >_{\text{speaker-expectation}} q]]$
　　　d.　The scalar presupposition ^{lian}
　　　　$\forall q [[C (q) \& q\neq {}^\wedge p] \rightarrow q >_{\text{likely}} {}^\wedge p]]$

　　　　Even though the *dou* statement and the *lian...dou* statement are logically distinct, their meanings converge in a way that gives the effect of optionality.
　　　　Now we look at the cases with *ye* and *lian...ye*. In (35) with *ye*, the assertion and the alternative propositions are the same as the previous sentences with *dou*. The difference is the presupposition *ye* introduces to the sentence. As in (36), *ye* requires that there be a true statement that is not identical to the assertion. That is, it is satisfied as long as there is another true statement that is not identical to *John solved problem 2*. Thus the *ye*-statement carries only the existential meaning but not the scalar meaning, as we have previously discussed.

(35)　　John　[di'erti]$_f$ ye zuochulaile　　[NP $_f$ + *ye*]
　　　　'John solved also problem 2.'

(36)　a.　⟦ John [di'erti]$_f$ ye zuochulaile ⟧ ^{0} = John solved problem 2
　　　b.　⟦John [di'erti]$_f$ ye zuochulaile ⟧ ^{f} = {John solved problem 2, John solved problem 3, John solved problem 4 }
　　　c.　The existential presupposition ^{ye}
　　　　$\exists q [C (q) \& {}^\vee q \& q \neq {}^\wedge p]$

　　　　(37) shows the meaning of the sentence with *lian...ye*. It differs from the *ye* statement in the added presupposition of *lian* in (38d). As explained earlier, *lian* introduces a scalar presupposition that ranks the assertion *John solved problem 2* as the least likely among all alternative propositions. Thus the combination of *lian* and *ye* gives the sentence both scalar and existential meanings.

(37)　　John *lian* [di'erti]$_f$ *ye* zuochulaile　　[*lia*n NP$_f$ + *ye*]
　　　　'John solved even problem 2.'

(38)　a.　⟦John lian [di'erti]$_f$ ye zuochulaile ⟧ ^{0} = John solved problem 2
　　　b.　⟦John lian [di'erti]$_f$ ye zuochulaile ⟧ ^{f} = {John solved problem 2, John solved problem 3, John solved problem 4 }

    c. The existential presupposition ^{ye}

        $\exists q\ [C\ (q)\ \&\ ^{\vee}q\ \&\ q \neq {}^{\wedge}p]$

    d. The scalar presupposition ^{lian}

        $\forall q\ [[C\ (q)\ \&\ q \neq {}^{\wedge}p]\ \rightarrow\ q >_{likely} {}^{\wedge}p]$

However unlike *dou* and *lian...dou* which may converge in a way to give the effect of optionality of *lian*, this doesn't happen for *ye* and *lian...ye*.

The advantage of packaging meaning this way is that it enabled us to capture the differences and similarities between *dou* and *ye* on the one hand and *lian...dou* and *lian...ye* on the other. For instance, in the assistant/associate professor example, *dou* merely indicates what the speaker's expectations were about the alternative propositions, not about the alternatives being true. *Ye*, on the other hand, has precisely this implicature, leading to the contrast observed. In addition, it enabled us to derive the meanings of *lian…dou* and *lian...ye* from each piece whose semantics can be independently motivated.

3. Implication[13]

The analysis we have proposed for focus *dou* clearly rests on the view that there are two distinct *dou*'s in Chinese, both connected by an expectation-oriented presupposition. Below we provide empirical evidence to support this view. We show that a sentence with *dou* can be ambiguous between the scalar reading and the distributive reading whether it involves a singular NP or a plural NP.

First, (39) with a singular NP is ambiguous depending on whether *dou* is stressed or not. When *dou* is stressed, we get the distributive reading and when *dou* is not stressed, we get the scalar reading.[14] When *lian* is added, as in (40), the scalar reading is salient but the distributive reading is not.

---

[13] This analysis raises many further issues such as the potential redundancy between *lian* and *dou* assuming both introduce scalarity, the dependence of *lian* on *dou/ye*, and scalrity of *ye* statements etc. In view of the space, I discuss only the ambiguity of *dou* here. I refer readers to Chen (2008) for discussions of other issues.

[14] The fact that *dou* shows differing stress patterns in different structures is not a new observation. For example, Hole (2004) cited the following from Sybesma (1996), claiming that distributive *dou* in (i) must bear stress and scalar *dou* in (ii) can't bear stress. But they didn't discuss ambiguity of *dou* in a sentence or a sentence with a singular NP.

(i)   Tamen dou^{stress} lai le

       they   dou   come-ASP

       'They all came.'

(ii)   Lian [tamen] $_f$ dou /*dou^{stress} lai le

       even they   dou   come-ASP

       'Even they came.'

(39)   Zheben shu,   ta dou dule
         this-CL book,   he dou read-ASP
         (i)   'He has read all of this book.'   - Distributive, dou ^{stressed}
         (ii)   'He has read even this book.'   -Scalar, dou ^{unstressed}

(40)   Lian [zheben shu]_{f,}   ta dou kanle
         even this-CL book,   he dou see-ASP
         (i)   'He has read even this book.'
         (ii) ? 'He has read all of the book.'

The difference between (39) with a stressed *dou* and (40) with *lian...dou* can be seen in (41), where a stressed *dou* is not ok with the continuation 'but he hasn't finished it', but an unstressed *dou* is. In other words, the distributivity in the former cannot be cancelled but the distributivity in the latter can. Thus if *dou* in (40) involves a distributive reading at all, it is not the same as the one in (39). Thus the two *dou*'s should be separated.

(41)   a.   Zheben shu   ta dou^{stressed} dule, * keshi hai meiduwan
                this-CL book,   he dou read-ASP   but still not   finish
                'He has read the entire book. But he hasn't finish it yet.'

         b.   Lian zheben shu,   ta dou dule,   keshi hai mei duwan
                even this-CL book, he dou read-ASP, but still not   finish
                'He has read even THIS BOOK. But he hasn't finished it yet.

A sentence with a plural NP shows the same ambiguity. For instance, our old example in (42) has both distributive reading and scalar reading:

(42)   John he Mary   dou hua le yifuhua.
         John and Mary   dou draw -ASP one-CL picture
         (i)   'John and Mary each drew a picture.'   - Distributive, dou ^{stressed}
         (ii)   'Even John and Mary drew a picture.'   -Scalar reading, dou ^{unstressed}

In fact, to get the 'scalar-distributive' reading for (42), two *dou's* can even appear overtly in the same sentence. As in (43), when scalar *dou* (*dou*^{scalar}) is in front of distributive *dou* (*dou* ^{dist}), the sentence has the scalar-distributive meaning: That John and Mary each drew a picture was something the speaker had not expected. [15]

---

[15]   Roger Schwarzschild (p.c) raised a question about the order of the two *dou*'s. In fact, scalar *dou* must precede distributive *dou.* The sentence is bad when we reverse the positions of the two *dou*'s as in (i), showing that distributive *dou* somehow has to be closer to the VP than scalar *dou*.
(i)   * [John he Mary]_f   dou ^{dist} dou ^{scalar} hua le   yifuhua

(43)   (Lian) [John he Mary]$_f$ dou^{scalar} dou ^{dist} hua le yifuhua
        even   John and Mary dou   dou   draw -ASP one-CL picture
        (i)   'Even John and Mary each drew a picture'
        (ii)   * 'Even John and Mary together drew a picture.'

In addition, that the sentence doesn't have the 'scalar collective' reading as (43ii) indicates that the two *dou's* are independently needed. That is, scalar *dou* doesn't override the role of distributive *dou* and vice versa. I take the above as evidence that dou is indeed ambiguous.

4. Conclusion

This paper studied *dou* in *lian...dou/ye* constructions. It argued that *dou* is scalar itself and its scalarity is captured by relating it to the context-sensitivity of distributive *dou*. In this connection, we proposed to analyze *lian* as *even* that is viewed as involving only scalar presupposition but not existential presupposition. This analysis not only enabled us to capture the differences between *lian...dou* and *lian...ye*: the former has only scalarity and the latter has both scalarity and existentiality, it also revealed to us some interesting facts about the two *dou's* that will otherwise remain hidden.

REFERENCES

CHEN, LIPING. 2005. Dou (dis) harmony in Chinese. *Proceedings of North East Linguistic Society* 35.
CHEN, LIPING. 2008. *Dou: Distributivity and Beyond*. Ph.D dissertation, Rutgers University

---

Intended meaning: 'Even John and Mary each drew a picture'
I don't have an explanation why there is such a restriction to the two *dou's* and will leave it for future study. Below I just want to point out some of the relevant discussions about this in the literature that I am aware of. Gao (1994) provided the example in (ii) to argue for two *dou's*, which I cited from Shyu (1995). In (ii), distributive *dou* can appear below negation, but scalar *dou* cannot.

(ii)   Lian [tamen] $_f$ dou meiyou   dou   mai zheben shu
        even they   dou   not   dou   buy this-CL book
        'Even they have not all bought this book'

Zhang (1997) pointed out that the distance between scalar *dou* and the focused element is shorter than the distance between distributive *dou* and its licensers. In his approach, scalar *dou* M-commands the focused element and distributive *dou* is C-commanded by its licenser. I refer the readers to his thesis for details.

HOLE, DANIEL. 2004. *Focus and background marking in Mandarin Chinese. System and theory behind cai, jiu, dou and ye.* London &New York: Routledge Curzon.

HUANG, SHI-ZHE. 2004. *Universal Quantification with Skolemization as Evidenced in Chinese and English.* Edwin Mellen Press

KARTUNNEN, LAURI, and STANLEY PETERS.1979. Conventional implicature. In C. K. Oh and D. A. Dinneen (eds), *Syntax and Semantics 11: Presuppositions*, 1-55. New York: Academic Press.

KAY, PAUL.1990. Even. *Linguistics and Philosophy* 13, 59-111

LAHIRI, UTPAL.1998. Focus and negative polarity in Hindi. *Natural Language Semantics* 6, 57-123.

LEE, THOMAS.1986. *Studies on Quantification in Chinese,* PhD dissertation, University of California, Los Angeles

LEE, YOUNG-SUK, and LAURENCE HORN.1994. *Any* as indefinite plus *even*. Ms. University of Yale.

LIN, JO-WANG.1998. Distributivity in Chinese and its Implications. *Natural Language Semantics* 6, 201-243

PARTEE, BARBARA H. 1988. Many Quantifiers. *Eastern States Conference On Linguistics* 383-402

PORTNER P. 2002. Topicality and (Non-)Specificity in Mandarin. *Journal of Semantics.* Oxford University Press

ROOTH, MATS. 1985. *Association with Focus.* Ph.D. Dissertattion. University of Massachusetts, Amherst.

ROOTH, MATS. 1992. A Theory of Focus Interpretation. *Natural Language Semantics*, 75-116.

RULLMANN, HOTZE.1996. Two Types of Negative Polarity Items. *North East Linguistic Society* 26.

RULLMANN, HOTZE.1997. Even, Polarity, and Scope. In *Papers in Experimental and Theoretical Linguistics*. Martha Gibson, Grace Wiebe, and Gary Litten (eds). Vol. 4. Department of Linguistics, University of Alberta.

SCHWARZSCHILD, ROGER.1994. Plurals, Presuppositions and the Sources of Distributivity, *Natural Language Semantics* 2: 201-248

SHANK, SCOTT. 2004. *Domain Widening.* Ph.D. dissertation, The University of British Columbia.

SHYU, SHU-ING. 1995. *The Syntax of Focus and Topic in Mandarin Chinese*. Ph.D. dissertation, University of Southern California.

SYBESMA, RINT. 1996. Review on Shu-Ing Shyu The Syntax of focus and Topic in Mandarin Chinese. *GLOT International* 4, 12-15

TOMIOKA, SATOSHI, and YAPING TSAI. 2005. Domain Restriction for Distributive quantification in Mandarin Chinese. *Journal of East Asian Linguistics* 14, 89-120.

WILKINSON, KARINA. 1996. The scope of *even*. *Natural Language Semantics* 4, 193-215.

WU, JIANXIN. 1999. *Syntax and Semantics of quantification in Chinese*. PhD Dissertation, Maryland University

YANG, RONG. 2001. *Common Nouns, Classifiers, and Quantification in Chinese*, PhD dissertation, Rutgers University

YU, XI-LIANG. 1965. Yiwen Daci De Renzhi Yongfa. *Zhongguo Yuwen* 1, 30-35

ZHANG, NING. 1997. *Syntactic Dependences in Mandarin Chinese*. PhD dissertation, University of Toronto.

ZHU, DEXI. 1984. *Yufa Jiangyi*. Beijing: Chinese Commercial Press.