Unifying three Mandarin *dou* constructions

The Mandarin Chinese preverbal particle *dou* has various uses. This paper focuses on three types of *dou* constructions and provides a unified analysis of how their syntax and semantics interact.

First, *dou* can be used as a scalar particle. In such constructions, if the focused constituent (called the lian-focus, as it can be optionally marked with lian) is the object, then it must appear before *dou*, either sentence initially or between the subject and *dou*; the basic SVO word order is ungrammatical (1). ([·] indicates alternative positions of the constituent in [·]).

(1) 

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[(lian) Mali] Yuehan [·] dou piping le __/*[·]
LIAN Mary John [·] DOU criticize PFV GAP/[·]
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‘John criticized even Mary’

Second, *dou* can exhaustify a wh-question, in which case the wh-phrase stays in situ (2).

(2) *[·] Yuehan *[·] dou piping le [shui] ?
[·] John [·] DOU criticize PFV who ?

‘What all did John criticize?’ Exhaustive question (without *dou* it is a normal wh-question)

Third, if a wh-phrase (optionally marked with *wulun*) appears before *dou*, either sentence initially or between the subject and *dou*, the sentence receives a universal reading (3).

(3) [(wulun) shui] Yuehan [·] dou piping le __/*[·].
no.matter who John [·] DOU criticize PFV GAP/[·].

‘John criticized everyone’

Phrasal wh *dou* constructions

Note that the wh-phrase in (2) and (3) are in complementary distribution.

The data above lead to the following research questions: What is the semantic contribution of *dou* in these constructions? How to capture the interaction between the syntactic position of the focused constituent and the semantics of the constructions?

Previous analyses of the particle *dou* tend to overlook or exclude from the analysis the use of *dou* in exhaustive questions and therefore do not provide satisfactory answers to the above questions. In this paper, I argue that the exhaustive question construction is in fact a good starting point to understand the role *dou* plays. I adopt a Roothian style two-dimensional system, with two main modifications: (i) the denotation of an expression is a set of ordinary-alternative value pairs, and (ii) *inquisitiveness* resides in ordinary values, i.e., ordinary values are themselves sets. Despite these changes, Rooth’s main insight is maintained: the alternative value of an unfocused expression is the singleton set containing the ordinary value, whereas the alternative value of a focused expression is a set of contextually relevant ordinary values. For example, the denotation of *who* is in (4a). It only has one ordinary-alternative value pair. Its ordinary value is the set of humans, and its alternative value (since it is focused) is the set of relevant ordinary values, i.e., singleton sets of humans.

(4) 

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a. \[\{\text{who}\} = \{(y \mid y \in D_{\text{human}}\}, \{(y) \mid y \in D_{\text{human}}\}\}\]
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b. \[
\begin{array}{c|c}
\text{John} & \text{criticized} \\
\text{\{y\}} & \text{who} \\
\end{array}
\Rightarrow \[
\begin{array}{c|c}
\text{John} & \text{criticized} \\
\text{\{y\}} & \text{\{\text{crit(m)(j)}, \text{crit(b)(j)}, \text{crit(j)(j)}\}...}\end{array}
\]
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Semantic composition in this new system is functional application or recursive pointwise composition (whichever is applicable). For example, the composition of the radical of a normal wh-question *John criticized who?* is shown in (4b). When computing the discourse effect, the question operator ? takes each ordinary value and creates a corresponding question. In this case there is one ordinary value, which corresponds to the wh-question *who did John criticized?* as desired.

To derive its exhaustive question use, I propose that *dou* distributes the alternative values of its argument to create many ordinary-alternative pairs that are further composed in parallel (5a).
The critical derivations of (2) is in (5b). Again, the question operator $?$ takes each ordinary value and creates a corresponding question. In this case, a yes-no question is created out of each ordinary value and (2) is interpreted as “for each $x$, the speaker asks the listener whether John ate $x$,” which only permits an exhaustive answer. This reading is available only when the wh-phrase is in situ because $dou$ only distributes the alternative semantic value of its argument.

Next, for the $wh$ $dou$ construction, I adapt Rawlins’s (2013) analysis on English unconditionals and assume that $wulun$ has no local effect but introduces a universal closure $\forall$ at the root level.

The main derivations of (3) are shown in (6b). Crucially, since $criticized$ is unfocused and hence has a singleton set as alternative value, composing with $dou$ does not change the denotation. After the whole sentence has been composed, the informative content being asserted is $\{crit(m)\} \land crit(b)\}

Wulun Mali haishi/*he Su Yuehan dou piping le no.matter Mary or/and Sue John DOU criticize PFV GAP .

‘John criticized Mary and Sue.’

Finally, I assume that $lian$ has no local effect and introduces a covert EVEN at the root level, which adds a presupposition that the ordinary value is the least likely among those in the alternative value. If the $lian$-focus appears after $dou$, the composition would result in out-of-domain errors, i.e., empty sets in the ordinary values (8). This explains why the $lian$-focus must appear before $dou$.

1The restriction in ordinary value $(m \cap y)$ is needed to maintain Rooth’s question-answer constraint.