DOU-QUANTIFICATION, DISTRIBUTIVITY, AND ALTERNATIVE SEMANTICS*

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1 Introduction

Mandarin *dou* has been claimed to play an important role in the quantificational system of Mandarin Chinese, due to two widely cited observations. First, *dou* is needed to express a distributive reading in the case of plural predication (e.g. Lin 1998:201). Second, to express universal quantification, *dou* is needed (e.g. Lin 1998:219). The next two examples illustrate.[1]

(1) DISTRIBUTIVE READINGS NEED *dou*

a. NO *dou* → COLLECTIVITY (Lin 1998:(1a))

Tamen mai-le yi-bu chezi.
they buy-ASP one-CL car
'They bought a car.'

b. *dou* → DISTRIBUTIVIY (Lin 1998:(1b))

Tamen dou mai-le yi-bu chezi.
they DOU buy-ASP one-CL car
'They each bought a car.'

(2) UNIVERSAL QUANTIFICATION NEEDS *dou* (Lin 1998:(31a))

Mei-ge ren *(dou) mai-le shu.
every-CL people *(DOU) buy-ASP book
'Everyone bought a book.'

The above two types of facts have lead to accounts where *dou* is treated as a quantificational element. Two popular proposals are *dou* as a distributive operator (Lin 1998, Yang 2001, Chen

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[1]Glossing conventions: ASP = aspectual marker, CL = classifier, DE = modification marker. I take numeral/every + CL+noun to have the structure of [[numeral/every CL] noun]]. Nothing crucial hinges on this.

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2008) and *dou* as a (adverbial) universal quantifier of some sort (Lee 1986, Cheng 1995, Dong 2009).

The current paper argues against the quantificational view of *dou*. Instead, it following the proposal developed in Liu (2016, 2017) takes *dou* to be an alternative-sensitive operator. Distinct 'uses' of *dou* are analyzed by associating *dou* with alternative sets of different properties. In particular, 'quantificational/distributive'-*dou* arises when *dou* works with entailment-based alternative sets.

While the paper inherits its basic idea from its predecessors Liu (2016, 2017), it tries to offer a slightly more simplified implementation, which arguably facilitates understanding of the proposal. Furthermore, it contains data reported in the literature (but under-appreciated) that challenge the empirical claim that Mandarin universal quantification needs *dou*.

2 *Dou* is EVEN-like

Besides acting like a distributive item in (1) and (2), *dou* has a different "use": a scalar particle similar to English *even*. Consider (3).

(3) San.ge xuesheng dou mai.le shi.ben shu.
three-CL student DOU buy.ASP ten.CL book
a. EVEN-*dou*: 'A group of three students together bought 10 books, which is unlikely.'
b. DISTRIBUTIVE-*dou*: 'The three students each bought 10 books.'

(3) is ambiguous between (3a) and (3b) (with stress disambiguating the two; specifically, putting stress on *san* 'three' facilitates (3a) while stressing *dou* renders (3b). See Section 5.2 for issues of prosody). Under (3a), *dou* adds an *even*-flavor and the sentence is interpreted collectively (the collective-cumulative distinction is irrelevant to our discussion), while in (3b) *dou* is *even*-less but triggers at the same time a distributivity effect (Lin 1998) and a maximality/definiteness effect (see for example Cheng (2009:67) and Cheng and Sybesma (1999:539) for report of the fact), indicated by the *each* and *the* in the gloss respectively.

Previous accounts of examples like (3) take *dou* to be either a distributivity operator similar to English *each* (Lin 1998) or a maximality operator mimicking the effect of the definite article *the* (Giannakidou and Cheng 2006). Without going into the details of the two accounts, it is easy to see that neither captures the full paradigm: taking *dou* to be *each* misses its maximality/definiteness effect in (3b) while making *dou* an adverbial *the* leaves unexplained its distributivity effect; furthermore, neither accounts for *dou*'s *even*-flavor as in (3a).

We present a unified analysis of Mandarin *dou* that captures not only its distributivity and maximality effects in (3b), but also its *even*-flavor in (3a). The central idea is that *dou* is an EVEN-like item, with a semantics similar to English *even* proposed in Karttunen and Peters (1979) (cf. Liao 2011:217). In (4), π stands for the prejacent of *dou*, and $[\![\pi]\!]^{Alt}$ its alternative semantic value (Rooth 1985, 1992), a set of propositions in this case. Notice that I assume for simplicity that *dou* takes sentential scope, which could be achieved either by movement of *dou*, similar to movement of *even* (Wilkinson (1996), Karttunen and Peters (1979), Lahiri 1998, Crnič (2014)), or by making *dou* an indicator of a covert *even* that has sentential scope (Liao 2011:215). In the latter view, *dou* does not have its own meaning. The paper adopts the movement view as in (5), but nothing crucial hinges on this. Finally, I take it that in (3), *three* is the alternative trigger (evidenced by the prosodic profile of (3a)), and I use $_F$ to mark it.

(4) $[\![dou(\pi)]\!]$ is defined
iff $\forall q \in [\![\pi]\!]^{\text{Alt}}[\neg([\![\pi]\!] = q) \rightarrow [\![\pi]\!] \succ_X q]$
if defined, $[\![dou(\pi)]\!] = [\![\pi]\!]$
In words: *dou* is truth conditionally vacuous but presupposes that its prejacent is the strongest proposition among its alternatives (on some scale X).

(5) LF: [*dou* [$_\pi$ three$_{\text{F}}$ students bought ten books]]

The entry in (4) is more general than the semantics of *even* in Karttunen and Peters (1979) and is parameterized (cf. Greenberg 2016). While Karttunen and Peters' *even* is restricted to the scale of unlikelihood, the one in (4) is not. As will be clear below, setting the scale parameter to entailment accounts for distributivity of *dou*.[2]

2.1 The *Even*-flavor

Treating *dou* as EVEN-like naturally accounts for its *even*-flavor in (3a). (6) below is a plausible alternative set for (3a) (with *san.ge xuesheng* 'three students' interpreted as standard existentials, hinted by the *there were* ... in (6)). Since the prejacent, being interpreted collectively, has no entailment relation with the other alternatives, the scale parameter has to be set to unlikelihood and *dou* conveys the *even*-flavor.

(6) $[\![\pi_{(3a)}]\!]^{\text{Alt}} = \left\{ \begin{array}{l} \ldots \\ \text{three were 5 students such that they together bought 10 books,} \\ \text{there were 4 students such that they together bought 10 books,} \\ \text{there were 3 students such that they together bought 10 books } (= \pi) \end{array} \right\}$

A question might arise at this point. Why is the proposition *that there were 2 students such that they together bought 10 books*, which presumably is more unlikely than the prejacent, not in (6)? I think the answer has to do with contextual pruning. The same process would explain the felicity of *she even made it to the semi-finals*$_{\text{F}}$, even though *that she made it to the finals* is more unlikely (Kay 1990).

2.2 The Distributivity Effect

While setting the scale parameter to unlikelihood captures *dou*'s *even*-flavor, setting it to entailment accounts for its distributivity effect. In this case, a distributive construal is required to make sure *dou*'s prejacent entails all the other alternatives. In this sense, entailment-based *dou* forces a distributive reading of its prejacent.

Let me first clarify my assumption about distributive readings. I analyze distributive readings by a covert distributivity operator (7) optionally on VP (Link 1987).

(7) $[\![Dist]\!] = \lambda P \lambda x \forall y[(y \leq x \wedge Atom(y)) \rightarrow P(y)]$

[2](4) differs from the proposal in Liu (2017) in the following way: in Liu (2017), I take entailment as a special unlikelihood relation, which is justified by that fact that unlikelihood always respects entailment — if p entails q, q cannot be more unlikely than p (Lahiri 1998, Crnič 2014). Under this understanding of unlikelihood, *dou* uniformly operates on the scale of unlikelihood and no parameterization is needed. On the other hand, the current paper, for reasons of exposition, takes entailment and unlikelihood as separate, and parameterization explains the two "uses" of *dou*.

The existence of a covert distributivity operator in Mandarin Chinese is independently justified by (8a) where *dou* is absent but a distributive reading is possible and strongly preferred for every speaker consulted. In this respect, our judgment agrees with Xiang (2008:229), but differs from Lin (1998:201), who claims that (definite) plurals in Mandarin do not have distributive readings, unless *dou*, according to Lin a distributivity operator, is added. However, it seems that Lin did not take context into consideration. For (8a), even Lin himself (personal communication) agrees that a distributive reading is the preferred one. Below, (8b) and (8c) spell out the LF and semantics of (8a).

(8) (Context: I asked who among the kids drew two pictures; you replied:)

a. Zhangsan he Lisi hua le liang fu.
Zhangsan and Lisi draw ASP two CL
'Zhangsan and Lisi each drew two pictures.'

b. [TP Zhangsan and Lisi [VP *Dist* [VP drew two pictures]]]

c. $\forall y[(y \leq \mathsf{z} \oplus \mathsf{I} \wedge Atom(y)) \rightarrow \exists X[|X| = 2 \wedge \mathsf{pics}(X) \wedge \mathsf{draw}(y, X)]]$

With *Dist*, the prejacent of *dou* in (3)/(5) can be interpreted distributively. Specifically, I propose that (9) is the alternative set associated with *dou* in (b), with *each* representing the distributivity operator *Dist*.

(9) $[\![\pi_{(3b)}]\!]^{\text{Alt}} = \left\{ \begin{array}{l} \text{there were 3 students such that each bought 10 books } (= \pi), \\ \text{there were 2 students such that each bought 10 books,} \\ \text{there were 1 students such that each bought 10 books,} \end{array} \right\}$

In $[\![\pi_{(3b)}]\!]^{\text{Alt}}$, the prejacent of *dou* entails all the alternatives, which satisfies *dou*'s presupposition that its prejacent needs to be the strongest on some scale — in this case, the scale of entailment. On the other hand, since the scale is not based on unlikelihood, no *even*-flavor is triggered. Finally, since the entailment is made possible by the distributive operator (the *each* in (9)), the correlation between *even*-less *dou* and distributive readings is observed, and the distributive effect of entailment-based *dou* is explained.

2.3 The Maximality Effect

The maximality/definiteness effect of *dou* also follows from our proposal. To illustrate, consider contexts where there are exactly three students. In such contexts, any alternative of the from *there were n students such that each bought 10 books* with $n > 3$ will not be included in the actual alternative set. This is because it does not make sense to consider a proposition like *that there were 4 students such that each bought 10 books* if we already know there could only be three students. Thus, the alternative set has to be the one in (9) and we have already seen how *dou* is licensed there without triggering an *even*-flavor.

Things change when there were more than three students in the context. Suppose there were four as in (10). In this case, there is a proposition q in the alternative set entailing the prejacent, and *dou*'s presupposition cannot be satisfied — this is true regardless of whether the scale parameter of *dou* is set to unlikelihood or entailment. For entailment, this is obvious. For unlikelihood, because of the *Principle of entailment* (Crnič 2014) "if p entails q, q cannot be more unlikely than p", the prejacent π cannot be more unlikely than q in (10). The sentence is thus infelicitous in the context.

(10) $[\![\pi_{n>3}]\!]^{Alt} = \left\{ \begin{array}{l} \text{there were 4 students such that each bought 10 books } (= q), \\ \text{there were 3 students such that each bought 10 books } (= \pi), \\ \text{there were 2 students such that each bought 10 books,} \\ \text{there were 1 students such that each bought 10 books,} \end{array} \right\}$

In other words, to get the *even*-less *dou* in (3b), the context has to contain exactly 3 students.[3] In this way, we have derived the maximality/definiteness effect of *dou* in (3b) from its *even* presupposition.

In summary, by examining a single *dou* sentence, the section has sketched an analysis of Mandarin *dou* that captures its *even*-flavor, its distributive effect, its maximality effect, and the interaction among the three. The essence of the story is that *dou* operates on a scale of propositions; since propositions can either be ranked on unlikelihood and entailment, the former corresponds to *even-dou* while the latter distributivity/maximality *dou*.[4]

3 *Dou* is Not Quantificational

Most previous analyses of *dou* treat *even*-less *dou* as a quantificational element, either a (adverbial) universal quantifier (Lee 1986, Cheng 1995, Dong 2009) or a distributive operator (Lin 1998, Yang 2001, Chen 2008). In this section, we will take the distributive operator analysis in Lin 1998 as representative of the quantificational analyses (but what we will say applies to the universal quantifier analyses as well). We will argue that *dou* cannot be quantificational, because it does not have fixed quantificaitonal force and it does not take scope.

There are mainly two types of facts that motivate Lin (1998) to treat *dou* as a distributive operator whose semantics equals to the covert *Dist* in (7).

First, when associated with a plural definite, *dou* forces distributive readings. This is the distributivity effect of *even*-less *dou* discussed above.

The second type of facts involves quantifiers. Most importantly, universal quantification in Mandarin requires the presence of *dou*, illustrated in (11a).

(11) a. Mei-ge-xuesheng *(dou) mai-le yi-ben-shu.
every-CL-student DOU buy-ASP one-CL-book
'Every student bought a book.'

b. $[\![\text{mei-CL-student}_{LIN}]\!] = \bigoplus \mathsf{student}(x)$[5]

c. $\forall x[(x \leq \bigoplus \mathsf{student} \wedge Atom(x)) \rightarrow \exists y(\mathsf{book}(y) \wedge \mathsf{bought}(x,y))]$

One consequence of treating *dou* as a quantificational element is that Mandarin *every*-NP needs to be taken as non-quantificational. Indeed Lin (1998) analyzes the *every-dou* puzzle as follows:

[3] What happens when there were less than 3 students in the context? In such a context, the alternative set won't contain the prejacent, which is ruled out by the Focus Interpretation Principle in Rooth (1992) which requires the prejacent to be always in the alternative set.

[4] The explanation of (1b) is analogous. Plural definites such as *tamen* 'they' trigger alternatives, each of which is a sub-plurality of $[\![they]\!]$ (Malamud 2012), and thus all alternative propositions stand in an entailment relation under a distributive constural, similar to (9).

[5] $\bigoplus \mathsf{student}(x)$ is a (presupposition-less) notational variant of $\sigma x.\mathsf{student}(x)$ (Sharvy 1980, Link 1983), which stands for the mereological sum of all entities to which student applies. We adopt this notation from Champollion (2010). Notice that Lin's own analysis uses *sets* instead of *sums* to represent pluralities, so he has $\bigcup$student. We systematically use *sums*.

different from English *every*-NP, Mandarin *meige*-NP is referential (11b), synonymous with *the*-NP. Thus it requires *dou* in order to express a quantificational meaning, as in (11c).

Notice however assigning *meige*-NP a (plural) definite semantics does not really explain why *meige*-NP needs *dou*: there is no reason why a plural definite $\oplus\mathsf{student}$ cannot directly combine with the VP predicate $\lambda x\exists y[P(x) \wedge \mathsf{book}(y) \wedge \mathsf{bought}(x,y)]$, delivering a collective reading in Lin's framework. Lin seems to be aware of this problem. He appeals to syntax: *meige*-NP carries a Q-feature, and thus it has to be distributively quantificational and needs *dou*. This weakens Lin's overall semantic account. Later, we will present our take on this *every-dou* puzzle.

From the above illustration of Lin's account we can see that the essence of a distributive operator analysis (and other quantificational analyses) of *dou* is that *dou*, being quantificational, introduces universal quantification into the truth-conditional semantics. Below, we would like to challenge this basic idea, by showing that *dou* does not seem to be quantificational and *meige*-NP in Mandarin is not referential. Our evidence concerns two very important aspects of a quantificational element – quantificational force and scope.

3.1 No Stable Q-force

Consider first quantificational force. When *dou*'s associate is a definite, another quantificational element Q_{adv} can be added, with the resulting sentence carrying various quantificational force based on the Q_{adv}. This is the quantificational variability (QV) problem of *dou*.

(12) Tamen daduo/henduo dou xihuan Lisi.
they most/many DOU like Lisi
'Most/many of them like Lisi.' Definite $\rightarrow \surd$-QV

(12) seems to be a problem for analyses that treat *dou* as a quantificational element. It shows that a *dou*-sentence doesn't uniformly have $\forall$-quantification.[6] In other words, if *dou* were indeed quantificational, it would have to be a very vacuous one.

Further and more importantly, *meige*-NPs '*every*-NP' do not show quantificational variability (13).

(13) meige xuesheng (∗daduo/∗henduo) dou xihuan Lisi.
every student most/many DOU like Lisi
Intended: 'Most/many of the students like Lisi.' *every*$\rightarrow$ ∗-QV

A comparison of (12)-(13) suggests that Mandarin *every*-NPs are quantificational while definite NPs are not. Thus the latter but not the former allows for another quantificational element. But this distinction (between definites and *meige*-NP) is hard to maintain under Lin's quantificational analysis of *dou*.

[6] I take the *daduo/henduo* in (12) to be adverbial (generalized) quantifiers relating two sets of atomic individuals, roughly $\lambda P\lambda X.\text{MOST/MANY}(\lambda x[x \leq X \wedge Atom(x)], P)$. They are not like English *most of the NPs* that introduces $\exists$-quantification over a group X whose cardinality is greater than a half of the NPs (Nakanishi and Romero 2004). The evidence for this analysis comes from the fact that adverbial *daduo/henduo* do not allow collective readings; that is, [they *daduo/henduo* lift the piano] can only be interpreted distributively, unlike *most of the NPs* but similar to *most NPs*. Under this analysis of *daduo/henduo*, it is hard to make sense of the *dou* in (12), if it is indeed a universal.

3.2 No Scope Bearing

Next let us turn to scopal facts. Under a quantificational analysis of *dou*, *dou* is expected to take scope. Since Mandarin is a famous surface-scope-only language (Huang 1982), we expect everything that comes before *dou* at the surface to have semantic scope over $\forall$ (introduced by *dou* according to a quantificaitonal analysis), and everything after *dou* to fall within the scope of $\forall$. (14)-(15) seems to confirm this prediction (Yang 2001). In (14), *dou* comes before negation and the sentence has the $\forall > \neg$ reading; in (15), negation comes before *dou* and the sentence is interpreted as $\neg > \forall$.

(14) Tamen dou bu xihuan Lisi.
they DOU not like Lisi
'They all don't like Lisi.' $\forall > \neg$

(15) Tamen bu-(shi) dou xihuan Lisi.
they not-(be) DOU like Lisi
'Not all of them like Lisi.' $\neg > \forall$

However, *meige*-NPs 'every-NP' are different again. In (16), both *meige* and *dou* occur before negation, and the sentence has $\forall > \neg$ reading, a result compatible with a quantificational analysis of *dou*. On the other hand, a $\neg > \forall$ reading surprisingly requires negation to appear before *meige*-NP at the surface (17); just putting negation before *dou* results in ungrammaticality (18).

(16) meige xuesheng dou bu xihuan Lisi.
every student DOU not like Lisi
'Every student is such that they don't like Lisi.' $\forall > \neg$

(17) bu-shi meige xuesheng dou xihuan Lisi.
not-be every student DOU like Lisi
'Not every student likes Lisi.' $\neg > \forall$

(18) *meige xuesheng bu-(shi) dou xihuan Lisi.
every student not-(be) DOU like Lisi
Intended: 'Not every student likes Lisi.' *every>NOT>DOU

(19) Tamen bu-(shi) dou xihuan Lisi.
they not-(be) DOU like Lisi
'Not all of them like Lisi.' they>NOT>DOU

The scopal contrast between *meige*-NPs (18) and definites (19) is again unexpected under Lin's quantificational analysis of *dou*, where *meige*-NPs and plural definites are treated on a par. Instead, the behavior of *meige*-NPs in (17)-(18) suggests that *meige*-NP should really take scope, explaining why a $\neg > \forall$ reading must have negation appear before *meige*-NP (instead of just *dou*) at the surface. But if *meige*-NPs take scope, *dou* had better not.

We seem to have a dilemma: (14)-(15) suggests *dou* takes scope, while (17)-(18) shows the opposite.

Yet the dilemma is only superficial. First, even in the definite-case, *dou* need not take scope: a overt $Q_{\forall}$ *quan*, if present, determines scope. The contrast between (20) and (21) shows that (exactly as in the case of *meige*-NPs (17)-(18)), in order to get a $\neg > \forall$ reading, negation has to appear before *quan*, indicating *quan*, rather than *dou*, is the scope-taking universal.

(20) Tamen bu-shi **quan** dou xihuan Lisi.
they not-be all DOU like Lisi
'Not all of them like Lisi.' $\neg > \forall$

(21) $*$Tamen **quan** bu-(shi) dou xihuan Lisi.
they all not-(be) DOU like Lisi
Intended: 'Not all of them like Lisi.' $*quan >$NOT$>$DOU

In the absence of *quan*, we can rely on the covert distributive operator *Dist* (7) posited in the previous section and require it to sit next to *dou* to capture *dou*'s 'scopal' facts. In other words, (14) and (15) actually have the following structures (22)-(23), and what takes scope in these structures is the *Dist*, not *dou*; since *dou* is next to *Dist*, other scopal elements that appear before or after *Dist* at LF also appear before or after *dou* at the surface, thus *dou*'s 'scopal' facts.[7]

(22) [*they* [*dou* [*Dist* [$\neg$ *like Lisi*]]]]

(23) [*they* [$\neg$ [*dou* [*Dist like Lisi*]]]]

It's time to take stock. We have shown that a quantificational analysis of *dou* such as Lin (1998) is problematic. *Dou* neither has obvious quantificational force nor determines scope. It simply does not behave like a quantificational expression. On the other hand, *meige*-NP '*every*-NP', although it generally requires *dou*'s support, is truly quantificational: it contributes stable quantificational force (universal) and takes scope.

4 *Dou* with *Every*

After showing the inadequacy of a quantificaitonal analysis, we have to make sure that our proposal for *dou* can handle (or at least is compatible with) the facts discussed above. We know how our proposal accounts for the distributivity effect of *dou* from Section 2.2, but we don't have an analysis of *meige*-NP and its association with *dou* yet, to which we now turn.

Based on the facts discussed above, we propose Mandarin *meige*-NP is quantificational with standard generalized quantifier semantics Barwise and Cooper 1981. We also assume with von Fintel 1994 that quantifiers have covert domain restriction variables ranging over properties of indivduals and represent it as $_{\mathrm{D}}$ in (24). Further, our *dou* is still *even*-like, as defined in (4).

(24) $[\![\text{mei}_{\mathrm{D}}\text{-CL-student}]\!] = \lambda P \forall x \in D[\mathsf{student}(x) \rightarrow P(x)]$

Next, *dou* associates with an alternative-triggering item, so we need to determine the alternatives to *meige*-NP, which we propose to be its subdomain alternatives (25) (Chierchia 2013).

(25) $[\![\text{mei}_{\mathrm{D}}\text{-CL-student}]\!]_{\mathrm{Alt}} = \{\lambda P \forall x \in D'[\mathsf{student}(x) \rightarrow P(x)] : D' \subset D\}$

Finally, we assume that a sentence contaning a *meige*-NP and *dou* such as (26a) has the analysis in (26b), with *dou* having sentential scope.

[7] Some clarifications: under an account where *meige*-NP, *quan* and *Dist* are quantificational while *dou* is not, 18 and 21 are predicted to have a $\forall > \neg$ reading. Yet the two are bad; this is because, we suggest, the default position of (a narrow scope) negation is low (Beghelli and Stowell 1997), and there is no motivation to move it across *dou*. Indeed, in all cases of $\forall > \neg$, negation has to appear after *dou*, if *dou* is present. See (16) for an example.

(26) a. Mei-ge-xuesheng dou mai-le yi-ben-shu.
every-CL-student DOU buy-ASP one-CL-book
'Every student bought a book.'

b. [DOU [$_{\pi}$ every$_{\mathrm{D_F}}$ student bought a book]]

c. $[\![\pi]\!] = \forall x \in D[\mathsf{student}(x) \rightarrow \exists y(\mathsf{book}(y) \wedge \mathsf{bought}(x,y))]$

d. $[\![\pi]\!]_{\mathrm{Alt}} = \{\forall x \in D'[\mathsf{student}(x) \rightarrow \exists y(\mathsf{book}(y) \wedge \mathsf{bought}(x,y))] : D' \subset D\}$

With the LF in (26b), we derive (26c) as the meaning of the prejacent π, and (26d) as π's alternatives.

Now we have a familiar situation: the prejacent entails all the other alternatives. The scale parameter of *dou* is thus set to entailment and *dou*'s *even*-like presupposition is satisfied, and this is, I claim, why *dou* is possible with *meige*-NPs.

To explain why *dou* is required in (2)/(26a), we suggest that the domain variable of *mei* 'every' is focused as default; in other words, it automatically triggers subdomain alternatives in such cases, similar to NPIs in Chierchia 2013. Thus, it needs *dou* to exhaustify these alternatives away.

Now with *dou* being *even*-like and *meige*-NPs quantificational, our proposal is compatible with all the facts discussed in this subsection. Since *meige*-NPs are quantificational, they do not allow quantificational variability (13), and they determine the scope of the universal based on their surface position (17). Since definites are non-quantificational, they allow quantificational variability (12) and the 'scopal facts' of *dou* (14)-(15) are due to a covert *Dist* on VP that sits next to *dou*. Finally, since *dou* is *even* and truth-conditionally vacuous, it does not interfere with any of the above truth-conditional phenomena.[8]

Before ending this section (and the paper), I would like to point out some facts concerning the co-occurrence of *dou* with *mei*-NPs that have been under-appreciated in the literature. In a corpus-based study, Zhang (2009) examines 4,084 naturally occurring sentences containing *mei*-NPs 'every-NP' to see if *dou* is really a necessary component of universal quantification, and the conclusion she arrives at is that (surprisingly) most of the *mei*-NPs do not need *dou*: only 1,475 out of the 4,084 sentences have *dou* in them. One interesting fact Zhang reports pertains to the interaction between *mei*-NP/*dou* and other focus-sensitive exclusives such as *jiu*, *zhi* and *cai*, all of which could be glossed as some sort of *only* (see Liu 2017 for an extensive discussion of *jiu* and *zhi*). Crucially, in all of the sentences that have *mei*-NP as subject and *jiu/zhi/cai* in the VP (80 out of the 4,084), *dou* is absent. See (27) below for an example.

(27) zhe-zhong che jiage pianyi, **mei-liang** shoujia **zhi** xiangdangyu tong lei
this-type car price inexpensive, every-CL selling-price only amount-to same type
riben che de baifenzhi 70.
Japanese car DE percent 70
'This type of car is inexpensive. The price of each only amounts to 70% of that of a similar Japanese car.'

While the facts and generalizations Zhang 2009 reports are certainly in need of more careful evaluation and discussion, they seem to speak against a quantificational-based explanation of the

[8] We do need *dou* to scope over a universal to get its *even* meaning trivialized. This is easy to obtain even with negation around. To get a $\forall > \neg$ reading, *dou*$> \forall > \neg$ will do, while $\neg > \forall$ requires $\neg >$ *dou*$> \forall$, both of which can be achieved by covert movement of *dou*.

every-dou puzzle. If *mei*-NPs indeed bear a strong Q feature and thus need *dou* to complete the quantificational process as Lin (1998) claims, it is unexpected that this feature can be suppressed for almost two thirds of the cases when *mei*-NPs are present. It is also unclear how the quantificational-based story could explain the connection of the *every-dou* puzzle to other focus-sensitive operators. A not implausible idea based on the proposal developed in the current paper might better explain the connection: the presence of focus-sensitive operators such as *zhi/jiu/cai* signal additional focus (what is under discussion) within the sentence, which suppresses the default focus triggered by *every*-NPs, and thus *dou* is not needed. I will leave an explication of this idea to another occasion.

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