Semantics **_Dou_-quantification, distributivity and alternative semantics** Mandarin Chinese

This talk brings together two strands of current research: one on the role of covert operators *only* and *even* interacting with alternative-sensitive expressions to yield a range of seemingly varied readings (Chierchia 13); the other on the special properties of quantification in Chinese (Cheng 95, Lin 98). It analyzes the so-called distributive particle *dou* obligatory in quantificaitonal structures as covert *even*. The distributivity associated with *dou* is not inherent to it but a result of a particular type of alternative that trivially satisfies the presuppositions of *even* and implicates distributivity.

The distributive effect: *dou* forces a distributive reading of its associate (1); to express universal quantification, *mei*-NP (*every*-NP) has to co-occur with *dou* (3). These *distributive effects* motivate Lin (98) to treat *dou* as a distributive operator (2) and Mandarin *every*-NP as (essentially) referential (4), thus requiring *dou* to express universal quantification.

(1) *Tamen **dou** mai le yi liang chezi.*
they DOU buy ASP one CL car
'They <u>each</u> bought a car.' (Distributive only)

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

(3) *Meige nanhai *(**dou**) xihuan Lisi.*
every boy DOU like Lisi
$\forall y[(y \leq_{Atom} \sigma x.\mathbf{boy}(x)) \rightarrow like.Lisi(y)]$

(4) $[\![meige\ nanhai]\!] = \sigma x.\mathbf{boy}(x)$

We present three novel arguments against this analysis where *dou* is treated quantificational and *every* referential.

The quantificational variability problem: When *dou*'s associate is a definite, a quantificational element Q_{adv} can be added, with the resulting sentence carrying various quantificational force based on the Q_{adv} (5). We call this QV.

(5) *Tamen **daduo/henduo** dou xihuan Lisi.*
they most/many DOU like Lisi
'Most/many of them like Lisi.'

(6) *meige nanhai (*__daduo__/*__henduo__) dou x.h Ls.*
every boy most/many DOU like Ls
Intended 'Most/many of the boys like Ls.'

(5) is a problem for (2): if *dou* is quantificational, it would have to vary between *every*, *many* and *most*. Further, *every* does not allow QV (6), which is a problem for (4): if *every* is referential, it should behave like (5), a false prediction.

The scope problem: Under a quantificational analysis of *dou*, *dou* is expected to take scope. Since Chinese is a surface-scope-only language (Huang 82), we expect everything that comes before *dou* at the surface to have (semantic) scope over the universal, and vice versa for things that come after *dou* (Yang 01). (7)-(8) seem to confirm this.

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

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

But *every* is different. $\neg$ has to occur before *every*, not just *dou*, for $\neg > \forall$ reading (9)-(10), suggesting *every* takes scope.

(9) ***bu-shi** meige nanhai dou xihuan Lisi.*
not-be every boy DOU like Lisi
'Not every boy likes Lisi.' $\neg > \forall$

(10) $*$ *meige nanhai **bu-(shi)** dou xihuan Lisi.*
every boy not-(be) DOU like Lisi
Intended: 'Not every boy likes Lisi.'

We seem to have a dilemma: (7)-(8) suggests *dou* takes scope, while (9)-(10) shows the opposite. Yet the dilemma is superficial. First, in the definite-cases, *dou* need not take scope: a overt $Q_{\forall}$ *quan*, if present, determines scope (11)-(12).

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

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

Then, in the absence of *quan*, we can posit a covert $\forall_{cvt}$ sitting beside *dou* and giving rise to *dou*'s 'scopal' effects—$\forall_{cvt}$ can be seen as the distributive operator *Dist* on VP (Link 83). This suggests that even in (7)-(8), $\forall_{cvt}$/*Dist* bears scope , while *dou* does not. In short, *dou* never takes scope, unexpected under a quantificational analysis.

Association with _nobody_: Although righward-association of *dou* is less studied, it has been noted for *wh*-phrases in questions (Li 92, Lin 98). We see that *dou* can be associated with *nobody* to its right (13).

(13) ***Dou meiyou.ren** lai.*
DOU no.body come
(Association with *nobody*)
'Nobody came'

(13) casts doubt on the distributive analysis, which relies on the introduction of a plurality for *dou* to distribute over. However, the quantificational force of *nobody* cannot be expressed referentially in terms of an $\exists$.

Interim conclusion: On the basis of the above we claim that (a), *dou* is not a quantificational/scopal expression and (b), *meige* NP is quantificational/scopal, instead of referential. A non-quantificational analysis of *dou* is presented below.

A non-quantificational analysis: The analysis presupposes a covert distributive operator (14), which is justified by (15) where *dou* is absent but a distributive reading is possible and strongly preferred for every speaker consulted. Next,

for *dou*, we adopt Karttunen & Peters' (79) analysis of *even* (16), which straightforwardly accounts for *dou*'s 'even'-use (17). We also follow Link (83) and Landman's (89) theory of plurality (with the group operator) and assume a sum has its subparts as its alternatives (18) (alternative in the sense of Rooth (85)), while a group has other groups as its alternatives (19). Finally, we take Chinese *every*-NPs to be generalized quantifiers (Barwise & Cooper 81) with domain variables *D* (20) (Stanley & Szabó 00), and we assume they activate subdomain alternatives in the sense of (Chierchia 13) (21).

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

(15) [Context: Among these kids, I asked who drew two pictures, and you say:]
Jieke he Lisi hua le liang fu.
Jack and Lisi draw ASP two CL
'Jack and Lisi each drew two pictures.'

(16) *dou*(*p*) presup: $\forall q \in C[\neg(p = q) \rightarrow p \prec_{likely} q]$

(17) Lisi dou lai le.
Lisi *dou* come ASP 'Even Lisi came.'

(18) $[\![\text{z and l}]\!] = z \oplus l$; $[\![\text{z and l}]\!]^{alt} = \{z \oplus l, z, l\}$

(19) $[\![\uparrow(\text{z and l})]\!]^{alt} = \{\uparrow(z \oplus l), \uparrow(z), \uparrow(z \oplus w)...\}$

(20) $[\![\text{meige}_D\text{-boy}]\!] = \lambda P[\forall x(\mathbf{boy}(x) \wedge D(x) \rightarrow P(x))]$

(21) $[\![\text{meige}_D\text{-boy}]\!]^{alt} = \{\lambda P[\forall x(\mathbf{boy}(x) \wedge D'(x) \rightarrow P(x))] : D' \subset D\}$

To explain why (1) only has a distributive reading without an *even* flavor, we take its LF to be DOU[*Dist*(*bought a car'*)($[z \oplus w \oplus l]_F$)]. Here, *dou*'s prejacent *Dist*(*bought a car'*)($j \oplus m \oplus b$) logically **entails** all the other alternatives such as *Dist*(*bought a car'*)($j \oplus m$). Since entailment is stronger than likelihood (Crnič 11), *dou*'s *even*-presupposition is trivialized because it is weaker than the assertion and automatically satisfied. Thus, we get a vacuous-'even' ($\Rightarrow$ 'distributive') *dou*. Alternatively, under a collective construal, *dou*'s prejacent does not entail its alternatives; thus the *even*-presupposition remains intact and we get the 'even'-*dou*. Summarizing: 'distributive'-*dou* is just a vacuous-'even' *dou*; since vacuous-'even' *dou* happens when a covert *Dist* is present, we have the correlation between *dou* and distributivity. The *every*-case (3) is similar: since the prejacent *every boy in D bought a book* entails all the other alternatives *every boy in* (a smaller domain) *D' bought a book*, *dou* is licensed. To explain why *dou* is required, we assume the domain variable of the quantificational *every* is obligatorily activated (Chierchia 13). Thus, it needs *dou*'s exhaustification. Problems solved: Since *every* is quantificational, it does not allow QV, and determines scope based on its surface position. Since definites are non-quantificational, they allow QV and the 'scopal facts' of *dou* are due to a covert *Dist*. Finally, *Dou* can be associated with *nobody*, if we assume *nobody* can activate subdomain alternatives, similar to *every*.

Departure from Liao: The idea that *dou* is *even* is not entirely new. Liao (11) (attributing the idea to Mok & Rose 97) shares many of the same assumptions as the current analysis, but with one crucial difference: instead of sum/group, Liao uses *cover* for the distributive/collective distinction (Schwarzschild 96). This has non-trivial empirical consequences: first, theories using Dis_{COV} on VP cannot handle a collective-among-alternatives situation. Below, (22a) stands in for both the English sentence and its Chinese counterpart.

(22) a. Even [Jil, Mary and Sue]$_F$ can't lift the piano.
[Jil, Mary and Sue]$_F$ *dou* lift-not-up the piano.

b. EVEN[*can't.lft.the piano'*($\uparrow j \oplus m \oplus s)_F$]

c. EVEN[Dis_{COV}(*can't.lft.th.pino'*)($j \oplus m \oplus s_F$)]

(22a) has a collective reading where we compare the likelihood of ϕ: *j, m and s together can't lift the piano* with that of its alternatives such as ψ: *j and m together can't lift the piano*. The present theory (22b) captures this by allowing $\uparrow j \oplus m$ to be an alternative of $\uparrow j \oplus m \oplus s$. A Dis_{COV}-analysis cannot get this reading. Since Dis_{COV} does not receive focus , the *COV* variable cannot vary among the alternatives of $j \oplus m \oplus s$. Yet a single COV_1 doesn't work: the collectivity of ϕ requires $g(COV_1) = \{j \oplus m \oplus s\}$, while the collectivity of ψ requires $g(COV_1) = \{j \oplus m, ...\}$. Since the two requirements cannot both be satisfied, Liao's theory is unable to capture the collective reading of (22a).

Second, the current analysis is compatible with the phonetic fact that 'distributive'-*dou* is stressed while 'even'-*dou* is not (Sybesma 96). This is because we take the 'two' *dou*'s as involving different types of foci (sum vs. group), and it's well known that different foci can plausibly be associated with different stress patterns. It's not clear how this would follow on Liao's account where the locus of the explanation would be a difference in contexts (specifically, in Rooth's *C*'s).

Conclusion: Radically different quantification structures across languages pose challenges for cross-linguistic studies (Chierchia 98, Matthewson 01). Here we attempt to bring *dou*-quantification in line with quantification strategies in other languages, by brining it in line with the theory of focus particles and alternatives. A second theme of our talk is the use of different types of alternatives to account for multiple faces of a focus particle. This has implication for analyses of other Chinese focus particles (*jiu*, *ye*, *cai*...), which systematically show heterogeneous uses.

Selected Refs: Cheng 95 On *dou*-quantification *JEAL*. Chierchia 13 Logic in Grammar *OUP*. Liao 11 Alternatives and Exhaustification.Harvard thesis. Lin 98 Distributivity in Chinese *NALS*.