Does Mandarin *dou* ever have rightward associates?

Huba Bartos
(Research Institute for Linguistics, Hungarian Academy of Sciences)

Abstract
The Mandarin quantificational adverb *dou* 都 is well-known for its versatility: it occurs in a wide variety of constructions, and has a wide range of semantic and pragmatic contributions to the meaning of the clause it occurs in, ranging from universal quantification, through *even*-type focusing, to clearly pragmatic-attitudinal functions. This paper targets a relatively narrow segment of this wide spectrum: those use of *dou* where (i) it is used with universal quantificational force, and/but (ii) the linguistic expression often associated with its quantification domain in the literature appears to its *right* in the clause, as opposed to the much more usual scenario of its associate taking a position to its *left*. It is shown that the alleged associates to its right are in fact *not* its true associates syntactically, at least not in the manner that its leftward associates are: (i) the 'personal pronoun' construction in fact complies with the LC, making use of covert elements; (ii) in the 'kind-denoting NP' construction the associate of *dou*, providing it with a variable to bind, is the VP, rather than the kind-denoting NP; (iii) in the 'wh-pronoun' construction *dou* is an adverb functioning as a discourse particle, it takes no associate, binds no variable, but modifies the meaning of the question by adding two congruency requirements (plurality, exhaustivity). Some remaining questions are addressed in a very tentative manner in an Appendix.

1 Introduction

The Mandarin quantificational adverb *dou* 都 is well-known for its versatility: it occurs in a wide variety of constructions, and has a wide range of semantic and pragmatic contributions to the meaning of the clause it occurs in, ranging from universal quantification (often hand in hand with distributivity), through *even*-type focusing, to clearly pragmatic-attitudinal functions, such as expressing the speaker's perception of some measurable quantity (e.g., time) as having reached a significant or excessive amount (see, e.g., Lü 1980, Lee 1986, Lin 1998, Yuan 2005, among an immense number of other works treating various uses of *dou*). This paper targets a relatively narrow segment of this wide spectrum: those use of *dou* where (i) it is used with universal quantificational force, and/but (ii) the linguistic expression often associated with its quantification domain in the literature appears to its *right* in the clause, as opposed to the much more usual scenario of its associate (the DP or QP serving it with a set to quantify over its members) taking a position to its *left*. The primary aim of the paper is twofold:

- To show that in these 'rightward-looking *dou*' constructions the alleged associates to its right are in fact *not* its true associates syntactically, at least not in the manner that its leftward associates are – a point that has already been made in the literature w.r.t. two of the three main such construction types (Yuan 2005, Zhang et al. 2012), so here my current aim is to propose slight corrections to these previous observations and analyses, as well as to extend this observation to the third construction type;
- To offer non-uniform analyses (contra Shin 2007, Zhang et al. 2012) for these constructions, showing that each of them is a non-rightward-looking case *in a different way*.

2 *Dou* with (alleged) rightward associates

As alluded to above, probably the most frequent use of *dou* (and the one that has drawn probably the most attention in linguistics) is where it is associated with a nominal (often quantificational) phrase that denotes a set of individuals, and *dou* universally quantifies (and usually also distributes

the predicate or the members of a set denoted by one of its arguments) over these set-members (see Lee 1986, Cheng 1995, Lin 1998 for 'standard' discussion and analyses in modern theoretical terms):[1]

(1a) ***Na ji-ben shu*** wo ***dou*** kan-guo.
that a_few-cl book I all read-exp
'I have read all of those books.'

(1b) ***Mei-ge xuesheng dou*** tijiao-le biye lunwen.
every-cl student all submit-prf graduate thesis
'Every student has submitted their thesis.'

(2b) Lao Er gen ***laoshimen dou*** qian-le hetong.
L.E. with teachers all sign-prf contract
'Lao Er has signed contracts with all of the teachers.'

The associate of *dou* stands to its left, i.e., precedes it in the linear arrangement of the clause – this is often phrased as a well-formedness requirement on this quantificational construction as the so-called *Leftness Condition* (Lee 1986):

(3) ***Leftness Condition (LC)***
The associate of *dou*, over whose denotation it expresses universal quantification and distributivity, must occur to its left.

However, there are a handful of constructions, equally well-known from the literature (Ma 1983, Li 1995, Yuan 2005), that apparently defy this condition: they contain an instance of *dou* brought into some sort of association with another constituent (an NP or DP) appearing to the right of *dou*, and *dou* is usually assumed to play the same role of universal quantifier in these examples as in the 'canonical', LC-observing ones. These seemingly LC-violating cases fall into three types according to the nature of the apparent associate of *dou*:[2]

- the rightward 'associate' is a personal pronoun: (4)
- the rightward 'associate' is a kind-denoting NP: (5)
- the rightward 'associate' is a wh-phrase: (6)

[1] This is a simplifying description insofar as the associate of *dou* need not itself denote a plurality; it suffices if some sort of plurality (such as the plurality of its referent's components or minimal parts) is made available by the associate, as in (i):

(i) Na-ben shu wo dou kan-wan-le.
that-cl book I all read-finish-prf
'I have finished [= read all (parts) of] that book.'

[2] Zhang et al. (2012: 64) make a four-way distinction: apart from the three types mentioned here, they assume that associates with (一)些 'some' (as in (i)) constitute a fourth type. My contention, however, is that in all crucial respects these are just a subcase of the kind-denoting associate type, and while it is clear that 一些 +NP nominals are larger than NPs (say, NumPs), and carrying this determiner they are not *bona fide* kind-denoters, they will be shown to fall under the account for the latter (whereby the crucial common property is not exactly 'kind-denoting', but 'non-referential', but for the ease of exposition I will continue to use the label 'kind-denoting NP' for this type.

(i) Ta dou kan xie meiyong de dongxi.
he all read some useless de thing
'He always/only reads (some) useless things.'

(4a) Wangwu **dou** yaoqing ***tamen*** le.
Wangwu all invite they crs
'Wangwu invited them all.'

(4b) Wo **dou** renshi ***tamen***.
I all know they
'I know them all.'

(5a) Lao Li **dou** chi ***mianbao***.
Old Li all eat bread
'Old Li always/only eats bread.'

(5b) Ni de linju **dou** chuan ***man nigou de xiezi***.
you de neighbor all wear full dirt de shoe
'Your neighbor always wears totally dirty shoes.'

(6a) Ni **dou** qu-guo ***na-xie difang***?
you all go-exp which-pl place
'Where all have you been?'

(6b) Lisi **dou** renshi ***shei***?
Lisi all know who
'Whom all does Lisi know?'

(6c) **Dou *shei*** lai canjia wanhui le?
all who come attend party crs
'Who all came to attend the party?'

3 Some puzzles – and some less than perfect solutions

Each of the above types of 'rightward-looking' *dou* constructions has certain puzzling properties that need to be addressed by any proposed account for these cases. These also bring into question the assumption that the alleged associates are truly *dou*'s associates in these constructions.

3.1 The puzzle of the personal pronouns

Why is the construction illustrated in (4) above confined to pronominal associates, i.e., why are the same sentences degraded with lexical DPs and NumPs in the place of the pronoun (7), especially in view of the fact that there is no similar constraint on leftward associates: (8)

(7a) * Wangwu dou yaoqing ***ziji de pengyou /you-xie pengyou*** le.
Wangwu all invite self de friend / exist-pl friend crs
intended: 'Wangwu invited all of his friends / certain friends'

(7b) * Wo dou renshi ***naxie zhuanjia***.
I all know those expert
intended: 'I know all of those experts.'

(8a) Ziji de pengyou / You-xie pengyou Wangwu dou yaoqing le.
self de friend / exist-pl friend W. all invite crs
'Wangwu invited all his friends / [all of] certain friends.'

cf. (4a') Tamen Wangwu dou yaoqing le.
they W. all invite crs
'Wangwu invited them all.'

(8b) Naxie zhuanjia wo dou renshi.
those expert I all know
'I know all of those experts.'

cf. (4b') Tamen wo dou renshi
they I all know
'I know them all.'

In fact, this puzzle has received a neat explanation already: Lin (1998) argued that in sentences like (4a, b) the pronoun is in fact a resumptive one, resuming a covert topic licensed by / recoverable from the discourse: (9), and in fact this topic could as well be overt: (10)

(9) Wangwu feichang xihuan *ziji de pengyou*, suoyi [$_{Top}$ ~~ziji de pengyou~~]$_x$ ta dou yaoqing tamen$_x$ le.
W. very like self de friend therefore he all invite they crs

'Wangwu likes his friend a lot, so he invited them all.'

(10) [$_{Top}$ Naxie zhuanjia]$_x$ ne, wo dou renshi tamen$_x$.
those expert prt I all know they
'Those experts, I know them all.'

Under this account the LC-violation disappears: *dou* is in fact associated leftward, with the (overt or covert) topic phrase, rather than the pronoun. And as resumptive pronouns translate as variables (the 'lexical DP ~ resumptive pronoun' unit being a movement-like chain), there is a well-placed variable for *dou* to bind, just as it binds the trace of a moved QP in simple, run-of-the-mill LC-observing cases, such as (1a, b) above. If this account is on the right track, then in fact this construction is *not* a case of rightward-looking *dou* at all.

There is some reason to worry, though. Many Mandarin speakers in fact find (7a, b) and similar sentences with a lexical DP perfectly acceptable, which means that the resumptive analysis is not available – in other words: we face a genuine case of *dou* with a rightward associate. Note, at the same time, that the same sentences with NumPs and QPs in the associate position are bad for even these speakers:

(11a) * Wangwu dou yaoqing ***ji-ge*** ***pengyou*** le.
Wangwu all invite a.few-cl friend crs
intended: 'Wangwu invited all/each of a number of friends.'

(11b) * Wo dou renshi ***yi-xie*** ***zhuanjia***.
I all know one-pl expert
intended: 'I know all/each of some experts.'

(11c) * Wo dou renshi ***mei-ge zhuanjia***.
I all know every-cl expert
'I know every expert.'

cf. (11c') Wo [mei-ge zhuanjia]$_x$ dou renshi t_x.

I therefore propose that in the grammar of these speakers what happens is the following scenario. I essentially assume Lin's (1998) analysis of canonical quantificational (i.e., LC-observing) structures with *dou*:

- **syntax:**
  - *dou* is a distributivity operator, situated in Dist^0 (à la Beghelli & Stowell 1997)

  - its associate moves to spec,Dist (triggered by some 'strong' feature)
  - *dou* has the lexical property of needing a free variable to bind within its scope – this is usually provided by the trace of its associate
- **semantics:**
  - *dou* is an adverb denoting a function (**dou** $\Rightarrow \lambda P \lambda X \forall y[y \in X \rightarrow P(y)]$, where $P \in D_{<e,t>}$)
  - *dou* distributes a property denoted by a VP over its associate QP or DP
  - *dou* is free to select *any* trace within its domain (VP) to bind

What distinguishes DPs, *mei*-QPs, and NumPs is their referential licensing, all set in a Beghelli & Stowell-style syntax: (12). *Mei*-QPs must move to spec,Dist overtly, see (11c); strong DPs have a choice between overt movement (= topicalization), or covert movement, to spec,Ref (probably via spec,Ref). Personal pronouns and lexical DPs behave alike in this respect. Finally, NumPs (like those in (11a, b)) are licensed by a covert relation to Share^0, so they will not move overtly – unless they are referentially strengthened (specificity, like *you-xie NP* 'certain …-s' in (8a)), in which case they overtly raise to spec,Ref, or they are universally quantified, thus having to move overtly to/through spec,Dist: (13)

(12) [$_{RefP}$ *topic/strong DP* Ref^0 [$_{DistP}$ *UQP* Dist^0 [$_{ShareP}$ *focus/distr.share/counting QP* Share^0 [$_{PredP}$ …

(13) Ji-ge / San-ge zhuanjia dou zou-jinqu-le.
a.few-cl / three-cl expert all walk-enter-prf
'The couple of/three experts (all) entered. '

3.2 The puzzle of the kind-denoting NPs

The major puzzle here is why referential DPs are unacceptable in this construction, in the place of the kind-denoting NP:

(14a) * Lao Li **dou** chi ***zhe-zhong mianbao***.
Old Li all eat this-kind bread
'Old Li always/only eats this kind of bread.'

(14b) * Ni de linju **dou** chuan ***na shuang xiezi***.
you de neighbor all wear that pair shoe
'Your neighbor always wears that pair of shoes.'

Several things must be clarified here. Firstly, whatever the correct analysis of this construction, and the explanation for this puzzle, there is no associate relation between *dou* and the post-*dou* NP of the kind that obtains between the plurality-providing DP/QP and *dou* in the LC-observing quantificational construction – sentences like (5) simply do not have a meaning compatible with such a scenario. In particular, (5a) does not mean anything like 'Lao Li ate all of the bread', and (5b)'s meaning is nothing close to 'Your neighbor wears all the dirty shoes', cf. the overtly LC-compatible sentences built of the same components in (15).[3]

(15a) Lao Li ***mianbao*** **dou** chi le.
Old Li bread all eat crs
'Old Li ate up all the bread.'

[3] For the naturalness of these sentences, aspect particles have been added, thus partly also modifying the meaning, but not in a way that would interfere with the point made here.

(15b) Ni de linju ***man*** ***nigou de*** ***xiezi*** **dou** chuan-guo.
you de neighbor full dirt de shoe all wear-exp
'Your neighbor has worn all of the totally dirty shoes.'

In other words, *dou* in (5) does not quantify over any sort of plurality related in any odd way to the kind-denoting NP.

Secondly, the role of *dou* here has been likened in the literature to either *only* (只 *zhi*) or *always* (总是 *zongshi*), or both (Lee at al. 1989, Pan 2006, Hu 2014). Hu (2014) shows, though, that *dou* is not genuinely like either of those adverbs, and constitutes a third ('in-between') type of quantifying adverb. At the same time, many speakers' intuition says that in most of these examples *dou* appears to quantify over occasions (or situations: Pan 2006, or events: Hu 2014), much as if there was a covert adverbial *mei-ci* 'each time' in the clause, offering up a set of occasions within a range provided by contextual factors, cf. Pan's (2006) and Zhang et al.'s (2012) suggested semantics for (5a), presented here in a classic first-order formula:

(16) $\forall s$ [s $\in$ set of (relevant/context-given) situations $\rightarrow$ Old Li eats bread in s]

Pan (2006) and Shin (2007), and in their wake Zhang et al. (2012), propose to treat 'rightward looking' *dou* in terms of a tripartite quantificational structure, with *dou* acting as a universal quantifier, its rightward associate, being the focal part of the clause, constitutes the nuclear scope, and the presupposed part of the clause contributes the restriction. To wit, a sentence like (5a) gets the following treatment:

(17) Dou_x [Old Li eats x] [x = bread]

However, it is not clear how such an account can handle the puzzle mentioned above. There should be nothing wrong with focusing a definite/referential nominal, in the first place. Zhang et al. (2012: 68) do in fact make an attempt to explain the problem away by saying that if the associate is a definite singular DP then some plurality requirement on the situations in the restriction is not met, but this explanation fails for three reasons:

- The origin of the assumed plurality requirement is the idea that all the rightward-looking *dou* constructions should be subject to the same analysis, and (as was explicitly shown by Li 1995), the wh-phrase associate construction does indeed display such a condition. But it is not made clear why such a plurality requirement should carry over to the kind-denoting associate type, too, except for the probably mistaken idea itself that we should seek a unified analysis for this group of constructions.[4]
- In the example Zhang et al. use for this demonstration, shown in (18), there is some pragmatic reason to believe that with a single book one cannot associate a plurality of writing events/situations (although even this is prone to counterarguments since the verb *xie* 'write' is not an achievement verb in itself, so there can in fact be several writing situations linked to one and the same book, without a necessary completion of the writing). But it is easy to find examples where such an argument is unavailable -- (14b), for that matter, would be one: the same pair of shoes can in principle be worn by a person on any number of different occasions, so the alleged plurality requirement is met for the set of situation without a glitch.

[4] Hu (2014) makes the point that (contrary to what is presented by Shin (2007)), no aspect marking can occur in the 'dou … kind-denoting NP' construction, and uses this as an argument for analysing *dou* as a quantifier over events, rather than situations (and this is also what sets *dou* apart from *only*). But then this very property sufficiently sets this construction apart from the 'dou … wh-' type, where there is absolutely no such requirement, and which therefore makes the idea of a unified account for the two constructions suspect.

(18) * Ta dou xie de na bu xiaoshuo.
he all write de that cl novel
'He always writes that novel.'

- They also link up these sentences with another construction (with a proper LC-observing configuration), and assume a common semantic translation for the pair, cf. (18'), but my contention is that in fact the semantics they propose for (5a) or (18) is really the translation of this counterpart sentence, and not exactly of the primary, 'rightward associate' one.

(18') * Ta xie de dou shi na bu xiaoshuo.
'All of what he writes is that novel.'

cf. also (5a') Ta chi de dou shi mianbao.
'All of what(ever) he eats is bread.'
'What he eats is all/only bread.'

As an alternative explanation for the unacceptability of referential DPs, as well as QPs, in the construction just discussed, I propose that, again, the differential behavior of nominals in respect of referentiality licensing is responsible for the pattern. Still keeping to Beghelli & Stowell's (1997) proposal, we can analyse this differential behavior in the following terms:

- Kind-denoting NPs are non-referential, hence they are not linked to any of the referentiality-based f-heads/projections in the Beghelli-and-Stowellian clause structure: they will not move to either spec,Ref, or spec,Dist, or spec,Share (either overtly or covertly). No variable is created/contributed by them either. This leaves *dou* with just the event variable to bind (unless some other quantifier deprives it from even this option, as shown by Hu (2014), cf. fn 4), and so a quantification over events emerges, in line with the general intuition. (NB This same scenario holds for those cases, too, where there is no 'associate' whatsoever that could move to anywhere, as in (19).)

(19) Zhangsan dou zai gongyuan li paobu.
Zhangsan all be.at park in run
'Zhangsan always/only runs in the park.'

- Referential DPs, on the other hand, are bound to move to spec,Ref, and certain QPs to spec,Dist, cf. the discussion in 3.1 above. If this happens overtly, then
  - if they are a plural (or plurality-evoking) DP, their movement to or through spec,Dist creates a LC-complying run-of-the-mill *dou* configuration, as in (1a, b) above;
  - if they are singular (and offer no accessible plurality for *dou* to quantify and distribute over), then either **(i)** a deviant structure emerges (there is nothing for *dou* to distribute over), or **(ii)** *dou* seeks to bind an event variable. Depending on this duality, a sentence like (20) is either semantically deviant, or (if the context allows it by making available a set of occasions) it will have the event-quantificational interpretation ('covert *mei-ci*').
- Referential DPs may also move just covertly, but by LF the same sort of configuration emerges as with overt movement, with the same options. So if the 'rightward associate' is singular, as in (18), we end up with semantic deviance, while if it is plural, we expect a well-formed quantificational structure -- and this is confirmed my many native speakers: this is precisely the case treated at the end of section 3.1, and illustrated by (7a, b).
- Finally, NumPs (like *san ben shu* 'three books', *ji ge ren* 'a few people') may only move to spec,Share (below *dou*'s position, in $Dist^0$), and will thus bind their own trace variable. *Dou* may thus only bind the event variable (if there is any), so to the extent that such sentences may be rendered acceptable by the context at all, they only have the covert *mei-ci* 'each time' reading, again: (21)

(20) (#) Na jian dayi wo dou yuanyi chuan.
that cl coat I all willing wear
#'I'm willing to wear all of that coat.' OR 'I'm always willing to wear that coat.'

(21a) ??Lisi dou mai wu ben shu.
Lisi all buy five cl book
'Lisi always (=on every occasion) buys/bought five books.'

(21b) * Lisi dou renshi san wei laoshi. – ILP → no event variable
Lisi all know three cl teacher
'???'

In sum: in the 'kind-denoting NP as *dou*'s associate' construction the kind-denoting NP definitely does not play the role of true associate. *Dou* thus does not play the same role, either, as in the LC-compliant quantificational sentences: it binds an event (or situation) variable, but has no associate *per se*, so the question of direction (left/right) does not literally arise. On the other hand, as soon as the kind-denoting NP is replaced by a referential one, complications enter the picture, moreover the thus emerging structure is related to the one discussed in the previous subsection.

3.3 The puzzle of the wh-pronominals

By far the most discussed of our three rightward-associate constructions is the one with a wh-phrase sitting to the right of *dou*. Its syntactic and semantic quirks have for long drawn the attention of linguists. While certain hallmark semantic properties (genuine question, requiring a plural and exhaustive answer) were recognized early on (Li 1995, Huang 1996), a convincing syntactic analysis matching up with the semantics, as well as an account of the difference between this and the 'leftward wh- … *dou* association' case has not yet been put on the table, as yet. I abstain from reviewing even the most promising accounts here, given the space limitations – this has actually been done to a large extent by Yuan (2005), Shin (2007) and Zhang et al. (2012), to which the reader is referred.

From our current perspective, the major puzzle here is how and why the 'rightward' and 'leftward' *dou* + wh- associations differ: (22).

(22a) Wangwu **dou** renshi ***shei***?
W. all know who
'Whom all does Wangwu know?'

(22b) Wangwu ***shei*** **dou** renshi.
W. who all know
'Wangwu knows everyone.'

If one should try to establish the same kind of relation between *dou* and the wh-phrase in the two cases, as happened in Lin's (1998) account, for instance, one would immediately face the question of how to avoid ending up with the same semantics. In particular, Lin proposes that wh-pronominal associates of *dou* also move to spec,Dist, but (unlike other associates) only do so covertly (by LF), *en route* to their ultimate target: spec,CP, for question formation/typing – this differential behavior is put down to the strength of the triggering feature (weak for wh-XPs, strong for QPs). Given that by LF, the wh-XP and *dou* enter the same configuration in the two constructions, it is difficult to see how the two sharply different meanings will be obtained, moreover, the wh-XP's further linking to spec,CP (or a Q-operator therein, à la Cheng 1991, Tsai 1994) will inevitably lead to a *bijection principle* (Koopman & Sportiche 1982) violation: both the Q-operator and *dou* wish to bind one and the same variable. On the semantics side, Lin's proposal is essentially this:

- *dou* is an adverb denoting a function whose domain is in $D_{<e,\,t>}$ and range is in $D_{<e,\,t>}$
- Translation of *dou*: **dou** $\Rightarrow \lambda P \lambda X \forall y[y \in X \rightarrow P(y)]$, where $P \in D_{<e,\,t>}$

- The index of *dou* is free to select *any* trace within its domain (VP) to bind.

But if we try to apply this to a particular '*dou* … wh-' sentence, like (22a), we run into trouble deriving the question meaning (bumping precisely into the bijection principle violation):

- $[_{DistP}$ *dou* $[_{VP}$ t_{subj} know $t_{wh}]]$ — $\lambda z \lambda X \forall y[y \in X \rightarrow \text{know}(z, y)]$
- $[_{DistP}$ wh- $[$*dou* $[_{VP}$ t_{subj} know $t_{wh}]]]$ — $\lambda z \forall y[y \in \text{people} \rightarrow \text{know}(z, y)]$
- $[_{TP}$ W. $[_{DistP}$ wh- $[$*dou* $[_{VP}$ t_{subj} know $t_{wh}]]]]$ — $\forall y[y \in \text{people} \rightarrow \text{know}(W., y)]$
- $[_{CP}$ wh- $[_{TP}$ W. $[_{DistP}$ t'$_{wh}$ $[$*dou* $[_{VP}$ t_{subj} know $t_{wh}]]]]]$ — ??? $\lambda y \forall y[y \in \text{people} \rightarrow \text{know}(W., y)]$[5]

As discussed already in 3.2 above, there is another line of analysis (Pan 2006, Shin 2007, Zhang et al. 2012) in terms of *dou* projecting a tripartite quantificational structure, and this is assumed to apply to the '*dou* … wh-' construction, too. So a question like (22a) would project the following LF:

(22a') DOU_x [Wangwu knows *x*][*x* = who], or more accurately:
(22a") DOU_x [Wangwu knows *x*] Q*y* [*x* = *y* & PERSON(*y*)] (Zhang et al. 2012: 65)

This solution is both too weak and too strong at the same time. Too weak, because it does not ensure that only plurality-specifying answers are congruent with it (*contra* what is claimed by Zhang et al.): even if there is only one value for *x* satisfying the background predicate (*Wangwu knows x*), formula could still be properly evaluated – in fact, this would even be true with no appropriate value for x. But answers specifying just one value are not felicitous, unless they contain an explicit cancellation of the plurality expectation: (23). On the other hand, it is also too strong, because the universal quantifier requires that the answer be exhaustive – but the actual data suggest that (unlike the plurality requirement) this expectation can in fact be 'benignly neglected' so that the answer is still felicitous: (24, 25).

(23) Q: Wo de tongxue dangzhong ni dou renshi shei?
I de classmate among you all know who
'Who all do you know among my classmates?'

A1: # Wo renshi Lisi.
I know Lisi

A2: # Biru wo renshi Lisi.
for.example I know Lisi

A3: Wo **zhi** renshi Lisi (bu renshi bieren).
I only know Lisi (not know other-person)

(24) A4: Wo renshi Lisi, Wangwu, hai renshi ji ge nühaizi.
I know Lisi Wangwu yet know a.few cl girl
'I know Lisi, Wangwu, and also a couple of girls.'

(25) Q: Ni mai-le xie shenme dongxi ne?
you buy-prf pl what thing Q
'What all have you bought?'

[5] Introducing a new variable for the question operator in the last step would remedy the problem with the formula: $\lambda x \forall y[[y \in \text{people} \rightarrow \text{know}(W., y)] \& y = x]$, but this would violate compositionality: since the same pronominal form is moved/linked to spec,CP as the one raised to spec,DistP, it would stretch compositionality to suddenly assign a second variable to it, out of nothing.

A: Wo mai-le mianbao, niunai, shuiguo shenme de…
I buy-prf bread milk fruit and.the.like
'I've bought some bread, milk, fruits, and the like.'

A common problem for both of these analyses is the assumption that *dou* is assumed to behave like in the plain universal quantificational construction: bind a variable, and quantify over its range. It seems, however, that the meaning of this construction is somehow different, and *dou* does not behave in the regular way.[6] Essentially, it functions as a discourse particle, modifying the denotation of a(n otherwise simple, canonical) wh-question. Clues for such an account come from functionally and semantically similar constructions from other languages. Related constructions can be found in languages as different as German, Hungarian, Hausa, and even some varieties of English. Here is a small sample:

German (Reis 1992, Zimmermann 2007)

(26a) ***Was*** hat er ***alles*** gegessen?
what has he all eaten
'What did he eat?'

(26b) ***Wer*** ist ***alles*** zur Party gekommen?
who is all to.the party come.prt
'Who all has come to the party?'

English (Ulster English: McCloskey 2000, American English: Cirillo 2011)

(27a) %***What all*** have you done today?
(27b) %***Where all*** have you been this year?

Hausa (Hartmann & Zimmermann 2007)

(28) Q: Wàanee-***nèe*** ya zoo?
who-EXH 3sg.m.perf.rel come
'Who all came?'
A: Audù #(***nee***) ya zoo.
Audu EXH 3sg.m.perf.rel come
'It is Audu that came (and nobody else came).'

Hungarian

(29a) ***Mi minden*** volt az asztalon?
what everything was the table-on
'What all was there on the table?'

(29b) ***Hol mindenhol*** járt már Viki?
where everywhere went(3sg) already Vicky
'Where all has Vicky been yet?'

[6] Yuan (2005) also recognized this, but offered a solution different from the current proposal, in terms of a predication relation ("topic–comment") between the *dou*-modified VP and the wh-pronoun. His account is somewhat similar in spirit to the Pan–Shin–Zhang et al. one, but with a completely different technical execution.

Although syntactically markedly different, these examples from these various languages share a number of important semantic properties:

- they demand plurality-specifying answers (cf. (23) above)
- the question pronouns used in them must range over individuals (illustrated for Mandarin in (30) vs. (31)
- according to the general view, they demand an exhaustive answer

(30a) Dou ***shei*** lai canjia wanhui le? PERSONS
all who come participate party crs
'Who all came to the party?'

(30b) Ta dou chi-le (xie) ***shenme***? THINGS
he all eat-prf (cl.pl) what
'What all did he eat?'

(30c) Ta dou qu-guo ***na-xie difang***? PLACES
he all go-exp which.pl place
'Where all has he been to?'

(31a) *Ta dou ***zenme*** jiejue-le lianxi? MANNER
he all how solve-prf exercise

(31b) *Ta dou ***weishenme*** lai le? REASON
he all why come le

(31c) *Ni xia zhou dou ***shenme shihou*** you kong? TIME
you next week all what time have space
'Next week what are all the times when you are free?'

Given the crucial semantic convergence, it is reasonable to assume that they are subject to a single semantic analysis. Zimmermann (2007) argues very convincingly for the following account of the relevant construction in German:

- *wh*-items denote appropriately restricted sets of individuals (Jacobson 1995)

(32) a. [[who]] = {x | x ∈ *PERSON} b. [[where]] = {z | z ∈ *PLACE}

- grammatically singular *wh*-items (*who*, *what,…*) are semantically underspecified as to number, and contain both atomic and plural individuals (cf. Jacobson 1995)

(33) [[who]] = {x | x ∈ *PERSON } = {Peter, Klaus, Paul, Peter+Klaus, Peter+Paul+Klaus, …}

- *wh*-questions denote structured propositions of a special kind: they consist of a question domain (QD) and a background predicate (BP); QD is provided by the meaning of the *wh*-item, which denotes a set of individuals that are appropriately restricted depending on its lexical shape; BP is provided by the λ-abstracted remainder of the question without the *wh*-item (Krifka 2001)

(34) < λx. λw. x left in w , {x| x ∈ *PERSON}>
BP QD

- ***question quantifying particles*** (QQPs) like *w-alles* or *dou* modify structured question denotations as in (47) by placing additional restrictions on their question domain, which corresponds to the meaning of the *wh*-item, thus the QQP has direct access to the meaning of the *wh*-item, as required

(35) *w-alles'* <P, Q> = <P, {x | x ∈ Q & **DIV(x)** & **¬∃z [z > x & z ∈ Q & z ∈ P]** }>
plurality exhaustiveness

By introducing *DIV(x)* and an exhaustiveness condition that serves to exclude any larger alternatives to any x contained in the question domain, *w-alles* restricts the latter such that it contains only the maximal divisible individual satisfying the background predicate P.

Given the cross-linguistic semantic isomorphy here, I believe that this analysis can be transferred to the Mandarin '*dou* … wh-' construction, which means that *dou* is essentially a discourse particle in this case, a QQP, modifying an otherwise plain, singular wh-question, loading it with two demands towards the properties of congruent answers.

Syntactically *dou* is an adverb situated in Dist^0 (as in the nominal quantificational cases),[7] but does not interfere with the syntactic question formation, which proceeds in its standard way: a Q-operator in spec,CP binds the variable provided by the in situ wh-pronoun. In particular, the wh-XP does *not* move to/through spec,Dist, either overtly or covertly, and is *not* associated with it in any other way. The particle nature of *dou* here is evidenced by (i) the complete lack of its operator features (hence its non-interference with the Q-dependency, even though it would obviously be a closer binder for the variable of the wh-pronoun), and (ii) its placement pattern, reminiscent of the focus particle 是 *shi*:[8] its primary position is at the left edge of the predicate phrase from where it can be associated with any wh-pronominal to its right, but shifts to the left to precede something that must be included in its (c-command?) domain. Some illustration is provided in (36):

(36a) *Shi* **wo** xiang cong tushuguan jiechu na ben shu.
foc I want from library borrow that cl book
'It's I who wants to borrow that book from the library.'

cf. *Dou* **shei** xiang cong tushuguan jiechu na ben shu?
all who want from library borrow that cl book
'Who all want to borrow that book from the library?'

(36b) Wo *shi* **cong tushuguan** jiechu le na ben shu
I foc from library borrow prf that cl book
'It was from the library that I borrowed that book.'

cf. Ni *dou* **cong shenme** difang jiechu le shu?
you all from what place borrow prf book
'Where all did you borrow books from?'

(36c) Wo zai tushuguan *shi* jiechu de **na ben shu**.
I at library foc borrow de that cl book
'It was that book that I borrowed at the library.'

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[7] As Li (1995: 319) demonstrates, the presence/absence of *dou* in wh-questions correlates with the availability of a distributive reading, so there is good reason to link *dou* to Dist^0 in this construction, too. Consider:

(i) Ni (*dou*) song-le ***na-xie*** ren liang zhang hua? *dou* → 2 pictures each
you all give-prf which-pl man two cl picture
'Which people did you givw two pictures to (*each*)?'

[8] A very recent contribution to the 'copula verb or particle/adverb' debate concerning *shi* (arguing for the latter view) is Erlewine (2015).

cf. Ni zai tushuguan *dou* jiechu le **na xie shu**?
you at library all borrow prf which pl book
'Which books did you borrow from the library?'

There remains just one question to be answered then: What is the concrete form of association between *dou* and the wh-pronominal whose meaning it modifies? In German, English, and Hungarian the wh-pronoun and the quantifying particle form a syntactic unit (constituent) at least at some point in the derivation of the sentence.[9] In Mandarin, there is no evidence for this kind of association: *dou* never appears to stand adjacent to the wh-XP,[10] and a floating analysis of *dou* is not likely, either, given that it is always the particle that occupies a more leftward position.

Right now I only have a tentative answer: Given the distributional similarity of *dou* (categorially an adverb) with the focus particle *shi* (discussed above) I am inclined to assume that the relevant associative relation is scope. *Dou* as a QQP modifies the meaning of a(ny) wh-pronominal in its scope, i.e., its c-command domain.

Conclusion

I have examined the three basic constructions of Mandarin Chinese where we find the quantificational adverb *dou* 'all' apparently associated with (hence quantifying over the denotations of) items that appear to its right, in violation of the general requirement that such associates of *dou* stand to the left of it (the Leftness Condition). I have shown that of these three constructions:

- the 'personal pronoun' construction in fact complies with the LC
    - for speakers who only accept personal pronouns there, the true associate of *dou* is a (possibly covert) discourse-determined topic phrase, which is in a LC-compatible position (Lin 1998)
    - for speakers who allow lexical DPs there as well, the associate (whether a non-anaphoric pronoun, or a lexical DP) covertly moves to a referentiality licensing position left of *dou* (RefP in Beghelli & Stowell's model)
- the 'kind-denoting NP' construction is a quirky case: in the core examples the associate of *dou*, providing it with a variable to bind, is the VP, rather than the kind-denoting NP;
- in the 'wh-pronoun' construction *dou* behaves differently (it is an adverb functioning as a discourse particle), it takes no associate, binds no variable, but modifies the meaning of the question by adding two congruency requirements (plurality, exhaustivity). Remaining questions abound; some of them are addressed (in a very tentative manner) in the following Appendix.

Appendix

In this appended part I briefly and informally describe certain vague/problematic points, and some possible explanations, but the verification of any of these hypothesis awaits further research.

While it is perfectly obvious that *dou* in the '*dou* … wh-' construction does not quantify over the set denoted by the wh-pronominal (such as the set of all (contextually relevant persons / things / places

[9] In English and Hungarian they overtly form a single constituent (throughout the overt derivation), and in German the placement possibilities of *alles* suggest that although the QQP 'floats' away from the wh-pronoun, they originate as a single constituent – witness their such occurrence in the base position in multiple questions (Reis 1992, Zimmermann 2007).

[10] Note that even the pre-subject *dou* does not form a unit with the wh-pronoun, in view of the possibility of inserting *shi* or *you* between them: Dou *shi* shei lai le? 'Who all have come?'; Dou *you* shenme ren zai wuzi li? 'Who all are in the room?'

etc.), and concomitantly does not bind the variable provided by this pronoun, as pointed out in his germane discussion of the problem by Yuan (2005) already, there is clearly a dual association between *dou* and the wh-XP, nevertheless, and any proper account must somehow explain this fact.

One aspect of association is the way QQP *dou* modifies the meaning of the wh-pronominal, as in Zimmermann's semantic analysis. In other languages this is achieved by a well-defined syntactic association: the two of them form one constituent (perhaps with the QQP adjoined to the wh-XP) at some/each point of the derivation. As argued in the main text, however, in Mandarin the two are never in a single-constituent configuration, nor is there any detectable trace of any such linkedness during the derivation, so it would merely be an unsubstantiated hypothesis to posit such a syntactic relation between the two. I therefore speculated that this is a matter of scope (which in fact amounts to the admission that there is no genuine syntactic relation between them, the matter is purely semantic in nature): *dou* will modify any (or all?) of the clausemate wh-pronouns in its scope as a QQP. Further testing needs to clarify whether and how this is effected. In particular, when there is more than one wh-pronoun of the appropriate type (individual-denoting) in the clausal scope domain of *dou*, which one does it associate with as a QQP? Each? The closest? The farthest? Freely chosen?

(A1) Ni *dou* song-le na-xie xuesheng shenme liwu?
you all give-prf which-pl student what present
'Which students did you give what present (s?) to?' which-all students? what-all presents?

(A2) *Dou* shei dai-lai-le shenme liwu?
all who bring-come-prf what present
'Who all brought what(-all?) present(s)?'

NB In the other languages examined: (i) in English the use of the *what all* construction is limited, and can affect one wh-XP per clause (and only the topmost one); (ii) in German it can also only affect one wh-pronoun per clause, but it need not be the most superior one, cf. Zimmermann's 2007: 630, ex (11), quoted here as (A3); (iii) in Hungarian it is very marginally possible to have two instances of *all* modifying two separate wh-pronouns, but in multiple-wh scenarios if the topmost wh-XP is *not* modified by the QQP, the lower one(s) cannot be, either, i.e., the Hung. counterpart of (A3) is rather degraded.

(A3) Wer hat denn gestern [[*wen*] *alles*] getroffen ? [Zimmermann 2007: 630, ex (11)]
who has then yesterday whom all met
'Who has met whom-all yesterday?'

The other aspect of the bondage between *dou* and the wh-pronoun is the necessary distributive relation between the QQP-modified wh-phrase and (other elements of) the predicate. Li (1995) has argued convincingly that distributivity plays a role in this construction (see fn. 7). But, on the one hand, the effects need to be tested further (e.g., Can a subject wh-pronoun be involved, too, as in (A4)? Are strictly collective predicates incompatible with the *dou … wh-* construction, as in (A5)?)

(A4) Dou shei chi-le liang ge pingguo?
all who eat-prf two cl apple
'Who all ate two apples (?each?)?'

(A5) Dou shei/na-xie ren baowei-zhe zongtong de fangzi?
all who/which-pl man surround-dur president de house
'Who all / Which-all people surrounded the presidents house?'

(A6) Ban jia de shihou, dou shei tai-qi-le gangqin?
move house de time all who lilft-rise-prf piano
'When moving home, who all lifted the piano?'

If distributivity is an overarching property of this construction then this must be accounted for. And in the kind of Beghelli & Stowellian framework advocated in the present paper, this amounts to having to link up the wh-pronoun with Dist^0, possibly chain-linking it to spec,Dist. Moreover, whenever the distributive share is expressed by a NP, as in ex. (i) of fn. 7, it should likewise be related syntactically to spec,ShareP. Putting the latter question aside, it is quite challenging to have to say that in this wh-construction the wh-pronominal is linked up with spec,Dist in a way similar to the case of non-interrogative UQ pronouns ('*Wo shenme dou xihuan*'), modulo the covert/overt nature of the linking, whereas we have assumed (correctly, I believe, along with Yuan (2005)) that these two relations are absolutely different. Otherwise, though, it is not easy to explain how the Dist-operator has access to the members of the set offered by the wh-pronoun.

Finally, the exhaustivity requirement of the QQP-construction has also been brought into question. While formally the source of the effect is more than obvious (the universal quantifying force of *dou* and its counterparts in the other languages, all of which are some sort of universal pronoun or adverb, being the source), it is not as simple as that. Firstly, Dong (2008) claims that '*dou … wh-*' questions cannot be embedded under every kind of matrix predicate – in particular, (certain?) extensional predicates, such as *zhidao* 'know' don't readily embed them (unlike in German (Zimmermann 2007) or Hungarian, and *contra* Jiang 1998's judgments of the Mandarin data):

(A7) ??Zhangsan **zhidao** Lisi dou mai-le shenme. Dong (2008: 8), exx (15–17)
Zhangsan know Lisi all buy-ASP what
'Zhangsan knows what all Lisi bought.'

(A8) Zhangsan **wen** Lisi dou mai-le shenme.
Zhangsan ask Lisi all buy-ASP what.
'Zhangsan asks what all Lisi bought.'

(A9) Zhangsan **xiangzhidao** Lisi dou mai-le shenme
Zhangsan wonder Lisi dou mai-le shenme
'Zhangsan wonders what all Lisi bought.'

Dong's own solution (it is built on a featural analysis, and for him (A7) is a Leftness Condition violation at LF in the embedded clause), as well as some comments to my presentations of earlier versions of this paper have suggested that the notion of exhaustivity might be a problem factor: if *dou*'s role is merely to add the plurality+exhaustivity requirement to the question meaning, then it is perfectly mysterious why there should be such a difference in the embedding options. But before a convincing counterargument can be given, it needs to be made clear whether the Dong-effect is real.

But even apart from the issue of embedding, the exhaustivity requirement is potentially suspicious. I am not sure that only genuinely exhaustive answers are congruent with such questions (as originally argued by Li (1995), and accepted by most everyone working on the topic, but Li may have been influenced too much by the related construction in German, and its accounts), and (admittedly partly under the influence of the relevant construction from another language, Hungarian) have the feeling that it suffices to provide a (sufficiently long) list, or large group, of individuals satisfying the predicate in question for a congruent answer, instead of a genuine total listing/definition. And this leads us back to German, where there is another construction, very similar to the *w- … alles* construction, but differing from it precisely in that the 'exhaustivity clause' is missing from its meaning – the *w- … so* questions: (A10), compared with (26b) repeated here:

(26b) ***Wer*** ist ***alles*** zur Party gekommen?
who is all to.the party come.prt
'Who all has come to the party?'

(A10) ***Wer*** ist ***so*** zur Party gekommen?
who is *so* to.the party come.prt
'Who.pl has come to the party?'

W- … so questions differ from *w- … alles* questions in that only the latter, but not the former, demands and exhaustive answer, while both demand the answer to specify a *plurality* of individuals.

My conviction is that Chinese '*dou … wh-*' questions are (at best) an in-between case w.r.t. these two, possibly vague as to the force of the exhaustivity clause (as are, for that matter, the Hungarian counterparts), and can therefore be satisfactorily answered by plural but not necessarily exhaustive answers:

(A11) Q: Ni dou mai-le (xie) shenme dongxi?
you all buy-prf (pl) what thing
'What all did you buy?'

A: Biru mai-le mianbao, pijiu, yi-xie pingguo (dengdeng).
for.example buy-prf bread beer one-pl apple (etc etc)
'For example I bought some bread, beer, a couple of apples, and so on.'

A': Mai-le yinliao, shipin, richang yongpin shenmede.
buy-prf drink food daily article and.the.like
'I bought drinks, food, daily necessities, and the like.'

A": #Mai-le niunai. (cf. ✓ Zhi mai-le niunai (mei mai biede).)
buy-prf milk only buy-prf milk not buy other
'I bought milk.' 'I only bought milk (and nothing else).'

This, by the way, is completely unexpected under (and incompatible with) Zhang et al.'s (2012) account:

- on that account A" should be OK, while A and A' should be out, given that exhaustivity is, but plurality isn't, built into it as a requirement;
- given the role of *dou* as a UQ there, one expects no flexibility w.r.t. the universal force, while the approach advocated here may be modified so that the exhaustivity expectation is purely pragmatic in nature, hence may be ignored by the interlocutor.

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