On every type of quantificational expression in Chinese

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On *Every* type of quantificational expression in Chinese*

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3.1 Introduction

There are two particular ways of expressing *every* in Chinese, both of which involve *dōu*, an often discussed element in Chinese linguistics, typically glossed as 'all'. The first way is to combine *měi*, typically glossed as 'every', with *dōu*, (see (1a)). Below I gloss *měi* and *dōu* simply as MEI and DOU, in order to be neutral in our discussion. The second way is by using reduplicative classifiers, as illustrated in (1b).[1]

(1)   a.   Měi (yī)-ge xuéshēng dōu lái-le.
          MEI one-CL student   DOU come-PERF
          'Every student came.'

      b.   Tāmén ge-ge dōu hěn cōngmíng.
          they   CL-CL DOU very intelligent
          'Every one of them is intelligent.'

The *měi-dōu* co-occurrence as well as the element *dōu* have often been discussed in the literature (see Lee (1986), Liu (1990), Cheng (1995), Huang (1996), J.-W. Lin (1998) among others). As for the reduplication classifiers, there are some recent discussions in Chinese journals (see Yang (2002), Yang (2004)).

I would like to reopen the discussion of *měi* and *dōu*, in view of Giannakidou & Cheng (2006) where *dōu* is treated as a maximality operator.

[1] This is not the typical position for a classifier, see section 3.5.

In particular, I will investigate the *měi-dōu* co-occurrence as well as contexts in which *dōu* occurs without contributing a distributive interpretation.

The cases with reduplicative classifiers which express distributive/universal quantification are worth discussing, not only because of the co-occurrence with *dōu* but also because of interesting differences between Mandarin and Cantonese, which are not pointed out earlier in the literature. Mandarin differs from Cantonese in that in Mandarin, reduplicative classifiers cannot be used as typical numeral-classifiers, while Cantonese does not have such a restriction. I argue that the difference between the two languages follows from a difference in the property of the classifiers. Below I will first discuss *dōu*, as well as the co-occurrence between *měi* and *dōu*, before turning to the reduplicative classifiers.

3.2 The other sides of *dōu*

3.2.1 *The non-distributivity of* dōu

J.-W. Lin (1998) argued that *dōu* is the overt realization of the generalized distributive operator proposed in Schwarzschild (1996). This is based on a number of interesting examples and arguments, which I will not address here. The question that I would like to raise here is whether or not *dōu* is always a distributivity operator. Consider first the following sentences:

(2)   a.   Tāmén dōu yīqǐ   lái.
           they   DOU together come
           'All of them came together.'

      b.   Zhěng-zuò qiáo   dōu dǎo-xiàlái-le.   (T.-H. Lin (1998))
           whole-CL   bridge DOU fall-down-ASP
           'The whole bridge collapsed.'

As the examples in (2) illustrate, the contribution of *dōu* is not distributive. In (2a), the adverbial *yīqǐ* 'together' ensures that it is not distributive. The interpretation of the sentence is that 'they all came together' and not '*Each of them came together'. Similarly, in (2b), the bridge collapses as a whole, and not that pieces of the bridge collapsed.

The point of these examples is to show that there are some cases in which *dōu* is NOT a distributive operator.[2] In section 3.2.2, I turn to another use of *dōu* (in combination with wh-phrases), and we see also from such cases that *dōu* is not a distributive operator.

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[2] Lin, J.-W. (p.c.) suggests that this non-distributive reading can still be explained under his theory by modifying the 'cover'. Whether or not this is the correct direction to pursue depends on whether or not *dōu* is indeed a distributive operator.

3.2.2 *The co-occurrence of* dōu *with* wh-*phrases*

As is well known and also often discussed in the literature, *wh*-phrases in Chinese exhibit quantificational variability. Thus, aside from a typical interrogative reading (3a), a *wh*-phrase such as *shénme* 'what' can also have an indefinite (3b) or a universal reading (3c).

(3) a.   Tā mǎi-le   shénme.   (interrogative)
          he buy-PERF what
          'What did he buy?'

     b.   Tā méiyǒu   mǎi shénme.   (existential)
          he not.have buy what
          'He didn't buy anything.'

     c.   Tā shénme dōu méiyǒu   mǎi.   (universal)
          he what   DOU not.have buy
          'He didn't buy anything at all/whatsoever.'

In Cheng (1995), *dōu* is treated as a universal quantifier providing universal force to *shénme*, which is treated as an indefinite noun phrase (i.e. as a variable). Lin (1996) considers sentences such as (3c) to always involve a (non-overt) *wúlùn* 'no-matter' (see further discussion concerning *wúlùn* in Giannakidou & Cheng (2006)). In Giannakidou & Cheng (2006), the *wh*-phrase plus *dōu* combination is investigated further, in particular, taking into consideration *which*-phrases and the Free Choice reading. It is shown that *which*-phrases differ from bare *wh*-phrases in their non-interrogative distribution. Here, I review some of the arguments (see Giannakidou & Cheng (2006) for more detailed discussions).

3.2.2.1 *Free Choice* wh   Bare *wh*-phrases differ from *which*-phrases in Chinese in that their appearance with *dōu* is less restricted. In contrast with (3c), (4a) is ungrammatical. However, under an intensional context, *which*-phrase plus *dōu* is licit (4b).

(4) a.   *Tā *nà-běn   shū*   dōu méiyǒu   mǎi.
          he   which-CL book DOU not.have buy
          'He didn't buy any book.'

     b.   Tā ná-běn   shū   dōu bu xiǎng mǎi.
          he which-CL book DOU not want buy
          'He doesn't want to buy any book.'

This is the same under simple negation contexts, and in questions. (5a) contrasts with (5b) in that *nǎ-běn shū* 'which book' in (5a) cannot be interpreted non-interrogatively. As indicated by the translation, (5a) can only be

interpreted as a question. (5b), on the other hand, can be interpreted as a non-interrogative (see more details below). The difference between the two is episodic negation vs. non-episodic negation (5b).

(5) a. Tā méiyǒu mǎi nǎ-běn   shū.
         he not-have buy which-cl book
         'Which book did he not buy?'
         Not: 'He didn't buy any book.'

     b. Tā bù xiǎng mǎi nǎ-běn   shū.
         he not want buy which-cl book
         'He does not want to buy any book.'

Similarly, *which*-phrases cannot appear in episodic questions (6a), but they can appear in non-episodic questions (6b).[3]

(6) a. *Tā mǎi-le   nǎ-běn   shū   ma?
          he buy-perf which-cl book y/n
          Intended: 'Did he buy any book?'

     b. Tā xiǎng mǎi nǎ-běn   shū   ma?
         he want buy which-cl book y/n
         'Does he want to buy any book?'

In other words, *nǎ*-cl phrases in Chinese do not behave like simple polarity items (compare with *any* in the English translation). They cannot appear in episodic questions and negation. They are Free Choice Items (FCIs) that are polarity-restricted in the sense of Giannakidou (2001).

In Giannakidou & Cheng (2006), it is argued that there are two kinds of FCIs, definite and indefinite. Below I go through some of the arguments for the difference between definite and indefinite FCIs in order to shed light on the interpretation of *dōu*.

3.2.2.2 *Definite vs. Indefinite FCIs*   To start with, it is clear that FCIs in Greek can be indefinites. This can be seen from a sentence such as (7), where the FCI *opjosdhipote* can be preceded by the indefinite determiner *enas*. The indefinite nature of such FCIs can also be seen from the fact that such FCIs exhibit quantificational variation (i.e. some FCIs seem to be interpretable as exisitential, and some as universal), and some with indeterminate quantificational force, depending on the Q-adverb they combine with (as shown in Giannakidou (2001)).

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[3] The sentence is ungrammatical in contrast with (5a) because the yes-no marker *ma* requires a non-*wh*-question, and *nǎ-běn shū* 'which book' here can only be interpreted as an interrogative *wh*-phrase.

(7) Dhen ime   enas opjosdhipote ego ja   na   mou ferese   etsi!
    not be.1sg a   FC-person   I   for subj me   treat.2sg so
    (Ime o   aderfos su!)
    (am the brother yours)
    'I am not just anybody to be treated this way. (I am your brother!)'

Aside from nominal FCI of the kind in (7), Giannakidou & Cheng (2006) discussed another kind of FCI, which we can find in free relatives (FRs) in Greek and English (8a,b). The *wh-ever* FRs and the Greek FC-FRs share in common that *wh-ever* and the Greek *opjosdhipote* appear in a free relative (sentential) structure, and that, due to the FR structure, they can be auto-licensed (i.e. not restricted to non-episodic contexts). And further, *wh-ever* in English and *o-wh-FC* (without *-dhipote*) cannot appear as FC-nominals (i.e. without FR structure) as shown in (9a,b).

(8) a. Whoever saw a fly in his soup complained to the manager.

     b. [Opjosdhipote idhe   miga sti   soupa tu]
         [wh-ever person saw.3sg fly   in-the soup his]
         paraponethike sto   diefthind
         complained.3sg to.the manager

(9) a. *{Whoever/whichever customer} complained to the manager.

     b. *Opjos fititis bori na lisi afto to provlima.
         'Any student can solve this problem.'

Giannakidou and Cheng show that FCI-nominals differ from FC-FRs in terms of what appears to be an expectation of existence.

(10) a. If any student calls, I am not here.

      b. Whichever student calls, I am not here.

The sentence (10a) with *any* is a neutral statement expressing my desire not to talk to anybody, and there is no expectation that somebody will actually call. The one with *whichever student* (10b), on the other hand, seems to favour (but not require) a context where there is indeed an expectation of call; in fact, it can (but doesn't have to) be an instruction to avoid talking to somebody unde-sirable. This expectation, which seems to not be as strong as a presupposition, makes sense only in the definite analysis of FRs because we tend to exclude the empty set from the plural FR collection we are forming. With an indefinite, there is no such inclination, hence the unmarked use of the FCI indefinite in a neutral context.

It is in this light that Giannakidou & Cheng made a distinction between definite and indefinite FCIs. The definite FCIs appear only in FRs in English and Greek.

Consider now the data in Chinese. I have shown above that *nǎ*-CL NPs are FCIs, and that they can appear with or without *dōu* (the latter case under non-episodic negation (5b) and yes-no question (6)). In some cases, it may be unclear what the contribution of *dōu* is. However, if we look at examples that are parallel to (10a,b), we see an interesting distinction between FCIs with *dōu* and FCIs without *dōu*.

(11) a. Rúguǒ (yǒu) nǎ-ge   rén   dǎ-diànhuà lái   jiù   suō
          if   have which-CL person telephone come, then say
          wǒ bù zài.
          I   not be
          'If anyone calls, say that I'm not here.'

      b. (Wúlùn)   nǎ-ge   rén   dǎ- diànhuà lái,   wǒ **dōu** bù
          no-matter which-CL person telephone   come I   all   not
          zài.
          be
          'Whoever calls, I'm not here.'

Though both sentences are grammatical, (11a) cannot be used in situations in which the phone is ringing. It thus seems that *dōu* contributes to the tendency observed for the definite plurals and FRs, namely the tendency to exclude the empty set. In fact, there is no necessary expectation of a call in (11a) while in (11b) there is. In other words, we obtain the same results as we have seen in Greek. (12a,b), with bare *wh*-forms, further illustrate this difference:

(12) a. Tā bù xiǎng qù nǎr.
          he not want go where
          'He does not want to go anywhere (in particular).'

      b. Tā nǎr   **dōu** bù xiǎng qù.
          he where all   not want go
          'He does not want to go to any (of the) places.'

In (12a), the bare *wh*-word *nǎr* 'where' appears under negation. This sentence can be used in cases where there isn't anywhere in particular or special that he wants to go to (though he may indeed want to go some place or other). In contrast, (12b) means that there is absolutely no place, of a contextually determined set of places, that he wants to go to. Again, we have the flavour of wanting to exclude the empty set that comes with definite-like expressions.

The same contrast can be shown with (13a), in contrast with (13b):

(13) a. Tā bù xiǎng mǎi nǎ-běn   shū.
          he not want buy which-CL book
          'He doesn't want to buy any book (in particular).'

      b. Tā nǎ-běn   shū dōu bù xiǎng mǎi.
          he which-CL book all not want buy
          'He does not want to buy any (of the) books.'

(13a), without *dōu,* can be interpreted as 'he does not want to buy any (kind of) books'; but (13b) can only be interpreted as 'there is no book (from a contextually determined set) that he wants to buy'.[4]

If this characterization of the difference between FCIs with *dōu* and FCIs without *dōu* is correct, it appears that the presence of *dōu* contributes to the definiteness and thus givenness. Chinese FCIs are thus similar to Greek FCIs in that we have both definite and indefinite FCIs. The difference between the two languages is that in Greek there is a difference between FC-nominal (indefinite) and FC-FR (definite), while in Mandarin Chinese both definite and indefinite FCIs have nominal structure, though *dōu* is present only in the former case.

3.2.2.3 Dōu *as an iota/maximality operator*   Given that *dōu* contributes definiteness in the cases of FCIs in Chinese, it is natural to consider *dōu* to be on a par with a definite determiner, that is, it is an iota/maximality operator (see Giannakidou & Cheng (2006) for more details concerning the interpretation of *dōu* and Free Choice). If this is on the right track, then it raises the question whether *dōu* is always a maximality operator. Here I first turn back to the data we discussed earlier in relation to J.-W. Lin (1998)'s proposal, and, in section 3.3, I further discuss data that support the hypothesis that *dōu* is a definite determiner.

Recall the sentences in (2a,b), repeated here as (14a,b). The question we raised earlier concerns the contribution of *dōu*, since it does not seem to contribute distributivity.

(14) a. Tāmén dōu yīqǐ   lái.
          they   DOU together come
          'All of them came together.'

      b. Zhěng-zuò qiáo   dōu dǎo-xiàlái-le.   (T.-H. Lin (1998))
          whole-CL   bridge DOU fall-down-ASP
          'The whole bridge collapsed.'

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⁴ The interpretation that we get from the *wh+dōu* is similar to a topic reading in the sense that there appears to be an 'understood' set. This is more apparent in the sentence in (13b) than in (12b) in the sense that there seems to be a given set of books that the speaker is talking about.

If *dōu* is an iota/maximality operator, it entails that *dōu* takes the maximal member of the (given) set. In the case of *tāmén* 'they', the reading of 'all of them' naturally comes from *dōu* taking the maximal member of the plural pronoun set. As for *zhěng-zuò qiáo* 'the whole bridge', what *dōu* does is to emphasize the entirety of the bridge (that is, it creates the maximal sum of all the parts of the bridge). In other words, the presence of *dōu* in these sentences is consistent with the hypothesis that *dōu* is a maximality operator.

3.3 *Měi* ± *dōu*

3.3.1 Měi *with* dōu

The discussion above argues that *dōu* is not necessarily a distributive operator (as J.-W. Lin has claimed). In this section, I discuss the co-occurrence of *měi* and *dōu*. *Měi* plus *dōu* yields an interpretation comparable to *every* in English, an interpretation with distributivity. Considering the discussion we have above concerning FCIs with *dōu*, the fact that the combination of *měi* and *dōu* yields distributivity further supports the claim that *dōu* itself is not a distributive operator.

Consider first some examples illustrating the co-occurrence.

(15) a. *Měi* (yī)-ge xuéshēng *(dōu) lái-le.
          MEI one-CL student   DOU   come-PERF
          'Every student came.'

      b. *Měi* (yī)-ge xuéshēng *(dōu) kàn-le   nèi-běn shū.
          MEI one-CL student   DOU   read-PERF that-CL-shu
          'Every student read that book.'

      c. *Měi* yī-ge-chúshī (dōu) zuò   yī-daò cài.
          MEI one-CL chef   DOU make one-CL-dish
          'Every chef makes a dish.'

As shown in (15a,b), *dōu* is obligatory with a *měi*-NP. (15c), however, illustrates one of the rare cases in which *dōu* can be optional: in such cases, the object noun phrase is an indefinite (an observation due to Huang (1996)). An analysis of treating either *měi* as a distributive operator or *dōu* as a (generalized) distributive operator (as in Lin (1996), J.-W. Lin (1998)) needs an extra mechanism for the obligatoriness of *dōu* in (15a,b) (see below).

Under the null hypothesis that the *dōu* that appears in FCIs and the *dōu* that appears with *měi* is the same element, we need to consider the possibility that *dōu* also contributes maximality in the *měi-dōu* co-occurrence. To see whether *dōu* also contributes maximality in the *měi-dōu* co-occurrence, we need to first understand the interpretation that *měi* contributes.

J.-W. Lin (1998) argues that *měi* is not inherently distributive.[5] Consider the interaction between *měi-yī-zǔ xiǎohái* 'every group of children' and *dōu* in (16) (example adapted from J.-W. Lin (1998), ex. (61b&a)):

(16) a. Měi yī   zǔ   xiǎohái dōu huà-le   yī-zhāng huà.
          MEI one group child   DOU draw-PERF   one-CL   picture
          'Every group of children drew one picture.'

  b. Nèi-yī-zǔ   xiǎohái dōu huà-le   yī-zhāng huà.
      that-one-group   child   DOU draw-PERF   one-CL   picture
      'That group of children all drew a picture'.

As Lin points out, in (16b) the distribution is down to the individual child, while in (16a) this is not the case. Instead, in (16a), the distribution is over groups of children, and never to the individual child. Thus, he proposes that NPs with *měi* denote a plurality and that '*měi* denotes a function [which] takes a predicate of type $<e, t>$ as its argument and returns the maximal collection of the individuals denoted by the predicate' (p. 238). In other words, in Lin's view, *měi*-one-CL-NP is comparable to a definite NP (i.e., with maximality). I think that Lin's intuition is basically correct. However, what he attributes to *měi*, I think, is actually what *měi* plus *dōu* contributes. In other words, the maximality is not given by *měi*; rather it is a result of having *dōu* (as we have already seen that *dōu* is a maximality operator with definite FCIs).

How about the plurality of *měi*-one-CL-NP? This then comes back to the question of what the contribution of *měi* is. I suggest that it simply provides a universal force (thus, it counts as a strong quantifier). To see that *měi* does not contribute distributivity by itself, we need to look at cases in which *měi* appears without *dōu*.

3.3.2 Měi *without* dōu

Consider first the data in (17a,b) (from Lü (1980)), in which *měi* is not used inside a noun phrase, but rather heads a conditional clause:

(17) a. Měi yǎn-chū sān   tiān, xiū-xí yī   tiān.
          MEI perform three day   rest   one day
          'Whenever/if (s)he performs for three days, (s)he rests for one day.'

  b. Měi féng   chūn-jié   wǒmén dōu qìng-zhù.
      mei get.to spring-festival   we   dou celebrate
      'Whenever/if we have Spring Festival, we celebrate.'

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[5] Recall that for J.-W. Lin, *dōu* is the distributive operator.

From the interpretation of the sentences in (17a,b), it is clear that *měi* provides a universal force (that is, it is a conditional universal quantifier).[6] In (17a,b), *měi* binds a situation/case variable (see Lewis (1975)), leading to the appropriate interpretation. We thus have, for (17a) for instance, the following interpretation: for every situation in which he performs for three days, he then rests for one day.

As we have already seen, there are other cases (with *měi* occuring in a noun phrase) in which *měi* does not occur with *dōu*, though the distributive reading is maintained. Consider examples in which *dōu* is optional, as in (18a,b):

(18) a. Měi yī-ge   chúshī (dōu) zuò   yī-daò cài.
          MEI one-CL chef   DOU   make one-CL dish
          'Every chef makes a dish.'

   b. Měi yī-ge   rén   (dōu) xiě   yī-fèn-bàogào.
          MEI one-CL person DOU   write one-CL-report
          'Everyone writes one report.'

It should be noted that native speakers tend to consider the variant without *dōu* incomplete (and should be preceded by statements such as 'Our restaurant has a policy'). Further, as noted by Huang (1996), if the object NP is definite, the optionality disappears:

(19) a. Měi yī-ge   chúshī *(dōu) zuò   nèi-daò cài.
          MEI one-CL chef   DOU   make that-CL dish
          'Every chef makes that dish.'

   b. Měi yī-ge   rén   *(dōu) xiě   nèi-fèn bàogào.
          MEI one-CL person   DOU   write that-CL report
          'Everyone writes that report.'

The reading in (19b) is more felicitous if one thinks about the report as a report that one has to write for a particular course (in other words, getting an indefinite reading for the demonstrative). These data show that the distributive reading is not from *měi*, but rather from the indefinite object. This can be illustrated further in the examples in (20):

(20) a. Yī-ge-chóshī zuò   yī-daò cài.
          one-CL chef   make one-CL-dish
          'One dish per chef/Every chef makes a dish.'

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[6] Huang (2005) also treats *měi* on a par with *every* in English, though she particularly adopted a skolemized definition of EVERY. See her work for how she handles the *měi-dōu* co-occurrence.

b. Yī-ge-rén   xiě   yī-fèn-bàogào.
    one-cl-person write one-cl-report
    'One report per person/Everyone writes one report.'

Since *měi* is not even present in these examples, the distributivity has to come from somewhere else (and note that *dōu* is also not present); instead, it is the presence of two indefinite noun phrases (the numeral can change from *yī* 'one' to other numerals).

The distributivity that we see in cases without *dōu* is probably a case of 'pseudo-distributivity' (cf. Beghelli (1997)). Pseudo-distributivity involves a covert distributive operator comparable to *each* in English, assuming the ingredients of distributivity à la Choe (1987), with a distributive key and a distributive share. In Chinese, when the distributive share is active (occupied by an indefinite NP), it can induce a covert distributive operator.

It should be noted that when an event is bounded, as in cases with perfective (21a,b), the cases with *měi* without *dōu* become a little degraded. Native speakers prefer to add to the beginning of the sentence elements such as *zhèr* 'here'. The question arises as to why elements such as *zhèr* can save sentences with *měi* without *dōu*. By adding elements such as *zhèr* 'here', the domain of *měi* 'every' is restricted (i.e. the universal quantifier in (21a) quantifies over the chefs who are here). This can be treated on a par with the sentences in (18a,b), in which native speakers naturally introduce a restriction to the *měi*-noun phrase. It further strengthens the idea that *dōu* is a maximality operator. With *měi* introducing sets of individuals, *dōu* operates on these sets and closes the domain. Without *dōu*, the *měi* sentences seem odd.

(21) a. ??Měi yī-ge   chúshī zuò-le   yī-daò cài.
          MEI one-cl chef   make-PERF one-cl-dish
          'Every chef made a dish.'

      b. Zhèr měi yī-ge   chóshī zuò-le   yī-daò cài.
          here MEI one-cl chef   make-PERF one-cl dish
          'Every chef here made a dish.'

We have seen above that *dōu* appears to restrict the quantificational domain of *měi*. We now turn to a more detailed discussion of this function of *dōu*.

3.4 Domain restriction

In section 2, we have seen that *dōu* functions as a definite determiner, providing contextual domain restriction and giveness, in cases with *wh*-FCIs in Chinese (see examples in (12) and (13)). We saw above that in the

co-occurrence of *měi, dōu* is restricting the domain of quantification. This domain restriction function can be further illustrated by the classical paradigm of indefinite subjects:

(22) a. *Sān-ge xuéshēng lái-le.
          three-CL student   come-PERF

      b. Yǒu sān-ge   xuéshēng lái-le.
          have three-CL student   come-PERF
          'Three students came.'

      c. Sān-ge   xuéshēng dōu lái-le.
          three-CL student   DOU come-PERF
          'The three students all came.' (must be a specific set of students.)

A simple indefinite subject is typically considered to be degraded.[7] To save the sentence, one can add the verb *yǒu* 'to have', making an existential sentence, as in (22b), or *dōu* can be added (22c). Note that if *dōu* is a distributive operator, it is unclear why it can save the indefinite (leaving aside the question of whether there is any distributive reading in the sentence). In fact, (22c) is interpreted as a specific noun phrase; it is clear which three students we are talking about. In other words, *dōu* in (22c) introduces familiarity; it provides the contextual domain restriction.

Recent work on the 'explicit' strategy of domain restriction centres upon the role that definite determiners play in providing domain restriction (Giannakidou (2004), Etxeberria (2005)) (see also Fintel (1998), Stanley (2002), who are proponents of the view that domain restriction is done in the grammar, rather than in pragmatics). Below I review some of the discussions in Giannakidou (2004) and Etxeberria (2005).

3.4.1 *Nominal vs. determiner restriction*

From quantification expressions in different languages, two issues of contextual domain restrictions are particularly important. One is the question of whether the restriction is done overtly or covertly. The other is whether or not the restriction is on the nominal or on the quantificational determiner. Consider first overt vs. covert restriction. English is a typical example of covert contextual domain restriction (though of course an overt domain can be spelled out as well). Thus, in a sentence such as (23a), *every* does not have an overt restriction, while the domain is clearly restricted to 'my syntax class' in (23b).

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[7] The level of acceptability varies, though in some cases it rests upon the reading. If the interpretation is three of the students (a more specific reading), emphasizing the numeral, the sentence is acceptable.

(23)   a.   Every student passed the exam.

       b.   In my syntax class, every student passed the exam.

       c.   ∀x [student$_c$] passed the exam.

For quantification expressions such as *every student*, the standard assumption (see, among others, Stanley (2002)) is that the nominal argument of *every*, in this case *student*, has a domain variable C (see (23c)) (yielding nominal domain restriction, see also Stanley & Szabó (2000)), which will refer to a contextually salient property. The nominal argument of *every* is thus a contextually salient set of students (i.e. the students in my syntax class).

   Giannakidou (2004), Etxeberria (2005), Etxeberria (this volume) and Martí (2003), Martí (this volume) argue that the domain restriction can be composed with the quantificational determiner (i.e. the domain restriction is not restricted to the nominal argument). Their arguments concern strong quantifiers accompanied by a definite determiner. Consider the data in (24a,b).

(24)   a.   The Greek determiner 'each' = 'the + every' (Giannakidou (2004))
            o   kathe
            the$_{masc.sg}$ every
            i   kathe
            the$_{fem.sg}$ every
            to   kathe
            the$_{neut.sg}$ every

       b.   Basque (Etxeberria (2005))

            [Ikasle guzti-*(ak)] berandu etorri ziren.
            student all-D.pl(abs) late   come   aux.past.pl

            'All of the students came late.'

As we can see in Greek and Basque, the definite determiner cannot be omitted with strong quantifiers. Giannakidou and Exteberria argue that since the definite determiner is at the outer layer of the determiner expression (i.e. the strong quantifier is first composed with the nominal argument), the contextual domain restriction provided by the definite determiner is composed with the strong quantifier, thus deviating from the idea that the domain variable is part of the nominal argument.

   Giannakidou (2004) argues that we also see domain restriction on quantificational determiners in Lillooet Salish (see also discussion concerning this

issue in Etxeberria (this volume)): in (25), the determiner *i...a* restricts the quantificational determiner *zí7zeg* 'each'.[8]

(25)   Lillooet Salish (Matthewson (2001))

      i   zí7zeg'-a sk'wemk'úk'wm'it
      det.pl each-det child.pl
      'each child'

In short, in Greek, Lillooet Salish and Basque, we not only see overt contextual domain restriction provided by a (definite) determiner (see footnote 8), we also see that the restriction can be directly composed with the quantificational determiner.

3.4.2 *Domain restriction with* dōu

We have seen that, in the case of *měi* as well as in the case of indefinites with numerals, *dōu* seems to provide domain restriction. In the *měi* case, speakers want to specify some kind of location to restrict the domain (recall the earlier discussion of adding *zhèr* 'here'), or *dōu* has to appear. In the indefinite numeral case, the presence of *dōu* makes the indefinite specific (i.e. the domain is specified; see Martí (this volume) for discussions concerning domain restriction with existential quantifiers).

Consider now more data in Mandarin Chinese. (26a) is comparable to the examples above in English (23a), except for the fact that, in (26a), the phrase *zhè-ge bān* 'this class' is obligatory. It is thus revealing that, when *dōu* is present, this phrase is no longer obligatory. In other words, *dōu* plays the same role as the phrase *zhè-ge bān* 'this class' in (26a).

(26)   a.   Wǒ jiāo-guò *(*zhè-ge bān*) suǒyǒu de xuéshēng.
         I   teach-EXP this-CL class all   DE student
         'I have taught all the students in this class.'

      b.   Wǒ suǒyǒu de xuéshēng *dōu* jiāo-guò.
         I   all   DE student   DOU teach-EXP
         'I have taught all the students (in some domain).'

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[8] Though Lillooet Salish seems similar to Greek and Basque in the use of a determiner in restricting the quantificational domain of the quantificational determiners, the determiner *i...a* in Lillooet Salish is not a definite determiner (in contrast with Greek and Basque) (Matthewson (1999), Matthewson (2001)). Further, this determiner can also be first combined with the nominal, as in (i):

(i)   zi7zeg' i sk'wemk'úk'wm'it-a   (Matthewson (2001))
     each   D.pl child(pl)-D
     'each of the children'

J.-W. Lin (1998), in developing an account for *měi-dōu* co-occurrence, pointed out that, besides *měi*, there are other quantifiers that also require the presence of *dōu*. Examples (27a–c) are from J.-W. Lin (1998).

(27) a. Měi-ge xuéshēng *(dōu) mǎi-le   shū.
       every-CL student   DOU buy-PERF book
       'Every student bought a book.'

   b. Dàbùfèn de xuéshēng *(dōu) mǎi-le   shū.
      most   DE student   DOU buy-PERF book
      'Most students bought a book.

   c. Suǒyǒu de xuéshēng *(dōu) mǎi-le   shū.
      all   DE student   DOU buy-PERF book
      'All the people bought a book.'

(27a–c) show that Mandarin Chinese is on a par with Greek and Basque in that strong quantifiers also need to have overt contextual domain restriction.[9] The element that can do this job in Mandarin Chinese is *dōu*, which has been analysed in Giannakidou & Cheng (2006) as an iota/maximality operator. We have seen that, in Greek and Basque, it is the definite determiner which provides the domain restriction. The fact that *dōu* also provides domain restriction gives us further supporting evidence that *dōu* is an iota operator; it is a definite determiner.

In contrast, weak quantifiers do not need to have *dōu*. But they may appear with *dōu*, as the examples below show. When they do, they are interpreted as domain-specific, almost as definites, as indicated in the translation.

(28) a. Hěnduō xuéshēng (dōu) mǎi-le   shū.
       many   student   DOU buy-PERF book
       'Many students bought books.'

   b. (Yǒu) sān-ge   xuéshēng mǎi-le   shū.
      have three-CL student buy-PERF book
      'Three students bought books.'

   c. Sān-ge   xuéshēng dōu mǎi-le shū.
      three-CL student DOU buy-PERF book
      'The three students bought books.'

As (28a–c) show, with weak quantifiers such as *hěnduō* 'many', and numerals, it is possible to have *dōu*, but its presence is not obligatory. This is similar to Basque and Greek as well.

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[9] The Mandarin Chinese patterns the same as Basque in that strong quantifiers are required to be contextually restricted. See also Etxeberria (this volume).

3.4.2.1 *DP-external restriction*   We noted above that languages differ as to whether it is the nominal that is being directly restricted by the domain restrictor (for example, as in the standard assumption or in Lillooet Salish (see footnote 8)) or it is the quantification determiner which is directly restricted, as in the case of Greek and Basque. To answer the question of which element is being restricted in Mandarin Chinese is actually not an easy task. The reason is that although *dōu* is on a par with definite determiners in Greek and Basque in terms of providing contextual domain restriction, and *dōu* can be considered to be a definite determiner qua its semantic contribution, it does not seem to appear in a determiner position inside the noun phrase; let alone the fact that Chinese is generally considered to be a language without any determiner.

Consider first data from Basque, which Etxeberria (2005) provides to show that the contextual domain restriction in Basque is DP-internal.

(29) *[[Ikasle gehien] eta [irakasle guzti]-ak]   goiz iritsi
       student most   and teacher all-D.PL(abs) early arrive
       ziren.
       aux.PL.past
       'Most of the students and all the teachers arrived early.' (intended)

(29) shows that a single determiner in Basque cannot license a conjoined noun phrase. This is due to the fact that the definite determiner is directly restricting the strong quantifier. It is thus not possible for one definite determiner to license two strong quantifiers.

The example in (30), however, shows that Mandarin Chinese differs from Basque in that one *dōu* can license a conjoined noun phrase.

(30) Dàbùfèn de xuéshēng hé   měi-ge lǎoshī dōu zǎo   dào.
      most   DE student and MEI-CL teacher DOU early arrive
      'Most of the students and all the teachers arrived early.'

This shows that *dōu* in Mandarin Chinese is not attached directly to the strong quantifier, which we can also see overtly. Note that if *dōu* is directly attached to a noun (phrase), and the strong quantifier is merged subsequently to the noun phrase, the grammaticality of (30) would also not be expected. What we have here is more compatible with the traditional view that *dōu* is adjoined to the VP, that is, *dōu*, if it is a determiner, is DP-external. Being DP-external allows it to contextually restrict a conjoined DP.

This view is also compatible with the traditional view that Chinese has no determiner – the traditional view is equating determiners with DP-internal determiners.

The role of *dōu* as a contextual domain restrictor fits well with the discussion we had earlier concerning the semantic interpretation/contribution of *měi*. Since *dōu* appears to be required for contextual domain restriction for strong quantifiers, and under the analysis that *měi* is a universal quantifier, the co-occurrence between *měi* and *dōu* is thus expected.

Before we turn to reduplicative classifiers, a few words should be said about *dōu*'s determiner status, since it appears to be external to DP (as is also confirmed by data like (30)). The idea of a determiner external to DP is not new, as this has also been explored by Hallman (2000), Johnson (2000), and Sportiche (2001) (see also Gil & Tsoulas (this volume)). Though developing a complete analysis of the syntax of *dōu* is beyond the scope of this chapter, I would like to point out that the syntactic position of *dōu*, as well as the answer to the question of why noun phrases that are 'connected' to *dōu* have to move to a certain proximity of *dōu*, have not been satisfactorily given. Positing *dōu* as an external determiner may in fact provide us with a new look at an old problem in terms of the syntax of *dōu*.

3.5 Reduplicative classifiers

We have seen from example (1b) at the beginning of this chapter that there is another way to express *every* in Chinese, by using classifier reduplication.[10] In this section, I show that (a) reduplication yields an interpretation comparable to *měi* and the presence of *dōu* is again obligatory; (b) Mandarin Chinese does not allow numeral-classifiers to reduplicate,[11] while Cantonese Chinese does; (c) the difference between Mandarin and Chinese can follow from the nature of classifiers in these two languages.

Consider first a pair of examples in Mandarin Chinese, which illustrate that prenominal classifiers seem to resist reduplication.

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[10] There are also examples with noun reduplication such as (ia). However, not all nouns can do this (see ib).

(i) a. rén-rén   dōu hěn nǔ-lì
      person-person DOU very hard.working
      'Everyone works very hard.'

   b. *shū-shū   dōu hěn zhòng
       book-book DOU very heavy
       'Every book is very heavy.'

[11] I call the typical classifiers in Chinese 'numeral-classifiers', to distinguish them from the classifiers which are not related to the numeral, e.g. the ones used as adverbs.

(31) a. *?*Ge-ge* xuéshēng dōu xiě-le   bàogào.
          CL-CL student   DOU write-PERF report
          'Every student wrote a report.'

      b. Xuéshēng *ge-ge* dōu hen yònggòng.
          student   CL-CL DOU very work.hard
          'Students all work very hard.'

Note that Chinese does not have post-nominal classifers (that is, Chinese differs from languages like Japanese in not allowing numeral-classifier float, cf. Miyagawa (1989)). The reduplicative classifiers in Mandarin are adverbials, comparable to the reduplicated *tiān* 'day' in (32).

(32) Tāmén tiān-tiān (dōu) chī miàn-bāo.
      they   day-day DOU eat bread
      'They eat bread every day.'

Here, *tiān-tiān* 'every day' is interpreted adverbially, and it is certainly not a classifier of *tāmén* 'they' (aside from the fact that pronouns do not occur with classifiers, it is also the wrong 'classifier' for 'people').

Reduplication as a strategy to yield a universal/distributive reading is certainly more widespread cross-linguistically, as shown by the examples in Kannada and Tamil in (33a,b) (data from Jayaseelan (2005), where CONJ = conjunctive marker).

(33) a. Ond(u)-ondu magu-nuu tanna taayi-anna
          one-one   child-CONJ self's mother-ACC
          nooD-i-tu.   (Kannada)
          see-PAST-3n.sg
          'Every child saw its mother.'

      b. Ovv-oru kuzhandai-(y)um tan ammaa-vai
          one-one child-CONJ   self mother-ACC
          paarta-adu.   (Tamil)
          saw-3n.sg
          'Every child saw its mother.'

As we see in (33a,b), the numeral 'one' in the respective languages can be reduplicated, and together with the nominal plus a conjunctive marker, we have an expression equivalent to *every*. In Kannada and Tamil, when the reduplicative strategy is used, the typical operator (which Jayaseelan called *disjunctive marker*) used in combination with the conjunctive operator to form *every* is absent. In other words, the reduplicative numerals in Kannada and Tamil appear to do the same job as the typical universal operator.

We also find reduplicative numerals in less exotic languages such as Greek (Giannakidou, p.c.):

(34) Ena ena ta pedia   xeretisan   tin mitera tous.
      one one the children greeted.3pl their mothers.
      'The children greeted their mothers one by one.'

3.5.1 *Difference between Mandarin and Cantonese*

We have seen in (31a) that, in Mandarin Chinese, numeral-classifiers cannot be reduplicated (see (35a,b) also). On the other hand, if the classifiers appear as adverbials, then they must be reduplicated. Consider now more examples, which show that even adverbial classifiers are restricted in appearance.

(35) a. *Ge-ge rén   dōu yǒu zìjǐ de líxiǎng.
          CL-CL person DOU have self DE ideal
          'Everyone has his own ideal.'
          (data from Yang (2004))

      b. *Ge-ge chúshī dōu zuò   yī-dào cài.
          CL-CL chef   DOU make one-CL dish
          'Every chef makes a dish./One chef per dish.'

(36) a. Háizimén ge-ge dōu hěn gāoxìng.
          children CL-CL DOU very happy
          'The children are all very happy.'

      b. *Háizimén ge-ge dōu chīfàn-le.
          children CL-CL DOU eat-PERF
          'The children have all eaten.'

      c. *Háizimén ge-ge dōu chī-le   yī-wǎn fàn.
          children CL-CL DOU eat-PERF one-CL rice
          'The children have all eaten a bowl of rice.'
          (data from Yang (2004))

(35b) shows that, even in cases where there is an indefinite noun phrase in the object position, it is not possible to have reduplicated classifiers. The contrast between (36a) and (36b,c) shows that adverbial reduplicated classifiers do not always yield legitimate results. Crucially, non-eventive predicates seem to allow reduplicated classifiers while eventive ones do not.

Yang (2004) and Yang (2002) both accounted for this restriction by stating that classifier reduplication yields 'general property' interpretation. Since general property interpretation is not compatible with events, sentences such

as (36b,c) are ruled out. This, however, cannot be the whole story, as we find reduplicative classifiers in Cantonese which are compatible with eventive predicates, as we see below.

As we see in (37a,b), Cantonese allows numeral-classifiers to reduplicate, and they have a reading equivalent to *every* (with an obligatory presence of *dōu*). Further, it should be noted that the reduplicated classifier in this case appears with an eventive predicate in (37b).

(37) a. Go-go jan⁴   dou¹ jau⁵ zi⁶gei² ge³ lei⁵soeng². (Cantonese)¹²
        CL-CL person DOU have self   GE ideal
        'Everyone has his own ideal.'

   b. Go-go cyu² dou¹ zou⁶-zo   yat¹-dip⁶ sung³.
      CL-CL chef DOU make-PERF one- CL   dish
      'Every chef makes a dish.'

This picture does not change even if we are using adverbial classifiers; that is, when we have adverbial reduplicated classifiers, they can also be used with eventive predicates (compare the grammatical (38b) with the ungrammatical (36c)):

(38) a. Di¹ sai³lou⁶ go-go dou¹ hou² hoi¹sam¹.   (Cantonese)
        CLₚₗ child   CL-CL DOU very happy
        'The children are all very happy.'

   b. Di¹ sai³lou⁶ go-go dou¹ sik⁶-zo   yat¹-wun² fan⁶.
      CLₚₗ child   CL-CL DOU each-PERF one- CLᵇᵒʷˡ rice
      'The children have each eaten a bowl of rice.'

Descriptively, what we can see from the difference between Mandarin and Cantonese is that reduplicative classifiers in Mandarin are not the same as *měi*, since there is no co-occurrence restriction of *měi* and eventive predicates. On the other hand, Cantonese classifier reduplication is similar to *měi*. It has the same function as a universal quantifier. In other words, we can say that reduplication of classifiers in Cantonese yields a set of individuals.

3.5.2 *Count-marker vs. classifier*

To understand the source of the difference between Mandarin and Cantonese, it is necessary to understand how classifiers in Mandarin differ from classifiers in Cantonese. In Cheng & Sybesma (1999), it is noted that ClassifierP (i.e. Classifier Phrase) in Mandarin must be selected by the numeral head. They stipulated this because Mandarin differs from Cantonese in that Cantonese

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¹² The numbers after each morpheme in the Cantonese examples indicate tone.

allows classifier-noun sequence without any pre-classifier numeral or demonstrative, and that this sequence can denote definiteness, while Mandarin classifier-noun sequence cannot yield such an interpretation, as shown by the contrast between (39a) and (39b).

(39) a. *Běn shū hěn zhòng. (Mandarin)
    CL book very heavy
    'The book is very heavy.'

   b. Bun^2 syu^1 hou^2 cong^5. (Cantonese)
    CL book very heavy
    'The book is very heavy.'

Sybesma (2007) notes that (a) the distribution of [Cl(assifier)-N] phrases in Cantonese is largely the same as that of bare nouns in Mandarin, which can also denote definiteness; (b) the use of the general classifier (*ge*) is more widespread in Mandarin than in Cantonese (*go*); and (c) the nominal suffix *-zi*, originally a dimunitive suffix, is very common in Mandarin count nouns, while it is virtually absent in Cantonese. Consider, for instance, the following pair:

(40) a. yǐ-zi 'chair'(椅子) c. chē-zi 'car' (Mandarin)
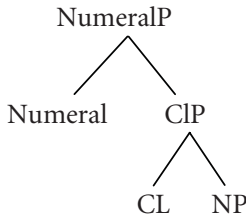   b. yi^2 'chair' d. ce^1 'car' (Cantonese)

There are many many more pairs which illustrate this (see also Pirani (2007)). In Cheng & Sybesma (1999), classifiers are said to have the function of individuation. Sybesma (2007), taking into consideration the differences in count nouns between Mandarin and Cantonese, proposed that *-zi* in Mandarin marks the noun as count. That is, *-zi* has the function of individuation (cf. Borer (2005a)). Classifiers on the other hand are used to combine numerals with the nouns (cf. Doetjes (1997)). Cantonese, moreover, does not have a separate element which functions as an individualizer. As a consequence, the Cantonese classifier acts as both an individuator and a go-between of the numeral and noun.

Note that under this view, *-zi* suffixation (marking a noun as count/individuating) is a lexical process. This means that count nouns in Mandarin come out from the lexicon as individuated. In contrast, individuation in Cantonese is a syntactic process, since count nouns are not already marked as such in the lexicon. In both languages, classifiers are used to combine nouns with numerals.
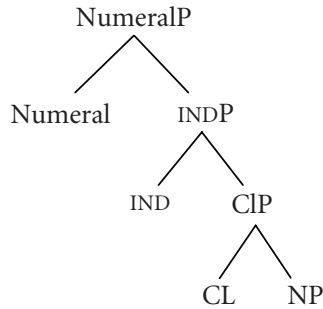
In the spirit of Sybesma (2007), I propose that, aside from the CL(assifier) projection, there is also an IND(ividuation) projection. Cantonese classifiers

start out as individuators and move to CL. Mandarin, on the other hand, simply does not have IND, since classifiers are not individuators. The structures are presented in (41a,b).

(41)   a.   Mandarin   b.   Cantonese

```
        NumeralP                      NumeralP
        /      \                      /      \
   Numeral     ClP              Numeral      INDP
               /  \                          /    \
             CL    NP                      IND     ClP
                                                   /  \
                                                 CL    NP
```

Getting back to reduplicative 'classifiers' and the differences between Mandarin and Cantonese, if we take into consideration how the classifiers differ in these two languages, then in Cantonese, what we are reduplicating is an individuator. Thus, the reduplication can yield (sets of) individuals. On the other hand, in Mandarin, classifiers in the nominal domain simply cannot be reduplicated.

What is interesting is that, once these classifiers are used adverbially, they can be reduplicated. However, in Mandarin, it is the case that the reduplicated classifiers are still restricted in their interpretation and co-occurrence with predicates. Here, I can only speculate that, when classifiers in Mandarin are reduplicated outside of the nominal domain, they get a collective/group interpretation, and are thus compatible with predicates that denote group properties. This of course does not explain why these classifiers cannot be reduplicated in the nominal domain and yield the collective/group interpretation.

3.6 Conclusion

I have provided additional evidence above that *dōu* is comparable to (definite) determiners in other languages (such as Greek, Basque, and Lillooet Salish), in that it provides contextual domain restriction, and it is obligatorily present with strong quantifiers. This entails that Chinese actually has a definite determiner. However, this determiner is not in the nominal domain, but rather a determiner which is generated outside of the noun phrase. Such an external determiner has actually been proposed by Sportiche (2001) and Johnson

(2000) for English. If this analysis is on the right track, it implies that, even for languages which do not seem to have a determiner inside the noun phrase, there are elements in the sentence which take the determiner function.

The claim that *dōu* is an external determiner, providing contextual domain restriction, fares well with the interpretation of *měi* as well as the obligatory co-occurrence between *měi* and *dōu*. This way, we do not have to re-invent an interpretation of *měi* which must then be compatible with a distributive *dōu*.

Lastly, I have also shown that a reduplicative classifier in Cantonese is similar to *měi* in that it yields the same results as a universal quantifier, resulting in individuals. The co-occurrence between reduplicative classifiers and *dōu* is simply the same as typical strong quantifiers. The difference between Cantonese and Mandarin, I have argued, stems from a difference in the nature of the classifiers in these two languages. Although we need to further examine the use of reduplicative classifiers as adverbials, it is clear that Cantonese classifiers are individuators, which, when reduplicated, yield sets of individuals.