9 Quantification and Scope

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The notion of quantification has often been used similarly in formal logic and formal semantics for natural languages. In natural languages, a quantifier, the element that generates quantification, is often a determiner, such as *all*, *every*, *some*, most, many, a few in English. Two widely used terms are "universal quantifier," illustrated by the English determiners all, every (all members or every member of a set) and so on, and "existential quantifier," represented by many/some/few/a (many/some/few member(s) of a set) and so on. Other types of quantifiers have also been identified, such as most, proportional quantifiers. A quantifier (such as all/some) and the restriction (the set, such as the set of person(s), thing(s)) form a quantified phrase or quantificational phrase, abbreviated as QP. Other quantifiers than determiners are also available, such as negation, modals, adverbs like *mostly*, usually, always, often, rarely, only. Wh-interrogative phrases also contain the Question operator and existential quantification. The interpretation of quantifiers is phrased in terms of scope (see, for instance, Szabolcsi 2003; Dayal 2012; and Keenan and Paperno 2012 for extensive reviews on the definitions, history, and variations). Important themes in the study of quantifiers or QPs generally include: (i) how to interpret and represent the scope of quantificational expressions; and (ii) how they interact with other scope-bearing elements.

The studies on quantification in Chinese¹ since the beginning of the 1980s, most prominently represented by S. F. Huang (1981) and C.-T. J. Huang (1982), have made significant contributions to the general theory of quantification regarding: (i) the relation between word order and interpretation (the Scope Principle in Huang 1982; Lee 1986); (ii) the comparative study of languages like Chinese whose scope properties seem to reflect the surface ordering more than languages like English, and the roles of chains, the types and properties of chains that need to be considered for scope interpretation (Huang 1982; Lee 1986; Aoun and Li 1989, 1993a; Hornstein 1995; Ernst 1998, among others); and (iii) the exact

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nature of scope interaction and classification of QPs, such as Liu (1990). Prominent properties in Chinese quantification, especially those involving the words seemingly supporting universal and existential expressions, different forms of negation, modals, adverbial quantification, intervention effects, the issue of scope and specificity, and so on, have also been investigated extensively, by, among many others, Cheng (1995, 2012); Ernst (1995, 2002); S. Z. Huang (1996); X. G. Li (1997); Wu (1999); J. W. Lin (1998); T.-H. Lin (1997, 1998, 2004); R. Yang (2001); D. Tsai (2001, 2002, 2003); B. Yang (2002, 2005, 2012); Soh (2005); Chen (2008); Y. Tsai 2009; H. Li (2011); and Jiang (2012).

Despite the many studies, there has not emerged a clear, coherent, and comprehensive picture of quantification in Chinese. Many issues have been raised, discussed, and then dropped. Even some fundamental issues do not have clear answers, such as what QPs there are in Chinese and why some supporting morphemes seemingly are required with some QPs. The limited space here will not allow us to conduct a comprehensive survey of the issues. The focus of this chapter will be on clarifying some prominent characteristics of QPs in Chinese, describing major achievements and challenges, and suggesting directions for further investigation. Section 1 will address the issues regarding the existence and properties of quantifiers in Chinese and Section 9.2 turns to the scope interaction of QPs.

1 Quantifiers

Chinese has clear quantifiers that are equivalents of the corresponding quantifiers in other better studied languages like English, such as negation *bu/mei*, modals like *hui* "will/can," *neng* "may/can," adverbial quantifiers like *ye* "also," *zhi* "only," *chang* "often," *nande* "rarely," and so on. They may differ from their English counterparts in category. For instance, *zhi* "only" is unambiguously an adverb modifying verb phrases in Chinese, in contrast to *only* in English, which can modify and form a constituent with a noun phrase. Regardless of distributional differences, the words mentioned above are clear quantifiers and have scope properties, which will be the subject of Section 2.

However, there has not been agreement on what represents universal and existential quantification. This has much to do with the fact that the candidates for universal and existential expressions generally need some "support" in some contexts:² *dou* "all" with universal quantifiers and, *you* "have" with existential quantifiers, as elaborated below.³

Chinese appears to have expressions roughly corresponding to commonly understood universal and existential QPs. The best candidates for universal QPs in Chinese are noun phrases containing *mei* "every," *suoyou* "all," or *quanbu* "all," as illustrated in (1):⁴

 mei-ge/suoyou/quanbu-de ren/dongxi/defang "every-CL(ASSIFER)/all/all-DE person/thing/place"

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The candidates for existential QPs and others are the following (see the classification in Liu 1990, 1997).⁵

- (2) a. you xuesheng $-you + NP^6$ have student "there are students . . ." b. vi/san-ge xuesheng –Number + Classifier + NP (NC expressions) one/three-CL student "a/three student(s)" c. henduo/henshao pengyou -"many/few" + NP many/few friend "many/few friends" d. zhishao – modified numeral + NP san-ge xuesheng at.least three-CL student "at least three students" e. baifenzhiwu/baifenzhijiushi de xuesheng - percentage + NP 5%/90% student DE "5%/90% of students" f. da/shao-bufen de xuesheng – proportional "most(majority)" + NP^7
 - big/small-part DE student "most (majority)/minority of students"

The expressions in (1)–(2) generate universal and existential (and proportional) quantification, and they enter into scope relations with each other (see Section 2).

- (3) a. mei-ge xuesheng dou mai yi-ben shu. ∀ > ∃ every-cL student all buy one-cL book "Every student bought a book."
 b. you san-ge laoshi kandao baifenzhiwu de xusheng. ∃ > "5%"
 - have three-CL teacher see 5% DE student "Three teachers saw 5% of students."

What makes the study of quantification in Chinese interesting is the fact that some of these expressions require *dou* "all" and *you* "have" in some contexts. The following examples show that universal and NC are not acceptable in subject and topic positions without dou/you.⁸

- (4) (ta yiwei) mei-ge/suoyou/quanbu xuesheng *(dou) xihuan shu.
 he think every-cL/all/all student all like book
 "(He thought) every student/all the students *(all) liked books."
- (5) (ta yiwei)* (you) san-ge xuesheng xihuan shu. he think have three-CL student like book "(He thought) three students liked books."

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- (6) (ta yiwei) mei-ge/suoyou/quanbu xuesheng, ta *(dou) xihuan.
 he think every-cL/all/all student he all like
 "(He thought) every student/all the students, he *(all) liked."
- (7) (ta yiwei) *(you) san-ge xuesheng, ta hen xihuan.he think have three-CL student he very like "(He thought) (there were) three students, he liked."

In addition, bare NPs and NC expressions can occur with either *dou* or *you* and generate universal and existential quantification respectively:

(8)	a.	you	(sar	n-ge)	xue	sheng	xihuan	shu.	– existential
		have	thr	ee-CL	stuc	lent	like	book	
		"There	are	(three)	stude	ents that	at like boo	oks."	
	b.	(san-ge	e)	xueshe	eng	dou	xihuan	shu.	– universal
		three-o	CL	studer	ıt	all	like	book	
		"All th	e (th	ree) stu	ıdent	s like ł	oooks."		

Such flexibility is reminiscent of the well-known variability in the interpretation of *wh*-phrases in Chinese. As frequently noted, *wh*-expressions in Chinese are variable-like and interpreted according to their contexts (see, among others, Huang 1982; Cheng 1991, 1995; Aoun and Li 1993b, 2003; Li 1992; Tsai 1994: Lin 1996, and Chapter 8 of this book). In addition to being interrogatives, they can be interpreted as non-interrogative universal expressions when related to *dou* or in the "bare *donkey* construction" with paired *wh*-expressions (Cheng and Huang 1996).

- (9) a. shei dou lai le who all come LE "Everyone came."
 - shei gei b. ta gei tangguo, wo jiu shei tangguo. who candy give who candy he give Ι then "I gave candy to whoever he gave candy to."

In other contexts, such as *if*-conditionals, questions, and negatives, they receive the existential interpretation.

(10) ruguo ni zhaodao shei. iiu ba ta qing lai. if find who then you BA him invite come "If you find someone, then invite him over."

Accordingly, *wh*-phrases in Chinese have generally been described as being underspecified in interpretation and analyzed as variables. The requirement of co-occurring *dou/you* in (4)–(7) and the variability in interpretation (8a–b) raise the question of whether the QP-looking expressions should be analyzed on a par with

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wh-phrases in the sense that they are all variables, whose interpretations are determined by their quantificational binders (e.g., T.H. Lin 1997; B. Yang 2002). A more general question is what quantifiers are in Chinese. The following subsections address these questions. Section 1.1 shows that the QP-looking expressions cannot be like variable *wh*-phrases dependent on quantificational binders for interpretation. They are existential and universal QPs. Section 1.2 discusses existential quantification and *you*; Section 1.3, universal quantification and *dou*.

1.1 QPs unlike variable wh-phrases

There are at least the following considerations that show that the expressions in (1)–(2) are not like variable *wh*-phrases.

First, QPs and *wh*-phrases differ in the relevance of licensing conditions and they may have different interpretations in identical contexts. As mentioned, *wh*-phrases are interpreted as interrogative or non-interrogative universal or existential depending on context, such as (9)–(10). In contrast, regardless of context, the expressions in (1) cannot be interpreted as existential and those in (2) should be interpreted as existential (except for bare NPs and NC expressions with a co-occurring *dou* in (8b), to which we return in Section 1.2). For instance, "everyone" can replace the existential "who" in (10), but the interpretation must be universal quantification. Differences in interpreting *wh*-phrases and QPs can be further illustrated by the contrast between (9b) and (11) below:

(11) ta gei mei/liang-ge ren tangguo, wo jiu gei he give every/two-cl person candy Ι then give mei/liang-ge ren tangguo. candy every/two-cl person "If he gives everyone/two people candy, I will give everyone/two people candy."

Unlike (9b) requiring the co-variance of values for the two *wh*-phrases, the two occurrences of "every" and existential expressions in (11) must be independently interpreted. In these cases, "every" and NC expressions occupy identical positions; yet, they must be interpreted as universal or existential respectively. Indeed, in contexts without *dou* or *you*, universal and existential-looking expressions are interpreted as universal and existential consistently. No flexibility is allowed, thus challenging a variable analysis. There are other problems against a consistent variable analysis. For instance, compare the types of elements that can be associated with *dou*. Were the relation between *dou* and its associated phrase a consistent quantifier-variable relation, the following contrast between "every" expressions and plural noun phrases would not be expected. As pointed out by R. Yang 2001, chapter 4 (contra Cheng 1995; T.-H. Lin 1997, 1998),⁹ both a plural definite noun phrase such as tamen "they" and an "every" type expression can be related to dou and interpreted as universal-distributive. Yet, the two types differ in a number of respects. First, the requirement of *dou* applies differently: *dou* is optional with plural definite noun phrases, but is obligatory with "every" expressions in

subject/topic positions, as in (4) and (6). Second, "almost" modifiers like *jihu* are possible with universal expressions but not with plural definite noun phrases:

- (12) a. (*jihu) naxie ren dou lai-le.
 almost those man all come-LE
 "(*Almost) Those people (all) came."
 b. (jihu) mei-ge/suoyou/quanbu-de ren dou lai-le.
 - almost every-cL/all/all-DE person all come-LE "(Almost) everyone/all the people (all) came."

In addition, a generic reading is possible with a universal QP but not with a definite plural.

(13)	a.	naxie gou dou you	yi-tiao	weiba.	– gener	ic reading	impossible
		those dog all have	one-CL	tail			
		"Those dogs (all) hav	ve a tail."				
	b.	mei-zhi/suoyou/	gou dou	you	yi-tiao	weiba.	– generic
		quanbu-de	-				reading possible
		every-CL/all/all-DE	dog all	have	one-cl	tail	
	i.	"(In general) every d	og/all do	gs has/ł	nave a tai	il.″	
	::	"Each of the dame he	· · · · · · · · · / //				

ii. "Each of the dogs has a tail."

The facts presented in this section show that the QP-like expressions related to dou/you cannot be analyzed like variable wh-phrases (cf. (10)). In a word, the expressions in (1)–(2) are not like variable wh-phrases but are more like their corresponding universal and existential QPs in English. However, the question still remains: why are dou and you required in certain contexts and what does it mean to have QPs that require the co-occurrence of other quantifiers (dou/you)? Let us begin with existential quantification.

1.2 Existential quantification and you

Notable issues regarding existential quantification include: (i) what are existential QPs, especially the oft-used NC expression with the number "one"; is it like an indefinite article in English? (ii) What is *you* "have" in existential quantification, when and why is *you* "have" required? And (iii) how are existential expressions represented grammatically and interpreted?

Regarding the status of *yi* "one," we can begin by comparing "one" NPs with bare NPs. Bare NPs in Chinese are like plural NPs (or mass nouns) or NPs with an indefinite article in English in that they can be bound by quantifiers from outside the noun phrases. They show variability in interpretation, as illustrated by the interpretation of the English indefinite phrase *a cat* in the following patterns (*a cat* can be replaced by *cats* without change of meaning).

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- (14) a. A cat always/usually/never chases a mouse
 - b. If a cat sees a mouse, it always/usually/never chases a mouse
 - c. A cat is always/usually/never ferocious.
 - d. If a cat has long hair, it always/usually/never chases a mouse

In these cases, adverbs of quantification determine the quantificational force of the noun phrase (see Lewis 1975) – *all cats(always), most cats (usually),* and *no cats (never)*. Bare NPs in Chinese behave in exactly the same way. *A cat* in (14) can be translated as a bare noun in Chinese and interpretations are identical. In contrast, NC expressions need modification, or occur in *if* clauses to be acceptable with the relevant adverbs as in (15a–b).¹⁰ A sentence like (16) is as strange as the English counterpart with *one cat*:

(15) a. yi-zhi shenbing de mao zongshi/tongchang/cong-bu one-CL sick DE cat always/usually/never shui zheng-tian jiao. sleep whole-day sleep "A sick cat/sick cats always/usually/never sleep(s) a whole day."

b. yi-zhi mao ruguo shengbing le, zongshi/ hui shui zheng-tian jiao.
 tongchang/cong-bu one-cL cat if sick LE always/usually/never will sleep whole-day sleep "If a cat/cats is/are sick, it/they will always/usually/never sleep a

whole day."

(16) *yi-zhi mao zongshi/tongchang/cong-bu shui zheng-tian jiao. one-CL cat always/usually/never sleep whole-day sleep "One cat always/usually/never sleeps a whole day."

When the meaning is intended to be quantity or amount, such as the following type of sentences, "one" expressions are acceptable in Chinese and English:

(17) yi-zhi mao zongshi/tongchang you si-tiao tui. one-cL cat always/usually have four-cL leg "One cat always/usually has four legs."

Therefore, we may conclude that the "one" in Chinese NPs is more like *one* in English than an indefinite article. Then, does Chinese have an indefinite article at all? It has been suggested that a deleted "one" can be equivalent to an indefinite article, such as in

(18) wo xiang kan yi-ben shu. I want read one-CL book "I want to read a book."

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When "one" is in an object noun phrase and is de-focused, it can be deleted (for recent works, see Jiang 2012). The quantity meaning of "one" here is not clearly present. It may be tempting to suggest that this is like an indefinite article. However, the deletion of "one" is phonologically constrained. A noun phrase with a deleted "one" does not occur in the same contexts that allow a noun phrase with an indefinite article in English. In addition, it does not have the generic interpretation that a noun phrase with an indefinite article does.¹¹ Therefore, it would be more appropriate to conclude that Chinese does not have the equivalent of the indefinite article in English.

Next, consider the issue with *you* "have" – what it is and when it is required. It has been commonly observed that *you* is required because a subject or topic nominal in Chinese cannot be indefinite, and *you* makes a subject/topic indefinite nominal acceptable. The rescuing effect is not surprising because the occurrence of *you* actually removes an indefinite noun phrase from being a subject or topic itself. *You* "have" asserts the existence of an entity or event, like *there* existential construction in English.¹² It is a verb or modal in category (e.g., Huang 1988, Li 1996) and generates existential quantification semantically, as demonstrated below (and see Section 2 on scope):

(19) you san-ge ren renshi ta. have thee-CL person know him "There are three people that know him."

In this sentence, the NC expression is indefinite and requires *you* to make an acceptable sentence. Similarly, a bare NP as in (20a) must be interpreted as definite or generic and an indefinite interpretation is possible only when *you* appears, as in (20b).¹³

(20) a. xuesheng renshi ta. student know him. "The students know him." xuesheng b. you renshi ta. know him have student "There are students that know him."

That *you* is a verb or a modal can be illustrated by the fact that it can appear in the alternative A-not-A question and serves as a simple answer to such questions – typical tests for verbhood (Li and Thompson 1981). Modals behave like verbs (Lin and Tang, 1995).

(21)	a.	you-m	ei-you	(san-ge)	ren	renshi	ta.
		have-n	ot-have	thee-CL	person	know	him.
		"Are th	here (thre	e) people t	that know	him?"	
	b.	you.	mei-you	l			
		have	not-have	е			
		"yes"	"no"				

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Because *you* "have" can be analyzed as a verb or a modal, it can take as its object the following noun phrase [*you* + noun phrase]. Then, the noun phrase following *you* is no longer in the typical subject or topic position by itself; *you* makes an indefinite expression acceptable in these positions (see Huang *et al.* 2009: ch. 8). That is, the addition of *you* avoids violating the prohibition against indefinite expressions in subject and topic positions in Chinese.

Nonetheless, it is also possible that *you* takes the entire clause as its object, not just the NP following *you*. A more general structural account for the prohibition against indefinite subjects or topics can be phrased by either the notion of lexical government or the presence of an existential quantifier. The former distinguishes subject and topic positions from other positions because only they are not lexically governed. For instance, Li (1998), following the insight of Longobardi (1994), argues that individual-denoting indefinite expressions should be analyzed as having the structure in (22b), in contrast to quantity-denoting expressions in (22a):



Individual-denoting indefinite expressions contain a null D that needs to be properly governed. The proper government requirement forces expressions of the form in (22b) to occur within the projection of VPs (or PPs in Chinese). Accordingly, such phrases do not occur in subject or topic positions. The occurrence of *you* provides a lexical governor for the relevant noun phrases. In contrast, a quantitydenoting expression is projected as NumP without a D. The absence of a null D makes such expressions acceptable in subject and topic positions, illustrated by the following acceptable sentences:

(23)	a.	san-ge	ren	chi-le	wu-wan	ı far	۱.
		three-CL	people	eat-le	five-cl	ric	e
		"Three pe	ople ate f	five bowl	s of rice."	,	
	b.	wu-wan	fan, sa	an-ge	ren	chi	le
		five-cl	rice th	nree-CL	people	eat	LE
		"Five bow	ls of rice	, three pe	ople ate.'	<i>''</i>	

The null D can receive a default existential interpretation, according to Longobardi (1994). Alternatively, the existential interpretation could be due to the availability of an existential closure (Diesing 1992, for instance) (and *you* occurring in the absence of an existential closure (Tsai 1994), as mentioned above).¹⁴ The existential closure would need to be high enough such that all the constituents after the subject can be within its domain:

(24) ta yinwei (yi-ge) pengyou sunshi henduo qian. he because one-CL friend lose much money "He lost much money because of friends (a friend)." In addition to a quantity-denoting expression, there is another structure that allows an indefinite expression in subject positions. It involves the so-called theticjudgment type of sentences, in contrast to the categorical-judgment type. The latter:

conforms to the traditional paradigm of subject-predicate, while [the former] represents simply the recognition or rejection of material of a judgment. Moreover, the categorical judgment is assumed to consist of two separate acts, one the act of recognition of that which is to be made the subject, and the other, the act of affirming or denying what is expressed by the predicate about the subject. With this analysis in mind, the thetic and the categorical judgments are also called the simple and the double judgments.

(Kuroda 1972:154; also see Kuroda 1992)

A categorical-judgment type of sentence, not the thetic one, contains a major subject, according to Kuroda (1988, 1992). Positionally, Kuroda (1988) places a major subject in the Spec of IP position and allows the subject of a thetic-judgment type sentence to be in the Spec of VP.¹⁵ Under a structural account, an indefinite subject in the Spec of VP position is possible because it is a lexically governed position, in contrast to a major subject in the Spec of IP, which is not lexically governed. Alternatively, an existential closure has within its scope a subject in the Spec of VP position, not Spec of IP. Huang *et al.* (2009: ch. 8) adopt this insight and suggest that examples that seem to allow an indefinite subject should be analyzed as a thetic-judgment type of sentence. The indefinite subject has a specific interpretation, such as the following:

(25) (wo kanjian) (liang-zhi) mao zai yuanzi-li dajia. I see two-CL cat at yard-in fight "(I saw that) (two) cats were fighting in the yard."

In short, *you* is required in subject and topic positions because of the prohibition against an indefinite subject. This can follow from an account that utilizes the notion of existential closure or from a structural account that employs a null D. An indefinite subject or topic is not possible because either it has a null D (giving the default existential interpretation, as proposed by Longobardi 1994) or that it itself is a variable and needs an existential closure to give it the existential interpretation. Exceptions to the prohibition of an indefinite subject/topic are due to the absence of a null D or because a null D is lexically governed/the noun phrase is low enough to be licensed by an existential closure.

The facts and accounts described above have interesting implications for the following sentences containing the types of expressions listed in (2c–f):

(26) a. (you) henduo ren, wo cai bu hui qu toupiao. have many people I guess not will go vote "Many people, I guess will not go to vote."

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- b. (you) dayue shang-bai-wei shendan lao-gonggong fandui youxing haveabout up-hundred-CL Christmas old-men oppose parade "About almost a hundred Santa Clauses oppose parades."
- c. (you) zhishao yi-bai-ge ren wo zhidao mei qu toupiao. have at.least one-hundred-CL people I know not go vote "At least 100 people I know did not go to vote."
- d. (you) baifenshibashi/baifenzhisanshi de ren mei qu toupiao. have 80%/30% DE people not go vote "80%/30% of the people did not go to vote."
- e. (you)xiao-bufen de ren mei qu toupiao. have small-part DE people not go vote "A minority of people did not go to vote."

These instances are acceptable without *you* "have," and are exceptions to the commonly observed prohibition against indefinite subjects, like the cases with quantitydenoting expressions. However, unlike quantity-denoting expressions which do not show scope interaction, these expressions without *you* can take wide scope (in addition to independent scope as in quantity-denoting expressions):

- (27) a. henduo/zhishao shi-ge haizi na-le san-dao-wu-ke many/at least ten-CL child take-LE three-to-five-CL tang. (subject > object) candy "Many/At least ten children took three-to-five candies."
 - b. (dayue) 10% de haizi na-le shi-duo-ke tang. (subject > object) about DE child take-LE three-to-five-CL candy "(About) 10% of children took three-to-five candies."

The facts illustrated in (26) and (27) suggest that the expressions in (2c–f) probably do not always contain null Ds; they can be QPs, in contrast to those in (2a–b), which are variables with null Ds. This contrast probably is responsible for the following interesting difference: bare NPs and NC expressions in (2a–b) can be interpreted as definite in some limited contexts, but not those in (2c–f).

- (28) ta yijing ba (san-ge) haizi xian dai hui-qu le. he already BA three-CL child first take back-go LE "He has already taken back the (three) children."
- (29) ta yijing ba zhishao san-ge/henduo haizi xian dai hui-qu le. he already BA at least three-CL/many child first take back-go LE "He has already taken back at least three/many children."

As indicated in the translation, only bare NPs and NC expressions in (28) are interpreted as definite, not the cases in (29). This contrast might be due to a contrast between the two in whether a D is already filled. In (29), the D is a quantifier, making it possible to use the relevant expressions in subject/topic positions

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without *you*. However, bare NPs and NC expressions do not have Ds occupied by quantifiers, and the limited context provides a definite interpretation (the noun phrase following *ba* in the construction; see Huang *et al.* 2009: ch. 5 for a recent work on *ba*, based on Li 2006). It is also possible that here we see a very limited case of deleting a D (demonstrative) available to bare numerals or bare NPs when there is a clear enough discourse context strongly favoring a definite interpretation (a limited case of the Cantonese pattern and deletion of demonstratives in Wu and Bodomo 2009). Alternatively, Lee and Zhuang (2012) suggest that a *pro* is available within the noun phrase, making the expression definite. The marker *ba* generally prefers strongly its object noun phrase to be definite. If this is a plausible option, then the possibility noted in (8b), repeated below, should not be because of *dou* making the noun phrase definite. Rather, the noun phrase itself is already definite, just as in (28).

(8)	b. (san-ge)	xuesheng	dou	xihuan	shu.
	three-CL	student	all	like	book
	"All the (th	nree) studen	ts like	books."	

As a segue to the next section on universal quantification and *dou*, it should be noted that the existential expressions discussed in this section can all occur with *dou* and *you* simultaneously.¹⁶

- (30) a. you zhishao yi-bai-ge ren dou qu toupiao le. have at.least one-hundred-CL people all go vote LE "At least 100 people all went to vote."
 - b. you baifenshibashi de ren dou mei qu toupiao. have 80% DE people all not go vote "80% of the people all did not go to vote."
 - henduo xuesheng, wo cai qu toupiao. c. you dou bu hui have many student Ι all not will go vote guess "Many students, I guess all will not go to vote."
 - d. you baifenzhisan de ren dou tongshi have 3% DE person all simultaneously chu-lai jingxuan, keneng ma? out-come campaign possible Q

"3% of people all came out to campaign simultaneously. Was it possible?"

The acceptability of these examples raises questions regarding the status of *you*, *dou*, and the Bijection Principle – an operator must bind one and only one variable (Koopman and Sportiche 1983). It is possible to get around the potential problem with the Bijection Principle with regard to the QPs optionally occurring with *you* by allowing them to be ambiguous: when they occur with *you* (or the covert existential closure), they are variables; otherwise, they are QPs. Alternatively, they can all be QPs; but a disclosure mechanism can apply as proposed in Chierchia (2000). Indefinite bare NPs and NC expressions are always variables with a null D (whose

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default interpretation is existential as in Longobardi 1994) (or QPs in need of a disclosure mechanism). Note that the same properties hold true in English because the corresponding expressions can either appear independently, including in subject positions, or in existential *there* constructions. In a word, Chinese existential expressions in (2a–f) do not differ from their English counterparts, which have also been analyzed as variables or QPs (or choice functions, see note 10; also, see Jiang 2012). The only difference between the two languages is the requirement of *you* for bare NPs and NC expressions in subject and topic positions but *there be* is not required in English (see, for instance, Aoun and Li 1993a for the status of an internal subject in English vs. Chinese).

Nonetheless, the possibility of (30a–d) does raise a question regarding the Bijection Principle. Not only *you* but also *dou* is a quantifier, because they interact with other scope-bearing elements scopally. What does it mean to have both *you* and *dou* occurring with the same QP/variable? This leads us to the discussion of universal quantification, which requires *dou* in some cases. Let us turn to universal quantification and *dou* in the next section.

1.3 Universal quantification and dou

Chinese seems to have typical universal QPs. For instance, typical universal QPs do not occur in existential constructions. Sentences like the following are also unacceptable:

(31) *you mei-ge student (dou) qu toupiao le. have every-CL people all go vote LE "There was every student (all) going to vote."

Others like *suoyou/quanbu de* "all" NP (and *da-bufen de* "most") are also impossible in the existential construction. Let us focus on "every" expressions as a representation of universal quantification.

What is unique in Chinese is the requirement of *dou*: as demonstrated in (4) and (6), *dou* must occur with universal QPs in subject and topic positions. Why is *dou* necessary? Over the years, there have been many works discussing the semantic properties of *dou* but only a few specifically address the question of why *dou* is obligatory with *every*. The morpheme *dou* has been analyzed as a distributive operator (e.g., Lee 1986 – also the proposal of *dou* as a totalizing quantifier; Liu 1990; Cheng 1995; Lin 1996, 1998; X.-G. Li 1997; R. Yang 2001; Tomioka and Tsai 2005; Chen 2008; Tsai 2009, etc.). The noun phrase relating to *dou* must be semantically measurable to the eventuality expressed by the predicate (Zhang 1997). Alternatively, Giannakidou and Cheng (2006) and Xiang (2006) analyze *dou* as a maximality operator; and Zhang (2008), as an exhaustivity marker, etc.¹⁷ S.-Z. Huang's (1995, 1996) proposal is especially interesting because of her relating the obligatoriness of *dou* to the semantics of "every" and the wide range of constructions accommodated. Basing her analysis on the interpretation of "every," she defines "every" as a quantifier EVERY that is always associated with a pairing.

For instance, "Every student left" in English means that for every student there is an event such that the student left in that event. She proposes a formal translation of the quantifier EVERY encoding the pairing relation and the translation should be augmented by a skolem function relating the two arguments of EVERY to ensure proper pairing. A skolem function links two variables by making the choice of a value for one variable depend on the choice of a value for the other. The requirement of *dou* follows from the skolemized definition of "every." The skolem function needs a variable in the scope of "every." She takes only morphologically/lexically licensed variables to be available for quantification (of "every" type). Dou occurs with mei "every" because dou can license an event variable for skolemization. *Dou* necessarily appears pre-verbally because it is a sum operator that takes an event variable, which is located within the predicate VP, and because all known functors in Chinese are on the left of their arguments. Being a sum operator on events, *dou* makes the predicate it modifies assert a plurality of minimum events. The size of a minimum event is compatible with the semantics of the predicate and *dou* can modify all types of predicates, including distributive (e.g., "pregnant"), symmetric (e.g., "meet, alike"), and collective (e.g., "surround, collide") predicates. Moreover, to account for the contrast between the requirement of *dou* with "every" type expressions in Chinese and the absence of such a requirement in English, she claims that the function of *dou* is performed by the tense operator in English. She further notes that mei "every" not only can be licensed by *dou*, but also an indefinite phrase, or a reflexive in its scope. The function of these elements is the same - to provide the needed variable in the scope of "every."

There are many interesting patterns accommodated by S.-Z. Huang's proposal. For instance, her account also covers constructions that do not involve distributivity, such as (32), and captures the contrast between the licensing of a *wh*-phrase to the right of *dou* but not a QP in this position, as in (33a–b) (cf. J. Li 1995).

- (32) ta dou yijing xue-le san-nian zhongwen le. he all already study-LE three-year Chinese LE "He has already studied Chinese for three years."
- mai-le shenme? (33) a. ta dou he all buy-le what "What all did he buy?" b. *ta dou mai-le mei-ge/suoyou dongxi. de he all buv-le every-cl/all DE thing "*He all bought everything/all things."

A comprehensible discussion of the wide range of patterns and the proposal would take us far beyond the space limit; readers are referred to her works for details (S. Z. Huang 1995a,b, 1996).¹⁸ Suffice it to point out that *dou* should be understood as not only related to the universal QP (introducing a second variable for "every" type expressions) but also the event (the predicate VP).

Such a semantic account of "every" expressions and the co-occurring *dou* is very insightful and connects a wide range of constructions involving "every" and *dou*. Nonetheless, just like the situation with any other complex issues, an ambitious unified account tends to present further challenges. There are still some clarifications desired and other distributional and syntactic issues that can benefit from further explanation and investigation. Let us briefly describe some of them below.

The first concerns the co-occurrence of *dou* and *you*, as mentioned at the end of last section. Sentences like (30a–c) are acceptable, which was suggested to be a problem for the Bijection Principle. In fact, according to S.Z. Huang, the co-occurrence of *dou* and *you* should not be possible because they are competing for the same event variable. But we cannot deny the fact that cases like (30a–c) are possible. How should the conflict be resolved? One option is to take these as similar to the secondary predicate structure in existential constructions (J. Huang 1987) – the existence-assertion *you* is a verb, taking the following noun phrase as its object. The VP containing *dou* is a secondary predicate predicate of the object noun phrase. This proposal can be supported by the fact that *you* and *dou* cannot co-occur when *you* is negated or when the object noun phrase of *you* is a bare NP, which does not have a specific interpretation (cf. J. Huang 1987; Tsai 1994 for the claim that the subject of a secondary predicate predicated of the object of existential constructions must be specific).

- (34) a. *mei-you henduo xuesheng dou bu hui qu toupiao. -*negation not-have many student all not will go vote
 "There are not many students all going to vote."
 - b. *you xuesheng dou bu hui qu toupiao. -*bare NP have student all not will go vote
 "There are students all going to vote."

Another option is to generate *you* and *dou* in two separate clauses: [*you* NP] [pro *dou* VP]. *You* asserts the existence of its object noun phrase, creating an antecedent for the following empty pronoun (Shi 1992 for the co-reference of empty pronouns with an antecedent in the preceding clause that has become an accessible topic). Accordingly, the co-occurrence of *dou* and *you* need not be an issue.

Nevertheless, there are some real challenges. One involves the distribution of "every" expressions. Huang's account essentially rules out "every" expressions in post-verbal position when there is not a second variable to their right. Indeed, the literature has not been quite in agreement on where "every" expressions are possible. The judgments reported in the literature vary greatly, ranging from claims that *mei* phrases can only occur in subject/topic positions, to claims that *mei* phrases can occur in pre-verbal positions, and to claims that *mei* phrases may also appear in post-verbal positions (e.g., see the stricter Cheng 1991 and S.Z. Huang 1996 to the more permissive Lee 1986; Liu 1990; X.-G. Li 1997; and B. Yang 2002).¹⁹ They also differ in whether only subject/topic *mei* phrases require *dou* or all pre-verbal *mei*-phrases have the requirement.

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A Google search reveals that *mei* expressions are commonly found in the postverbal object position and within pre-verbal PPs without *dou* (also without an indefinite phrase providing a variable within its c-command domain: see note 19).

- (35) a. Shanghai quan-jing-tu, keyi kandao mei-ge xijie Shanghai whole-scene-map can see every-CL detail "On the Shanghai full-scene map, one can see every detail."
 - b. jiaoxue zhongxin yao yong xin qu jiao mei-yi-ge xuesheng teaching center will use heart go teach every-one-CL student "The teaching center will conscientiously teach every student."
 - c. yanjiu i-Phone zhanju wo mei-ge wanshang study i-Phone occupy me every-CL evening "Studying i-Phone occupies every evening of mine."
- (36) a. ba mei-ge xijie diaozhuo cheng yishu BA every-CL detail carve become art "carve every detail to make an art"
 - b. gongsi dui mei-ge kehu fuze daodi company to every-CL customer take responsibility to.bottom "The company will take responsibilities for every customer to the end."
 - c. xiang mei-ge mama zhijing to every-CL mother salute "Salute to every mother."
 - d. wei mei-ge huiyuan gusuan neng sheng duoshao shui for every-CL member estimate can save how much water "estimate how much water can be saved for every member"
- (37) xin kecheng jiaocai rang mei-ge laoshi xuehui chuangzao new curriculum material let every-cL teacher learn create "The new curricular materials allow every teacher to learn to create."

These examples show that *mei* phrases do not occur with *dou*, and the *dou-less mei*-phrases can be in the object positions of a V/P or the subject position of an embedded clause (see Pan 2008). A pre-verbal PP containing a *mei* phrase can follow the subject of a sentence (which can be the case in (36a–f) if a subject is added to the beginning of the expressions) or precede the subject as the one below:

(38) dui mei-ge kehu, women gongsi hui fuze daodi. to every-CL client we company will take responsibility to.bottom "To every client, our company will take full responsibilities."

In some of these cases which have "every" phrases in pre-verbal position, *dou* can optionally occur and does seem to contribute a "distributive" interpretation. Thus, the following sentences differ in their acceptability in the use of *dou* only because of the (un)naturalness of distributivity associated with the events:

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- (39) wo cong mei-jia yinghang (dou) jie-le qian. I from every-CL bank all borrow-LE money "I borrowed money from every bank."
- (40) cong mei-ge xijie (*dou) zuoqi from every-CL detail all do.begin "work from every detail"

Indeed, a survey of the literature and an online data search suggest the following generalization: for some speakers, *dou* often is not used when a *mei*-phrase is not in the subject (or topic) position of a root clause and "certain embedded clauses." Modifying "embedded clauses" with "certain" means the distinction of two types – one type requires *dou* and the other type does not. The latter type includes relative clauses, sentential subjects (which can be topicalized), and conditional clauses, illustrated below.

- (41) a. mei-ge ren yao de shu bijiao you visi. every-CL want DE book compare have meaning person "The books that everyone wants are more interesting."
 - b. mei-ge ren jueding qu kan ta shi bu keneng de shi. every-CL person decide go visit him be not likely DE matter "That everyone decides to visit him is an impossible matter."
 - c. ruguo mei-ge ren jueding qu kan ta, ni juede heshi
 if every-CL person decide go visit him you feel appropriate
 ma?
 O

"If everyone decides to visit him, do you feel it is appropriate?"

Other types of embedded clauses, in which *mei* expressions in subject positions without *dou* are still not acceptable, might involve *because* clauses or complement clauses embedded under verbs taking clausal complements:

- (42) a. wo yinwei mei-ge ren *(dou) jueding qu kan ta hen gaoxing I because every-CL person all decide go visit him very happy "I was happy because everyone decided to visit him."
 - b. wo yiwei/zhidao mei-ge ren *(dou) jueding qu kan ta I think/know every-cL person all decide go visit him "I thought/knew everyone decided to visit him."

However, distinguishing the types of clauses that allow or disallow the nonoccurrence of *dou* with "every" phrases has been challenging. Judgments among native speakers seem to be uncertain. For example, some speakers still require *dou* in the sentences above. In the cases with clausal complements to verb, the choice of the verb also seems to affect the acceptability of *dou* missing for some speakers. Such uncertainty and variability are reminiscent of the cases regarding the requirement of *hen* "very" with an adjectival predicate in some embedded clauses but

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not others (for a recent work, see Grano 2011, among others). The uncertainty of the data makes it difficult to arrive at a clearer picture and I cannot offer further insight to advance our understanding of the issues beyond what is available in the literature.

Next, consider the relation between *dou* and the phrase related to it. As frequently noted, *dou* can be related to many different types of noun phrases. Let us focus on the structural relation between *dou* and its associated noun phrase. According to the kinds of elements that can occur between *dou* and the associated element, three types of noun phrases should be recognized: *wh*-phrases, QPs, and plural noun phrases. *Wh*-phrases are governed by the strictest locality condition, and plural noun phrases the least. Generally, a *wh*-phrase and a licensing *dou* cannot be intervened by another scope-bearing element, such as modals, adverbials, negation.

(43)	*shei/shenme ren	mei/bu/hui/changchang	dou	lai.
	who/what person	not/not/will/often	all	come

QPs and *dou* can be intervened by a sentential negation, some epistemic modals but not a VP-negation, deontic modals, or some adverbs:²⁰

(44)	a.	mei-ge	ren	bu/mei	d	lou	zuo le	$ma?^{21}$	
		every-cl	person	not 🔪	a	11	do le	Q	
		"Isn't/Was	sn't it that	everyon	e ha	as doi	ne (som	ething)?	//
	b.	mei-ge	ren	hui d	ou	nac	lao jia	ngpin	ma?
		every-CL	person	will a	11	get	pi	rize	Q
		"Will ever	yone get p	orizes?"		Ũ	-		
	c.	*mei-ge	ren	neng	do	u y	ouyong	ma?	
		every-cL	person	can	all	SI	wim	Q	
		"Can ever	yone swin	n?"					
	d.	*mei-ge	ren	hensha	0	dou	you	yijian.	22
		every-CL	person	rarely		all	have	opinic	n
		"Everyone	rarely ha	s opinior	ns."			•	
cf.	e.	henshao	mei-ge	ren	(dou	you	yijian.	
		rarely	every-cL	person	á	all	have	opinio	n

"Rarely everyone has opinions."

That the negation in (44a) is used as a sentential negation is indicated by the occurrence of the completion aspect marker *le* after the verb, which generally does not occur when the scope of *bu* or *mei* is less than sentential. The following example with *bu/mei* negating the phrase following it, rather than negating the entire sentence, is worse than (44a) with sentential negation:

(45) mei-ge ren bu/mei dou qu. every-CL person not all go "Everyone will not/did not all go."

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Nonetheless, QPs and *dou* can be intervened by *wh*-phrases:²³

(46) mei-ge ren weishenme/zenme dou mei lai? every-CL person why/how.come all not come "Why didn't everyone come?"

Compared with QPs, plural noun phrases have additional possibilities in allowing VP negation and adverbials between them and *dou*.

a.	tamen	meı	dou	qu.		
	they	not	all	go		
	"They d	lid not	all w	rent."		
b.	tamen	hensh	nao	dou	you	yijian.
	they	rarely	7	all	have	opinion
	"They r	arely h	ave c	opinior	ns.″	
	a. b.	a. tamen they "They d b. tamen they "They r	a. tamen mei they not "They did not b. tamen hensk they rarely "They rarely h	a. tamen mei dou they not all "They did not all w b. tamen henshao they rarely "They rarely have o	a. tamen mei dou qu. they not all go "They did not all went."b. tamen henshao dou they rarely all "They rarely have opinior	 a. tamen mei dou qu. they not all go "They did not all went." b. tamen henshao dou you they rarely all have "They rarely have opinions."

These variations show that *wh*-phrases, QPs, and plural noun phrases should be distinguished when related to *dou*. The distinction further supports the point made in Section 1 that not all the elements related to *dou* behave alike and therefore they should not be analyzed in the same way. The different locality conditions should be captured in some manner.²⁴

Another instance illustrating the need for further work on locality conditions involves distributional differences between *dou* and a closely related word *ge* "each" or "respectively." Both are adverbs in category and adjoined to VPs. *Ge* has a distributive interpretation. It requires a plural noun phrase to its left (or a *mei*-phrase), which is mostly true with *dou* except for a few cases such as (32). However, it differs from *dou* in that it requires a phrase of the type in (2b, d, e) or a *wh*-phrase to its right (see, for instance, Soh 2005 and T.-H. Lin 1998 for more differences between *dou* and *ge*):

- (48) tamen ge na-zou *((dayue) wu-ben/10% de) shu. they respectively take-away about five-CL/10% DE book "They took away about five books/10% of books respectively."
- (49) tamen ge na-zhe shenme dongxi? they respectively hold-ASP what thing "What things are they holding respectively?"

Dou can be related to a *wh*-interrogative on its right. This is not possible with *ge*:

(50) ta dou/*ge xihuan (xie) shenme? he all/respectively like some what "What all does he like/*What respectively does he like?"

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In double object constructions, ge, not dou, can appear between the two objects:²⁵

(51) wo gei mei-ge ren ge/*dou yi-ben shu I give every-cL person respectively/all one-cL book "I gave everyone a book respectively."

Dou and *ge* can co-occur and the order can be *dou-ge* or *ge-dou*:

(52)	a.	tamen	dou	ge		na-le	yi-ben	shu
		they	all	respec	tively	take-le	one-CL	book
		"They a	ll took	a book	respect	tively."		
	b.	tamen	ge		dou	na-le	yi-ben	shu
		they	respe	ctively	all	take-le	one-CL	book
		~		2				

These examples show that even though *dou* and *ge* can have a similar distributive interpretation, they have distinct syntactic properties.

In short, universal/distributive quantifiers in Chinese present many challenging issues, such as the semantics of "every" expressions and *dou*, the distribution of these elements, and locality conditions between them. The relatively more comprehensive accounts of the issues are the dissertations devoted to the topics: S.Z. Huang (1996) and X.G. Li (1997) (and R. Yang 2002 from different perspectives; Wu 1999 on wh and QPs), which have presented many interesting and important constructions and offered insightful accounts. However, as with many complex issues, true empirical generalizations tend to be elusive. For instance, the two major dissertations just mentioned disagree on whether elements other than dou can license an "every" expression. They disagree on the fundamental contributions made by *dou* (distributivity or not). The analyses for instances of "every" expressions without *dou* either rely on invisible covert licensers (which have not been independently supported) or are left unaccounted for. In addition, both analyses rely on the distinction between the lack of tense in Chinese and its presence in English to account for the unique requirement of *dou* with "every" expressions in Chinese. However, it is a contentious issue whether Chinese has tense or not (e.g., Li 1985, 1990; Hu et al. 2001; Lin 2006; Sybesma 2007; Tsai 2008a). Because of these issues, it is not surprising that there have been many more works on *dou* and universal quantification since the 1990s up till now and at least these issues seem to remain: (i) What are the true generalizations regarding the distribution of *dou* in regard to universal quantification and other expressions *dou* is related to? (ii) What is a unified analysis that can, at least, accommodate the range of rich (but sometimes conflicting) data discussed in S.Z. Huang (1996) and X.G. Li (1997)? (iii) What might be good alternatives to differentiating English and Chinese other than the option of tense? Answers to these and other related questions will need much more research.

1.4 Summary

Section 1 began with the issue of whether true QPs exist in Chinese, both existential and universal. It was affirmed that the presence of QPs should be recognized and elements that can generate existential and universal quantification in Chinese are identified. Most existential quantifiers are like those in English. The similarity is sometimes obscured by the fact that they can occur as objects of you as in (26), which is essentially a verb in category. A recurrent question asked in the literature seems to be the need of you with indefinite bare NP and NC expressions when they are in subject or topic positions.²⁶ This requirement is attributed to their structures, which have a null D or lack in quantificational force. Different types of existential expressions are distinguished according to their requirement or acceptability to co-occur with you or both you and dou, and their possibilities in varying interpretations according to the quantifiers in context. With regard to universal quantification, the issues have been on what licenses "every" expressions, the role of *dou*, the distribution of "every" expressions with or without *dou*, the range of constructions allowing "every," and so on. They have inspired many insightful works from syntactic, semantic, and pragmatic perspectives. However, some questions are still waiting for clearer answers.

Regardless of the complications, we need to recognize the presence of existential and universal quantification in Chinese, which means that relevant scope properties should be considered, as discussed next.

2 Scope interaction

The existence of QPs in Chinese naturally leads to the question of how QPs scopally interact with each other and with other scope-bearing elements such as *wh*-interrogatives, negation, modals, and adverbs. The very limited space here does not allow us to discuss all the relevant issues. The following subsections will simply focus on some points that either have not received much attention, or that can be better understood now than before, or that have raised new questions.

2.1 Word order and scope

Let us begin with the clearer cases – those involving scope-bearing adverbs, whose scope properties are more cleanly and clearly defined. Adverbs modify phrases, which immediately follow them, their sister constituents (see Huang 1982; Sportiche 1988; Aoun and Li 1993a; Ernst 2002, among others). That is, the domain of scope-bearing adverbs such as *dou* "all," *ye* "also," *changchang* "often," negation and so on is the constituent to the right of the adverb.²⁷ Thus, the position of adverbs is a good indication of the scope domain, and scope readings are largely clear. No ambiguity arises in the cases containing more than one of such adverbs – the one on the left has scope over the one on the right.

(53)	a.	tamen they "They a	dou all ll often	changel often did not	hang	mei not	qu. go	all > often > not
	b.	tamen they "They of	chang often	chang	dou all	mei not	qu. go	often > all > not
	c.	tamen they	mei not	changel often	nang	dou all	qu. go	not > often > all
		iney d	ia not	often all	go."			

All the other logical possibilities for the adverbial elements in (53) are acceptable as well: all > often > not, not > all > often, often > not > all. Different ordering results in different scope readings.

The fact above shows that *dou* is a scope-bearing adverb and its scope is what is on its right, just like other adverbs. This raises the question of what the scope properties of a QP related to *dou* might be. A trademark property of a QP is that it has scope and can enter into scope relations with other scope-bearing phrases. If *dou* is also a scope-bearing element and can interact with other elements scopally, how does the combination of *dou* and its related QP behave? We saw in the previous section that dou and the associated QP do not have to be adjacent to each other. When they are separated, how is scope determined? Answering this question will also help us understand why only some modals can intervene between dou and the related QP and why the same constraint is not observed with plural noun phrases, as briefly mentioned in Section 1.3. I will show that QPs in Chinese, even when they are paired with *dou*, are still scope-bearing elements, entering into scope relations with other elements, just as in other languages. At the same time, dou also bears scope. The close relation between dou and its related QP, that is, the pair [QP . . . dou], requires that the two bear the same scope when they interact with other scope-bearing elements, which may affect their ordering with negation and other scope-bearing constituents. In contrast, plural noun phrases are not QPs and do not interact with other elements scopally. These factors capture the patterns in (44), (47), and others, as shown below.

The contrast between the acceptability of the sentential negation bu/mei in (44a) and the unacceptability of VP negation in (45) is most telling. The sentential negation is indicated by the English translation "Isn't/Wasn't it that...." The sentential negation bu "not" can be followed by an overt copular verb *shi* "be." For instance, (54) below with a copula is an equivalent of (44a) with *bu*:

(54)	mei-ge	ren	bu	shi	dou	lai le	ma?
	every-CL	person	not	be	all	come le	Q
	"Isn't it th	at everyo	ne has	come	e?"		

In (44a)/(54), the QP and *dou* both have narrow scope with respect to the negation, which has scope over the entire sentence. In contrast, the VP negation in (45) only negates what follows it. That is, it takes scope over the elements to its right,

including *dou*. However, the subject QP precedes the negation and has scope over it. This creates a conflict between the pair [QP . . . *dou*] and negation. Therefore, (45) is not acceptable. On the other hand, the acceptability of sentences like (47) can be captured when plural noun phrases are not scope-bearing QPs.

Similar to *dou* "all,"the existential marker *you* "have" also marks scope. The noun phrase associated with it is always strictly adjacent to it.²⁸ The strict adjacency relation means that the complications with *dou* do not exist in the cases with *you*. The *you* phrase necessarily has scope over the adverb "often" and negation in a sentence like (55a) below, but only scopes over the negation in (55b) because of their relevant positions.

(55)	a.	you	xuesh	eng	cha	angchang	bu lai.
		have	studer	nt	oft	en	not come
		"There	are stu	idents	tha	at often do	not come."
	b.	change	hang	you	3	xuesheng	bu lai.
		often		have		student	not come
		"There	often a	are stu	ıdeı	nts that do	not come."

The following two sentences are also unambiguous: the QP or *dou/you* on the left has scope over the one on the right:

- mei-ge tebie xihuan (56) a. you yi-ge wanju xiaohai dou have one-cl toy every-CL child all specially like "There is a toy that every child likes especially." b. mei-ge xiaohai dou you yi-ge wanju tebie xihuan
 - every-CL child all have one-CL toy specially like "Every child has a toy that they like especially."

2.2 The scope principle

Patterns similar to those illustrated in the examples above have frequently been used to demonstrate a common observation to the effect that surface word order is correlated with scope relations in Chinese (e.g., S. Huang 1981;J. Huang 1982; Liu 1990). Chinese is considered a right-branching language and a c-command relation between two elements generally is realized as linear precedence. J. Huang (1982) proposes the following Isomorphic Principle, which very often is realized in linear terms as well: A c-commands B means A precedes B:

(57) Huang (1982: 220): The Isomorphic Principle

General condition on scope interpretation:

Suppose A and B are both QPs or both A-NPs or A-expressions; then if A c-commands B at S-Structure, A also c-commands B at the Logical Form.

Lee (1986) rephrased Huang's (57) in terms of command and precedence: A has scope over B if A commands and precedes B (also see Barss and Lasnik 1986). In other words, the surface order of the scope-bearing lexical items determines their relative scope.

There has been further research showing that not just the lexical items but also traces related to them may play a role in determining scope (see, for instance, the role of traces in Hornstein 1995). Aoun and Li (1989, 1993a) observe that a contrast exists in the interpretation of QPs between active and passive sentences in Chinese. A canonical active sentence with a subject QP interacting with an object QP is not ambiguous. In contrast, the passive counterpart is ambiguous. The difference can be demonstrated by the examples below.

(unambiguous: $\forall > \exists$)²⁹ (58) a. mei-ge-ren dou xihuan vi-ge nuren. every-cl-one all like one-CL woman "Everyone loves a woman." b. yaoshi liang-ge ren zhaodao mei-ge found if two-cL men every-CL xiansuo. . . . (unambiguous: $\exists > \forall$)³⁰ clue "If two men found every clue . . .' (59) a. mei-ge-ren dou vi-ge bei nuren all bv every-cl-one one-cl woman zhuazou le. (ambiguous: $\forall > \exists, \exists > \forall$) arrested LE "Everyone was arrested by a woman." b. yaoshi liang-ge xiansuo bei mei-ge-ren if two-cl clues by every-cl-one zhaodao . . . (ambiguous: $\forall > \exists, \exists > \forall$) found

"If two clues were found by everyone . . ."

Aoun and Li suggest that the ambiguity of (59) is due to the fact that, when an object QP is passivized and raised to the subject position, it may c-command the demoted subject QP and the c-commanded QP may in turn c-command the trace left by passivization: [QP1 ... QP2 ... t1] (left to right reflecting c-command relations). That is, traces participate in scope interaction.

Accordingly, the following scope principle was proposed to account for the contrast described above and other similar cases (Aoun and Li 1989: 141)

(60) The Scope Principle

A quantifier A has scope over a quantifier B in case A c-commands a member of the chain containing B.

Aoun and Li further note that there is a contrast between double object and dative constructions and they again attribute the contrast to the existence of traces (for details, see Aoun and Li 1989: section 5.3.)

(61) wo song yi-ge ren mei-ben shu. (unambiguous: ∃ > ∀)
 I give one-CL person every-CL book
 "I gave a person every book."

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- (62) wo song yi-ben shu gei mei-ge-ren. (ambiguous: ∀ > ∃, ∃ > ∀)
 I give one-cL book to every-cL-one
 "I gave a book to everyone."
- (63) wo dei jieshao gei liang-ge laoshi mei-ge I need introduce to two-CL teacher every-CL xuesheng. (unambiguous: ∃ > ∀) student
 "I should introduce to two teachers every student."
- (64) wo dei jieshao liang-ge xuesheng gei mei-ge I need introduce two-CL student to every-CL laoshi. (ambiguous: ∀ > ∃, ∃ > ∀) teacher
 "I should introduce two students to every teacher."

Other pairs of double object and dative constructions with different QPs illustrate the same contrast (also see S.Z. Huang 1996 for a similar observation on differentiating the two structures):³¹

- (65) a. wo song liang-ge pengyou zhishao liang-ge liwu. (unambiguous) I give two-cL friend at.least two-cL present "I gave two friends at least two presents."
 - b. wo song zhishao liang-ge pengyou liang-ge liwu. (unambiguous) I give at.least two-CL friend two-CL present "I gave two friends at least two presents."
- gei (66) a. wo song zhishao liang-ge liwu liang-ge at.least give ≥ two-cl present two-cl Т to pengyou. (ambiguous) friend "I gave at least two presents to two friends." b. wo song liang-ge liwu gei zhishao liang-ge Ι give two-cl present to at.least two-cl pengyou. (ambiguous) friend

"I gave at least two presents to two friends."

In response to the proposal by Aoun and Li, J. Huang (1993) suggests that the ambiguity of passive sentences might be due to the tendency for a pre-verbal noun phrase (including the noun phrase that follows *bei* "by" in passive sentences) to be definite or specific and a post-verbal noun phrase to be indefinite or non-specific. He further notes that there are other types of QPs that do not induce ambiguity in the same construction. With a similar, but not identical, view, Liu (1990) suggests that different types of QPs should be distinguished according to their scope behavior and ambiguous cases are sometimes due to the possibility of a branching reading for certain types of QPs. Therefore, the presence or absence

of ambiguity can be due to the (un)availability of a "branching reading," rather than true scope interaction.

However, it is not clear that these alternatives can capture the contrast noted in the minimal pairs of sentences (58)–(66). Consider first the positional account (pre-verbal vs. post-verbal). It is true that certain positions favor a definite or specific noun phrase; however, this should not be held responsible for the observed contrast. This is because, first, the contrast found in the pairs of sentences in (58)– (66) would be unexpected, as both QPs are post-verbal. Second, a pre-verbal noun phrase can be indefinite and a post-verbal one can be definite. The following sentences show that the post-verbal object of an active sentence can be definite and the noun phrase following *bei* in the passive structure can be non-specific indefinite:

(67)	a.	WO	zhaodao	na-ge	xiaohai	le.		
		Ι	find	that-CL	child	LE		
"I found that child."								
	b.	wo	zhaodao	xiaohai	le.			
		Ι	find	child	LE			
"I found the child."								

(68) ta bei ren zhaodao le. he by person find LE "He was found by someone."

Third, a narrow scope indefinite expression can still be specific, as shown by the following example (see Enc 1991 for the separation of specificity and scope; see Jiang 2012 for specificity and scope in Chinese).³²

(69) mei-ge haizi dou hui dailai ta zui xihuan de yi-ge wanju every-cL child all will bring he most like DE one-CL toy "Every child will bring a toy that he likes the most."

The object noun phrase in this sentence [[*ta zui xihuan de*] *yi-ge wanju*] "a toy that he likes the most" should be interpreted as specific because the relative clause precedes the number + classifier *yi-ge*. For a non-specific reading, the relative clause should follow the number + classifier *yi-ge*: [*yi-ge* [*ta zui xihuan de*] *wanju*] (e.g., Zhang 2006). Importantly, the object QP in (69) has narrow scope with respect to the subject QP – everyone brings a different toy.

In regard to the issue of different types of QPs behaving differently, it is true that different quantifiers have their particular scope properties (e.g., the tendency of *each* in English for a wide scope reading and the various types of QPs able or unable to be scope dependent or to induce scope dependency as in Liu 1990).³³ However, we still need to account for why, with the same QPs, the contrast in (58)–(66) exists.

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A related issue is the scope interaction between QPs and *wh*-interrogatives. May (1985) notes that a sentence containing a *wh*-subject and a QP-object is not ambiguous, but one with a QP-subject and a *wh*-object is:

(70) a. Who cooked every dish? – unambiguousb. What dish did everyone cook? – ambiguous

The same contrast is found in Chinese: the sentence in (71b) below allows the reading according to which everyone makes a different dish, but this reading is not possible with (71a).

(71)	a.	shei	zuo	-le	mei-	dao	cai?	– una	mbiguo	us	
		who	mal	ke-le	ever	y-cl	dish	ı			
		"Who made every dish?"									
	b.	mei-ge)	ren (d	ou)	zuo-le	9	shenme	cai?	– ambiguous ³⁴	
		every-	CL	one al	1	cook-	LE	what	dish		
	"What dish did everyone make?"										

The following pair of sentences exhibits the same contrast:

- (72) a. ni yao song sheme-ren mei-ge dongxi? unambiguous you will give what-person every-cL thing "Whom(x), you will give x everything?"
 - b. ni yao song mei-ge ren shenme dongxi? ambiguous you will give every-cL person what thing
 "What will you give to everyone?"
 - c. ni yao song shenme dongxi gei mei-ge ren? ambiguous you will give what thing to every-CL person "What will you give to everyone?"

Aoun and Li (1993a) show that these contrasts fall under a structural account, which considers the syntactic position of the relevant expressions hierarchically. In the same work, they also investigate differences in scope interaction between two arguments vs. between an argument and an adjunct in Chinese. Liu (1990) discusses the interaction between QPs and *wh*-phrases and again attributes ambiguity to the availability of branching readings. More generally, there have been many different accounts over the years to capture the interaction between QPs and QPs/*wh*-phrases. For instance, Wu (1999), along the line of Hornstein (1995), argues that any ambiguity should arise from overt movement of the relevant phrases. Kuno *et al.* (1999) propose an "expert system" that considers varying degrees of relevance played by some syntactic and non-syntactic principles. Lin (2004) argues that aspect plays an important role in the availability of ambiguity. In recent years, several handbooks and syntax companions have offered extensive and systematic reviews of the pros and cons of different approaches to scope interaction between QPs and *wh*-phrases, such as Dayal (2012),

Kiss (2005), May and Bale (2005), and Sportiche (2005), among others. There have also been works raising questions from different angles, such as asking what true empirical generalizations regarding scope interaction are, what speaker variations mean, and what factors are involved. For instance, Hayashishita (2012) rejects the claim that there are real instances of inverse scope grammatically, that is, a hierarchically lower QP having scope over a higher one is not a grammatical option. Instead, he claims that what seems like an inverse scope reading is just a vague interpretation of expressions denoting specific sets.

Obviously, much more work is needed to determine the properties of scopebearing elements and the interaction possibilities. Clarification is still needed on what empirical generalizations there are and how they should be formulated before there is hope of reaching a consensus on an adequate account for scope interaction of quantificational expressions, including *wh*-phrases, applicable to different types of languages.

3 Conclusion and further issues

This chapter began with the question of whether Chinese has true QPs because of the concern that you and dou seem to be required in some cases of existential and universal quantification. It was shown that Chinese does have QPs corresponding to those in more familiar languages, such as English. Many QPs in Chinese do not need the support of you or dou. For existential quantification, you is required only when non-specific indefinite bare NPs or NC expressions occur in the subject or topic position. This requirement is traced to the structure of such an expression: it has a null D or lacks in quantificational force, which can be regarded as a variable that needs a binder (existential quantifier) and needs to be in a proper position. For universal quantification, *dou* is required in some constructions, although there is disagreement on exactly what these are (cf. S. Z. Huang 1996 vs. X.G. Li 1997 for instance). The co-occurrence of *dou* with universal "every" QPs has been mostly analyzed in semantic terms and related to the absence of tense in Chinese (as in S.Z. Huang 1996 and X.G. Li 1997). However, there is still not a unified account for all "every" expressions, with and without *dou*, with and without a "distributivity" interpretation.

We also very briefly reviewed some approaches to scope interaction. It is not controversial that a hierarchically higher QP must be able to scope over a lower QP and different types of QPs need to be distinguished. What is not agreed upon is whether traces, in addition to lexical items, should be considered when determining scope, what constitutes grammatical scope ambiguity, and how scope ambiguity is derived. There are many other questions regarding quantification and scope that are not addressed at all within this limited space. For instance, it is frequently noted that, cross-linguistically, a QP subject interacting with a QP object may be unambiguous in one language and ambiguous in another. Such a contrast has been an important topic of study in the literature on Chinese QPs since Huang (1982). The available accounts generally resort to variations in phrase

structures of different languages while keeping the same interpretive rules for all languages (Huang 1982; Aoun and Li 1989; Hornstein 1995, etc.). A different approach recently is that of Bobaljik and Wurmbrand (2012), which attempts to relate scope ambiguity to the possibility of "scrambling" in languages. They claim that scrambling, such as in Japanese and German, is understood as free variation in word order without any differences in interpretation, including interpretation of which elements as topic and focus. If a language allows free ordering of subjects and objects through scrambling, then a subject QP interacting with an object QP would not yield ambiguity. In contrast, if free word order alternations are not possible, then ambiguity arises. Such an approach may provide a fresh perspective to cross-linguistic differences in quantification and scope. Unfortunately, there does not seem to be a clear way to determine if a language has true word order variations without any effects on which elements should be interpreted as topic and focus (see Matsuda 1997 for the claim that scrambling in Japanese makes differences in interpreting an element as topic or focus). Nonetheless, it is important to discuss variations of word order and how scope is affected, especially those involving topic and focus phrases (see, e.g., Shyu 1995; Kuno et al. 1999; Wu 1999; also see Ueyama 1998, 2003 for very detailed discussions on the derivation of OSV constructions in Japanese and the properties of the displaced O).

There are other important issues that deserve more thorough investigation, such as the status of quantifier-raising (QR) in regard to different types of QPs, what the true empirical generalizations are regarding QPs interacting with argument and adjunct *wh*-phrases that are beyond independent scope readings or entailment possibilities (cf. Liu 1990; Aoun and Li 1993a; Lin 2004, among others)? What are the solid generalizations regarding the "intervention effects" on scope dependency and how should they be accounted for (see some recent works such as B. Yang 2011 and H. Li 2011)? There are also issues that have not been addressed at all, as far as I know, such as scope properties in ellipsis structures, the status of "scope economy" in Chinese – the idea that QR applies only when it generates an interpretation distinct from the interpretations available without QR (e.g., Fox 1995, 2000; Reinhart 2005). How does QR work in ellipsis constructions in Chinese? Satisfactory answers to these questions and many others await further research.

NOTES

- 1 This work focuses on Mandarin Chinese. Some other varieties of the Chinese language have distinct quantifiers, such as sentence-final particles in Cantonese. See the Cantonese chapter in this collection.
- 2 See, among many others, Cheng (1991, 1995); Giannakidou and Cheng (2006); C.-T. J. Huang (1982); S.-Z. Huang (1996); Lee (1986); Y.-H. A. Li (1992, 1998); X.G Li (1997); T. H. Lin (1997, 1998); Tsai (1994); R. Yang (2001); B. Yang (2002).
- 3 A contrastive focus marker *shi* "be" makes these expressions acceptable without *dou/ you*:

- i) shi suoyou de/quanbu de/mei-ge/san-ge nanhai xihuan shu, bu-shi...
 be all DE/all DE/every-CL/three-CL boy like book not-be "It is all the boys/every boy/three boys that like(s) books, not ..."
- 4 In (1), the modification marker *de* following *suoyou* and *quanbu* is optional; but it cannot occur with *mei*. In addition, the use of *mei* requires the co-occurrence of a classifier (*ge* in (1)); and the numeral *yi* "one" is always implied, if not overtly present with *mei*. It is possible that *mei* occupies a head position in the "spine" of the projections for a nominal expression (such as the Determiner head of a Determiner Phrase, DP) but *suoyou* and *quanbu* with *de* are modifiers adjoined to some projections within a noun phrase (see Tang 1990; Y.-H. A. Li 1998, 1999; Sio 2006, among others).
- 5 Liu distinguishes noun phrases into four types according to their abilities to induce dependency or be dependent regarding scope interaction. We will discuss scope interaction in Section 2. Tsai (2002) distinguishes numeral expressions with "one" vs. "two" vs. "three" and above. For him, only "one" expressions are QPs. The others are cardinal numerals. It is true that there are distinctions among these expressions. However, it is not clear that the distinctions indeed should be attributed to differences in quantificational force. Lack of space prevents us from discussing the possibilities. Below is one brief example of the issues. Tsai notes that "one" expressions can be specific, but "three or above" expressions cannot. Note that the following examples can have the interpretation according to which the NC subject of an embedded clause in (i) and the object of *ba* in (ii) are specific ("three guests in (ii) is actually interpreted as definite "the three guests").
 - (i) wo kandao yi/san-ge keren dian-le niurou mian.
 I see one/three-CL guest order-LE beef noodle
 "I saw a/three guest(s) ordered beef noodle."
 - (ii) wo ba yi/san-ge keren dai dao canguan le.
 I BA one/three-CL guest take arrive restaurant LE "I brought a guest/the three guests to the restaurant."

It is interesting to note that, for (ii), when the numeral is "one," the noun phrase is specific; but, when the numeral is more than "one," it is definite.

- 6 The distinction between NP and DP is not significant and only the NP label is used in this work.
- 7 *Da-bufen* "big-part" is often translated as an equivalent of *most* in English. However, the latter can be ambiguous, having a majority reading (more than half) or a plurality reading (more than all the others, but not necessarily more than half). *Da-bufen* has only the majority reading.
- 8 S.-Z. Huang (1996) notes that an NC expression, an adverbial, a reflexive, a temporal expression, and so on can also license a subject "every" type expression. Also see Luo (2011). The examples below illustrate the licensing by an NC expression:

(i)	mei-ge	xuesheng	mai	yi-ben	shu.				
	every-cl	student	buy	one-CL	book				
	"Every student buys a book."								
(ii)	san-go	vijechong	mai	wi_bon	shu				

(i) san-ge xuesheng mai yi-ben shu. three-CL student buy one-CL book "Three students buy a book."

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In contrast, X.G. Li (1997) argues that the cases whose licensers are not *dou* either are not quite good or should be analyzed as not involving real universal QPs. For him, *dou* is the only licensor for "every" type expressions.

- 9 Cheng (1995) suggests a dual status of *dou*: as a quantifier and a binder. As a quantifier, *dou* quantifies over plural NPs; while as a binder, it binds and provides quantificational force for the *wh*-polarity items that do not have inherent quantificational force. T.-H. Lin (1997) suggests the Quantificational Force Parameter (QPF) in his proposal. According to him, QPs are variables in Chinese but truly quantificational in English.
 - (i) The Quantificational Force Parameter (QPF)

Languages differ in the phrase structural level at which the quantificational force (QF) of the quantificational elements manifests.

10 Such context dependency and variability in interpretation have generated proposals that analyze indefinite noun phrases as variables, rather than QPs (see Heim 1982: ch. 2; or Kamp and Reyle 1993). However, adverbs can affect the interpretation of the relevant NPs only in generic contexts. Chierchia (1995, 2000) proposes that indefinite expressions should be analyzed as QPs, because of the relevance of the novelty effect – each occurrence of the expression introduces new referents as in (11). More options have been proposed, such as the mechanism of choice functions (such as Reinhart 1997; Kratzer 1998).

Also note that numerals other than "one" can appear in patterns like (14) only with modification or in quantity context.

- (i) a. liang-ge nanren zai yiqi zongshi/tongchang/cong-bu hui chaojia. two-CL men at together always/usually/never will quarrel "Two men getting together always/usually/never quarrel."
 - b. liang-ge nanren zongshi/tongchang/cong-bu neng sheng-guo yi-ge xiaohai two-CL men always/usually/never can win-pass one-CL child "Two men can always/usually/never win over a child."

The need of modification or conditional clauses indicates that these quantificational adverbs quantify over situations, rather than the NPs.

- 11 In contrast to NPs with indefinite articles in English allowing a specific interpretation, Cheng and Sybesma (1999) argue that the NC expression with "one" missing cannot have a specific interpretation; however, Jiang (2012) argues that it can. Either way a PF deletion approach should be able to accommodate the missing of "one", depending on when a specific "one"-NP can be defocused and destressed such that it can be missing phonologically.
- 12 See Tsai 2003 for *you* and different types of existential quantification. Li (1996, 1998) notes that "every/all" expressions, generally considered as strong NPs, can occur in existential constructions following *you*, if it is the entire clause that is the target of existence assertion:
 - (i) ruguo you mei-zhong shuiguo *(zai zhuo-shang).... if have every-cL fruit at table-top
 - "If every kind of fruit was on the table. . . ."

- 13 You can be associated with all the elements in (2a–f), except da-bufen "big-part (majority/ most)," which can occur with dou. The unacceptability with da-bufen can be subsumed under the general observation that a strong NP does not appear in existential constructions (Milsark 1974; Barwise and Cooper 1981; Diesing 1992; de Hoop 1992; McNally 1992; Ladusaw 1994 etc.)
- 14 The two options may be two sides of the same property these expressions must be DPs with a null D. A null D needs to be in a proper position so that it is a well-formed empty category and can be identified. You or the existential closure serves the purpose of identifying the empty category. See Yang (2005) for an integrated discussion. A different approach taken by S. Z. Huang (1996) is to highlight the difference between English, which seems to allow an indefinite subject at least for stage-level predicates (Diesing 1992, for instance), and Chinese, which prohibits its subject from being indefinite. She suggests that the existential closure should be higher, high enough to provide existential force for an indefinite expression in the subject position. What makes sentences with indefinite subjects unacceptable should be attributed to the failure of proper constraint of an event argument. As support, she notes that if an event argument is properly constrained, then an indefinite subject is possible. Among the elements that can properly constrain event arguments are what Lee (1986: 82-83), attributing the observation to Fan (1986), discusses: when the relevant sentences contain topics or when the indefinite subject is more heavily modified. An alternative to accommodating these sentences that seemingly allow indefinite subjects is the distinction between specific and non-specific indefinites. Indefinite subjects preceded by the said topics or modified more heavily are specific, in contrast to those without as non-specific. Specific indefinites can be analyzed as QPs (a Q in the D position, as in Diesing 1992). In other words, it is an indefinite non-specific expression, not an indefinite specific one, that requires an existential closure.
- 15 See Jiang (2012: ch. 3) for reducing the indefinite subject constraint to the topic status of a subject.
- 16 Liu (1990) claims that modified numerical and decreasing proportional (less than 50%) expressions cannot occur with *dou*. However, searches in *baidu* and Google yielded many examples of these types with *dou*. Below are two examples:
 - (i) a. zuotian dagai yi-ershi-ge ren dou chi huai-le duzi. yesterday probably one-twenty-CL people all eat bad-LE stomach "Yesterday, probably ten or twenty people all ate and hurt their stomachs."
 - b. shi-duo-ge ren dou zai waimian deng. ten-more-CL people all at outside wait "Ten plus people were all waiting outside."

Determining the types of NPs possible with *dou* seems to require pragmatic considerations. For instance, even though a small percentage such as 3% generally does not occur with *dou*, it is acceptable in the following example, when the percentage seems to be high compared to normal circumstances:

(ii) baifenzhisan de ren dou tongshi chu-lai jingxuan, keneng ma? 3% DE person all simultaneously out-come campaign possible Q "3% of people all came out to campaign simultaneously. Was it possible?"

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- 17 As noted in S. Z. Huang (1996), the following English examples involving symmetric predicates (Lakoff and Peters 1969) show that such predicates are compatible with *all*, but not with *each*, which suggests that *all* is not a distributor while *each* is.
 - (i) a. They are all alike/classmates.
 - b. *They are each alike/classmates

The examples below show that *dou* is perfectly acceptable with the Chinese equivalents of the above predicates:

(ii) tamen dou hen xiangxiang/dou shi tongxue.
 they all very alike/all be classmate
 "They are all alike/all classmates."

For this reason and others, S.-Z. Huang claims that *dou* should not be analyzed as a distributivity marker. Rather, it is a sum operator, requiring plurality of events.

- 18 Elsewhere, R. Yang (2001) highlights the semantic function of *yi* "one" in "every" expressions and proposes that *dou* is an overt licenser of a distributive interpretation when "every" phrases occur in the pre-verbal position, and that a covert licenser exists to license an "every" phrase in the post-verbal position. In addition, Pan (2008) offers a non-uniform analysis of *mei* and *dou mei* can be used as either a distributive operator or a sum operator and *dou* should be analyzed as a matching function or a distributive operator.
- 19 Cheng (1991) and S.Z. Huang (1996) mentioned the general unacceptability of "every" phrases in post-verbal position. Huang notes that a post-verbal "every" phrase is possible only when there is an appropriate variable, most likely an indefinite phrase, within its c-command domain.
- 20 The judgment with the epistemic modal *hui* "will," *keyi* "may," and deontic modals seem to be clearer for my informants. However, the judgments are not as firm with other epistemic modals.
- 21 It seems that, even though all the informants that I checked with agreed that *bu* could be a sentential negation, not everyone liked *mei* in similar situations. If *mei* cannot be interpreted as sentential negation, then the sentence is not acceptable.
- 22 I use adverbs that cannot be related to *dou*, instead of adverbs that can, such as *changchang* "often," *laoshi/zonghsi* "always," like (i) below.
 - (i) mei/san-ge ren changchang dou you yijian. every/three-CL person often all have opinion "Everyone/all the three people often has/have opinions."

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Judgments on (i) and related sentences vary with informants. Some speakers seem to interpret *dou* as being related to "often" and the subject QP simultaneously.

23 According to B. Yang (2010), QPs cannot intervene between a *wh*-adjunct and its scope position at the periphery of an interrogative clause, but the intervention effect is absent when the *wh*-phrase is an argument. He proposes that such contrasts be accounted for by feature movement of adjunct *wh*-phrases at LF, which is blocked by a QP. An argument *wh* does not undergo movement and the intervention effect is absent. However, it is not difficult to search online (Google, *baidu*) and find sentences with universal QPs between adjunct *wh*-phrases and their scope positions, regardless of whether the *wh*-phrase precedes or follows *dou* "all." Some examples are:

- (i) mei-ge-ren weishenme dou you sixin?
 every-CL-person why all have selfishness
 "Why is everyone selfish?"
- (ii) mei-ge-ren weishenme dou yao shenghuo de name lei ne?
 every-cL-person why all will live.life DE that tired Q
 "Why does everyone have to live such an exhausting life?"
- (iii) mei-ge-zhuanye dou zenmeyang? every-cL-field all how "How is every field?"

In this regard, Tsai (2008b) notices the following contrast:

- (iv) mei-ge-ren zenme/weishenme dou mei lai? every-cL-person why all not come "Why didn't everyone come?"
- (v) *mei-ge-ren dou zenme/weishenme mei lai? every-CL-person all why not come

This contrast is related to the syntactic positions of causal *how* and reason *why*. According to Tsai, these two *wh*-adverbials are located in the left periphery of a sentence. Consequently, they are higher than *dou* and (v) is not possible. In contrast, "everyone" in (iv) is a subject that undergoes topicalization, moving across the *wh*-adverbials. Thus, "everyone" can be higher than the *wh*-adjunct. Nonetheless, the judgment on (v) seems to vary with speakers – some do find it acceptable with the meaning intended.

- 24 The contrast is related to these distinctions: (i) *wh*-phrases, in contrast to QPs and plural nominals, need to be licensed in proper contexts (see Huang 1982; Cheng 1991, 1995; Li 1992; Tsai 1994; Lin 1996; among others); (ii) linking *dou* with the related QP exhibits some intervention effect (e.g., Obenauer 1976; Rizzi 1990; Aoun and Li 1993; Cheng 1995; Beck 1996; Beck and Kim 1997; Pesetsky 2000; H. Li 2011; and B. Yang 2011, among many others). The latter also has scope congruence issues as discussed in the text.
- 25 Dative constructions do not allow *dou/ge* between the two complements.
- 26 Some readers may question whether we are missing a generalization when both the indefinite bare NPs and NC existential expressions and the universal "every" phrases cannot appear in topic and subject positions without the support of *you/dou*. The two are quite similar but not identical. For instance, the existential indefinites can be made specific and occur in these positions (such as with more modification or a topic preceding an indefinite subject; see Fan 1985 and Lee 1986). However, these contexts do not help with the "every" phrase.
 - (i) na-ge banji, san-ge xuesheng bing le that-CL class, three-CL student sick LE.
 "That class, three students are sick."
 - (ii) na-ge banji, mei-ge xuesheng *(dou) bing le that-CL class, every-CL student all sick LE."That class, all students are sick."

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- 27 Structurally, adverbs, negation and so on may be adjoined to some projections of verbs, or may head functional projections themselves, or occur as Specifiers to such functional projections. See, for instance, Ernst and Wang (1995), Cinque (1999), and Ernst (2002).
- 28 This could be due to the assignment of Case by *you* to the following NP (Li 1985, 1990).
- 29 The wide scope reading of the subject QP over the object QP in (58a) can have the accidental reading according to which everyone likes the same person. This is because, even though everyone likes a person and there can be as many people liked as the number of the people in the group denoted by everyone, it may accidentally be the case that each of the members in the group likes one but the ones being liked happen to refer to the same entity. In addition, it may be that there is a specific individual being referred to (cf. the issue of specificity and scope). When the context is clear, this reading is easy to obtain:
 - (i) a. women ban de mei-ge xuesheng dou xihuan
 we class DE every-CL student all like
 yi-ge muqian zui hong de gexing.
 one-CL now most hot DE singer
 "Every student in our class likes a singer that is hottest now."

Therefore, it is the (b) examples that are more telling.

- 30 The subject of a conditional clause is an exception to the requirement that subjects cannot be indefinite (recall that *dou* is also optional with universal subject QPs in this pattern).
- 31 The ambiguity of dative constructions contrasts with the unambiguity of any double complement structures discussed in Barss and Lasnik (1986), Larson (1988), Jackendoff (1990), and so on. This may suggest that the so-called dative construction in Chinese need not be a true double complement structure. Instead, the marker *gei* should be analyzed as a verb "give," rather than a preposition "to" (Li 1990). Many interesting issues regarding dative constructions remain, such as the inability to use *ge* "each/ respectively" or *dou* "all" as noted in the previous section.
- 32 However, some other studies argue that the "wide" scope reading of an indefinite is due to its specific interpretation (e.g., Fordor and Sag 1982; Hintikka 1986; Kratzer 1998).
- 33 Beghelli (1995), Beghelli *et al.* (1997), and Beghelli and Stowell (1997) propose that different types of QPs must move to the Spec of designated functional projections (RefP, DisP, ShareP, CQP, AgrP). Scope ambiguity is due to the possibility of some quantifiers moving to different projections. These approaches determine scope relations according to the types of QPs. Some QPs have more variation in scope properties because they can occur in different positions.
- 34 The speakers that I consulted with differ in judging the role of *dou* in (71b): for the ambiguous interpretation, some prefer the presence and others the absence of *dou*.

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