

On Choice Functions and Scope of Existential Polarity Wh-phrases in Mandarin Chinese

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ABSTRACT

A consensus about the interpretation of English indefinite NPs has begun to emerge in the recent literature since Reinhart (1992) proposes that they may involve a choice function mechanism in their interpretation. However, there are diversified views concerning how the choice function mechanism should be executed; in particular there is a debate regarding which level(s) existential closure should apply to. This paper attempts to make a contribution to this debate. On the basis of the scopal behavior of Chinese existential polarity wh-phrases, we argue that Kratzer's (1998) and Matthewson's (1998) ideas that choice-functions can never be existentially closed at a site lower than the top cannot be correct. Nor is it right to allow free existential closure at every possible site as in Reinhart (1997) and Winter (1997). The behavior of Chinese existential polarity wh-phrases indicates that intermediate scope is possible for them but is not free everywhere. Intermediate scope for existential polarity wh-phrases and (indefinites headed by *mou* 'some') is blocked by certain quantifiers when the latter c-command the former. I show that this blocking effect can be accounted for by a condition very similar to a recent proposal made by Chierchia (2001), who also argues that free existential closure must be constrained. In fact, I will show that it is even possible to unify my data with that of Chierchia's. My findings in Chinese thus revive the possibility, rejected by Matthewson (1998), that the choice function mechanism may vary from language to language or possibly from indefinite NPs in one language to indefinite NPs in another language or even from one type of indefinite NP to another type of indefinite NP within the same language.

1. Introduction

Quantified NPs such as *every student* have usually been assumed to obtain their scope through (covert) quantifier raising (QR) in Logical Form (LF) since May's (1977) work and QR is subject to island constraints. Thus, a quantified NP embedded in a relative clause or an *if*-clause may not have scope over the matrix clause as the examples in (1) show. In contrast, indefinite NPs such as *a student* may freely take scope outside an island as illustrated by the examples in (2).

- (1) a. He will be happy if every teacher of his comes.
b. He likes reading a book that every teacher of his writes.
- (2) a. He will be happy if a teacher of his comes.
b. He likes reading a book that a teacher of his writes.

The contrast between (1) and (2) indicates that indefinite NPs may obtain their scope through a mechanism other than QR or one would have to stipulate that QR has different properties when it

applies to quantified NPs and when it applies to indefinite NPs.

A recent popular analysis to account for the exceptional scopal possibilities of indefinite NPs is to use choice functions as originally proposed by Reinhart (1992, 1997) and later adopted by Winter (1997) and Kratzer (1998). The definition of a choice function is as follows:

- (3) A function f is a choice function ($CH(f)$) if it applies to any non-empty set and yields a member of that set. Reinhart (1997, 372)

According to Reinhart, indefinite determiners may introduce variables over choice functions which are closed by existential closure that may apply to any level. A simple example to illustrate this is given in (4).

- (4) Every student bought some book.
a. $\exists f[CH(f) \ \& \ \forall z[\text{student}(z) \rightarrow z \text{ bought } f(\text{book})]]$
b. $\forall z[\text{student}(z) \rightarrow \exists f [CH(f) \ \& \ z \text{ bought } f(\text{book})]]$

In (4a), the choice function variable is existentially closed at the highest level and the logical form says that there is some choice function f such that every student bought the book which f picks out from the set of books. Under this wide scope reading of the indefinite *some book*, every student bought the same book. In (4b), the choice function variable is existentially closed at a level lower than the subject NP *every student*. On this analysis, (4) means that for every student z , there is a potentially different choice function f such that z bought the book which f picks out. On this reading, every student may buy a different book.

According to Reinhart's choice function analysis, indefinite NPs do not have to move to obtain their scope but introduce a choice function variable in the in-situ position that is later closed by existential closure that may apply to any level. Accordingly, indefinite NPs can be interpreted with widest scope from an in-situ position inside an island without violating any constraint on movement. Reinhart's analysis also predicts that in a sentence like (5), the indefinite NP *some condition proposed by Chomsky* may freely have widest, intermediate and narrowest scope readings.

- (5) Each student has to come up with three arguments which show that some condition proposed by Chomsky is wrong. Farkas (1981, 64)

Winter's (1997) theory of choice functions is basically similar to Reinhart's (1997). In particular, he also claims that choice function variables can be bound by existential quantifiers at any level. Thus, his analysis shares with Reinhart's the prediction that indefinite NPs may have widest, intermediate and narrowest scope. The main difference between Reinhart's and Winter's approaches is that while Reinhart assumes that indefinite NPs may be interpreted as either generalized quantifiers or choice function NPs, Winter argues that all simple indefinites are unambiguously interpreted as choice function NPs.

Kratzer's (1998) use of choice functions is different from the above two authors' approaches in many major aspects. Assuming with Fodor and Sag (1982), she suggests that indefinites are

rather than just wide scope. Thus, in (8), the intermediate and narrowest scope readings for the indefinite *ta twíw't-a* ‘a child’ are impossible. The only reading available is the widest scope reading.

(8) [tákem i wa7 tsunám'-cal] cuz' wa7 qwenúxw-alhts'a7
all DET.PL PROG teach-INTR going.to PROG sick-inside
lh-káw-lec-as [ta twíw't-a]
HYP-far-INTR-3CONJ DET child-DET

a. Accepted: There is one child, who every teacher doesn't want to leave.

b. Rejected: For each teacher, there's one child who s/he doesn't want to leave.

c. Rejected: Every teacher will be sad if any child leaves. (Matthewson 2000, 119)

According to Matthewson, intermediate scope is possible for indefinites in St'át'imcets only when there is a bound pronoun as is quite similar to example (6b).

To account for the above facts, Matthewson has argued against a movement approach and proposed instead that non-polarity indefinite determiners in St'át'imcets are all obligatorily interpreted as choice function variables, whereas the polarity determiner *ku* is not. According to her, Reinhart-Winter's treatment of existential closure as applying to any level wrongly predicts that non-polarity indefinite NPs in St'át'imcets have free scopal possibilities. But the facts in St'át'imcets are consistent with Kratzer's approach in which choice function variables have widest scope. Matthewson's approach to choice functions, however, is still different from Kratzer's in that the latter assumes that choice function variables are free variables provided a value by the context, whereas the latter, borrowing Reinhart-Winter's idea of existential closure, stipulates that choice function variables in St'át'imcets are existentially closed at the highest level of semantic composition. According to her, the data in St'át'imcets lend strong support to Kratzer's postulation of scope ambiguity for indefinites, because “St'át'imcets overtly encodes exactly the ambiguity which Kratzer proposes, between indefinites which utilize choice functions and those which do not.” Moreover, she suggests that if choice functions in all languages are existentially closed with the widest scope, “we will have an elegant theory of cross-linguistic variation in the choice function mechanism, namely that variation is non-existent”.

Is it really true that all languages utilize the same choice function mechanism and allow no cross-linguistic variation as Matthewson suggests? In this paper, I will examine indefinite NPs from another language, namely, Mandarin Chinese, showing that Matthewson's suggestion is not true. The indefinite NPs that I will examine are existential polarity wh-phrases as discussed in Huang (1982), Li (1992), Cheng (1994) and Lin (1996, 1998). I will show that unlike polarity indefinites in St'át'imcets, existential polarity wh-phrases in Mandarin Chinese are not restricted to a position with narrowest scope. They exhibit scopal flexibility and must make use of choice functions in their interpretations. But the mechanism involved is different from that in St'át'imcets, because scopal possibilities for Chinese existential polarity wh-phrases are obviously different from those of non-polarity indefinite NPs in St'át'imcets. As I will show later, Chinese existential polarity wh-phrases freely allow wide and narrowest scope. However, the potential widest scope of existential polarity wh-phrases can never be the whole sentence, because they must take narrow scope with respect to their polarity triggers. Intermediate scope for existential polarity wh-phrases (and indefinite NPs headed by *mou* ‘some/a certain’) is possible but is subject to a condition very similar to the one proposed in Chierchia (2001), who

argues that free existential closure must be constrained in some manner. The data in Chinese thus refutes Matthewson's claim that the widest-scope stipulation is a universal restriction on the choice function mechanism. But Reinhart-Winter's approach to choice functions fails no better, because it overgenerates scopal possibilities. The Chinese data indicates that Chierchia's (2001) view that free existential closure for choice function indefinites must be constrained in a certain way is more likely to be correct.

The remaining sections of this paper are organized as follows. Section 2 briefly reviews the licensing condition of Chinese existential polarity wh-phrases. Section 3 examines their scopal possibilities and section 4 the problem of intermediate scope. Section 5 reviews previous analyses of existential polarity wh-phrase, in particular Cheng's (1991, 199x) analysis. Section 6 provides arguments for why existential polarity wh-phrases should be treated as choice functions. Section 7 is a review of Chierchia's (2001) constraint on existential closure for choice functions. Section 8 proceeds to show that with some revision of Chierchia's assumptions, the behavior of long distance existential polarity wh-phrase can be unified with that of long distance indefinites discussed by Chierchia. Section 9 concludes this article.

2. Chinese Existential polarity wh-phrases

Like English polarity *any*, Chinese existential polarity wh-phrases may not appear in affirmative contexts; also like English polarity *any*, the typical contexts in which they appear are negation sentences, questions and conditional clauses. For this reason, previous studies such as Huang (1982), Li (1992), Cheng (1994) and Lin (1996, 1998) have assumed that existential polarity wh-phrases are polarity items. Although Lin (1996, 1998) has shown that the distribution of Chinese existential polarity wh-phrases is actually somewhat different from that of English polarity *any*, it suffices for this paper to assume that Chinese existential polarity wh-phrases must be licensed by certain operators such as negative word, yes-no question particle, conditional connective, or expressions indicating possibility.¹ Some illustrating examples are given below.

- (9) *Wo mai-le shenme
I buy-ASP what
'I bought something.'

¹ Lin's (1998) descriptive generalization of the distribution of Chinese existential polarity wh-phrases is the following:

The use of an EPW [=our existential polarity wh-phrases] is felicitous iff the proposition in which the EPW appears does not entail existence of a referent satisfying the description of the EPW. (Lin 1998, 230)

- (10) Wo mei mai shenme (dongxi) ²
 I not buy what thing
 ‘I didn’t buy anything.’
- (11) Ruguo shei da ni, ni jiu gaosu wo
 if who hit you you then tell me
 ‘If someone hit you, you then tell me.’
- (12) Shei you qifu ni le ma?
 who again bully you ASP Q
 ‘Is it the case that someone bullied you again?’
- (13) Haoxiang shei chuang-cuo-le xiezi de-yangzi
 seem who put-on-wrong-ASP shoe seem
 ‘It seems that someone has put on wrong shoes.’

Because many of my examples to be discussed later contain the word *haoxiang* ‘seem’, it is necessary to clarify its grammatical category in order not to make any confusion. Although *haoxiang* is translated as English *seem*, it is an adverb, not a verb. This is confirmed by the fact that *haoxiang* cannot be used to form an A-not-A question as a verb should be able to. Thus, examples like (13) are mono-clausal rather than bi-clausal. Note also that *haoxiang* may appear alone or form a discontinuous constituent with *de-yangzi*, which appears at the sentence-final position.

3. Scopal Flexibility of Existential polarity wh-phrases

Existential polarity wh-phrases exhibit a very interesting pattern of scopal ambiguities that has been hitherto unknown in the literature. Consider (10) again. This example only has one interpretation on which the existential polarity wh-phrase takes narrow scope with respect to the negative marker. This must be the case because the licensing condition of existential polarity wh-phrases would otherwise be violated if *shenme dongxi* ‘what thing’ in (10) has scope over *mei* ‘not’. But now consider (14).

- (14) Ta haoxiang mei/bu(neng) chi shenme (dongxi) de-yangzi³
 he seem not/not eat what thing seem

² When the existential polarity wh-phrase *shenme* ‘what’ appears as the object of a verb, it may sometimes have another meaning paraphrasable as ‘anything special or important’. Thus, (10) also has the meaning ‘I didn’t buy anything special.’ Such a meaning does not arise when *shenme* ‘what’ appears in other positions such as subject position as in (i).

- (i) Meiyou shenme bi longxia gen hao chi
 not-have what than lobster more good eat
 ‘Nothing is more delicious than lobsters.’

³ The negative marker *mei* ‘not’ is used when the sentence is perfective. *Bu* ‘not’ has the flavor of ‘not want’ rather than just ‘not’.

- a. ‘It seems that he did/does not (want to) eat anything.’
- b. ‘It seems that there is something such that he did/does/can not (want to) eat it.’

(14) minimally differs from (10) in having an extra polarity licenser *haoxiang* ‘seem’ in the sentence. Significantly, the addition of this extra licenser makes the sentence ambiguous. The existential polarity wh-phrase in (14) can have either wide or narrow scope with respect to the negative marker *mei/bu* ‘not’, as indicated by the two translations.⁴ However, it still cannot have scope over *haoxiang* ‘seem’. That an existential polarity wh-phrase can have scope over a negative marker if another potential polarity licenser is higher than the negative marker is also corroborated by (15). (15) clearly has a reading on which the existential polarity wh-phrase takes scope over the negative marker *bu*, i.e., the reading ‘If there is somebody such that you do not want to invite him, please let me know in advance’.

- (15) Yaoshi ni bu xiang yaoqing shei de-hua, qing shixian rang
 if you not want invite who if please beforehand let
 wo zhidao
 me know
 ‘If you does not want to invite somebody, please let me know in advance.’

(14) and (15) have a significant implication about scope properties of existential polarity wh-phrases. They indicate that existential polarity wh-phrases may in principle have free scopal possibilities so long as their licensing condition is not violated.

Below, I give more examples to support scope ambiguities of indefinite polaritywh-phrases. Consider (16).

- (16) Haoxiang [yaoshi shei bu qu de-hua, ta jiu bu qu] de-yangzi
 seem if who not go if he then not go seem
 (i) ‘It seems that if someone or other does not (want to) go, he won't go.’
 (ii) ‘It seems that there is somebody such that if that person does not go, then he won't go.’

(16) has two readings. In one reading—the less preferred one, the existential polarity wh-phrase only has scope within the conditional clause. The dominating reading of (16) is that the existential polarity wh-phrase is scoped out of the conditional clause but is within the scope of *haoxiang* ‘seem’. Note that if the existential polarity wh-phrase is preceded by the existential verb *you* ‘have’ as in (17), the ambiguity seems to disappear. The existential polarity wh-phrase in (17) can only take narrow scope with respect to the conditional clause.

- (17) Haoxiang [yaoshi **you** shei bu qu de-hua, ta jiu bu qu] de-yangzi
 seem if have who not go if he then not go seem
 ‘It seems that if someone or other does not go, he won't go.’

⁴ It seems that when the negative marker is *mei*, the narrow scope reading is preferred; when the negative marker is *bu*, the wide scope reading is preferred.

An existential polarity wh-phrase may also interact with a universal quantifier to produce scope ambiguity. For example, in (18), the existential polarity wh-phrase can take either narrow or wide scope with respect to the universal quantifier.

- (18) Haoxiang mei-ge ren dou kandao-le/chi-le shenme de-yangzi
 seem every-Cl man all see-Asp/eat-Asp what seem
 a. 'It seems that everyone saw/ate something or other'
 b. 'Is it the case that there is something such that everyone saw/ate it.'

That an existential polarity wh-phrase can take scope over a universal quantifier is further supported by the following conditional sentence.

- (19) Ruguo mei ge nanren dou tongshi aishang nage nyuren
 if every DE man all at-the-same-time fall-in-love which woman
 de-hua, nage nyuren bu fongdiao cai kuai
 if that woman not crazy CAI strange
 'If every man falls in love with a woman at the same time, it would be strange if that woman does not go crazy.'

It is intuitively clear that what is claimed in (19) is that if there is a girl such that every man falls in love with her at the same time, it would be strange if she does not go crazy. That is, the wh-phrase *nage nyuren* 'which woman' has scope wider than the universal quantifier. This wide scope reading is in fact forced by the use of the adverbial *tongshi* 'at the same time'.

There is a proof in support of the claim that the existential polarity wh-phrases in (19) must have wide scope over the universal quantifier. It has been observed that if an indefinite has narrow scope with respect to a universal quantifier in a conditional clause, then a definite description in the main clause cannot be anaphoric to it. Thus, (20) is ill-formed on the reading in which *a donkey* has narrow scope with respect to *everyone* and *that donkey* is anaphoric to it.

- (20) *If everyone buys a donkey, I will beat it/that donkey.

As we saw in (19), however, the definite descriptions *nage nyuren* 'that girl' is able to be anaphorically linked to the existential polarity wh-phrases *nage nyuren* 'which woman'. So the latter must have wide scope over the universal quantifier.

The following example shows that an existential polarity wh-phrase can even take scope over a universal quantifier which is much higher in hierarchical structure than the conditional clause in which the existential polarity wh-phrase is embedded.

- (21) Haoxiang mei-ge ren dou shuo yaoshi shei bu qu de-hua,
 seem every-Cl man all say if who not go if
 tamen jiu dou bu qu
 they then all not go
 'It seems that everyone says that if somebody does not go, then they will not go.'

(21) clearly has a reading--actually the preferred one--in which the existential polarity wh-phrase

has scope over everything except *haoxiang* ‘seem’, i.e., the reading ‘It seems that there is a certain person such that everyone says that if that person does not go, then they will not go.’

What we have learned from the above discussion of scope ambiguities is the following: existential polarity wh-phrases seem able to take any scope with respect to another scope bearing element in a sentence so long as their licensing condition is not violated. In particular, they are capable of taking possible widest scope over any potential polarity licenser except the highest one.

4. Intermediate Scope of Existential Polarity Wh-phrases

In the last section, we have seen that Chinese existential polarity wh-phrases seem to be quite flexible with regard to their scopal possibility. However, it is not true that they can have any scope, in particular intermediate scope. In this section, we will discuss some examples which show that scopal possibilities of polarity wh-phrases must be constrained in some manner.

To begin with, consider the following two examples.

- (22)a. Haoxiang mei-ge ren dou bu yuanyi gen shei/mou-ge ren shuohua
 seem every man all not willing with who/someone speak
 de-yangzi
 seem
 (i) ‘It seems that everyone is not willing to speak to anybody.’
 (ii) ‘It seems that there is somebody such that everyone is not willing to speak to him.’
 (iii) ?‘It seems that for every person x, there is some person y such that x is not willing to speak to y.’
- b. Haoxiang mei-ge ren dou henshao gen shei/mou-ge ren shuohua
 seem every man all seldom with who/someone speak
 de-yangzi
 seem
 (i) ‘It seems that everyone seldom talks to anybody’
 (ii) ‘It seems that there is someone such that everyone seldom talks to him.’
 (iii) *‘It seems that for every person x there is some person y such that x seldom talks to y.’

Consider (22b) first. This sentence are two-way ambiguous. The existential polarity wh-phrase or the indefinite *mou-ge ren* ‘some person’ can be construed as having narrow scope with respect to the frequency adverb *henshao* ‘seldom’, i.e., the reading (i) or wide scope with respect to the universal quantifier, i.e., the reading (ii). However, it does not seem to have a reading on which the existential polarity wh-phrase or the normal indefinite has wide scope over *henshao* ‘seldom’ but narrow scope with respect to the universal subject NP, i.e., the reading (iii), which is a kind of intermediate scope reading. But if the intervening operator is a negation operator, the intermediate scope reading seems to be somehow more acceptable, though (22a) is absolutely not a very natural way to express the intended reading. Also, it seems that it is easier for the indefinite *mou-ge ren* ‘someone’ to get the intermediate scope than for the existential polarity wh-phrase.

Next, let us consider examples where an existential polarity wh-phrase is embedded in an island, as is illustrated by (23). This type of construction is a construction that is often claimed to have an intermediate scope reading for indefinites.

- (23) Haoxiang mei-yi-ben qikan dou jujue chuban mei-yi-pian Chomksy
 seem every-one-CL journal all refuse publish every-CL Chomksy
 han shei yiqi he-xie de wenzhang
 with whom together co-write REL article
 ‘It seems that every journal has refused to publish every article that Chomsky has co-written with someone.’

A natural situation in which (23) could be true on the intermediate scope reading is the following:

- (24) Journal A refuses to publish every article that Chomsky has co-written with Richard Kayne.
 Journal B refuses to publish every article that Chomsky has co-written with Howard Lasnik.
 Journal C refuses to publish every article that Chomsky has co-written with Ken Hale.
 ...

But (23) does not seem to be true on this situation. The preferred reading of (23) is (25a) or (25b).

- (25)a. It seems that every journal has refused to publish any article that Chomsky has co-written with someone or other.
 b. It seems that someone is such that every journal refuses to publish any article that Chomsky has co-written with him.

However, it would be too hasty to conclude that intermediate scope is always impossible with existential polarity wh-phrase embedded in a relative clause. A very interesting property about constructions like (23) is that if one replaces the universal determiner of the complex NP in which the polarity wh-phrase is embedded with a pure cardinal modifier, the intermediate scope reading seems relatively easy to get. Compare (26) with (23).

- (26) Haoxiang mei-yi-ben qikan dou jujue chuban liang-pian Chomksy
 seem every-one-CL journal all refuse publish two-CL Chomksy
 han shei yiqi he-xie de wenzhang
 with whom together co-write REL article
 ‘It seems that every journal has refused to publish two articles that Chomsky has co-written with someone.’

Thus, there seems to exist an asymmetry between quantificational NPs and indefinite NPs with respect to blocking of intermediate scope.

Notice that the asymmetry in question is attested not only for polarity wh-phrases but also for non-polarity indefinites headed by *mou* ‘some/a certain’. For instance, while it is very difficult to get the intermediate scope reading for (27a) and (27b), the intermediate scope reading seems available for (28a) and (28b).

- (27)a. Mei-yi-ge xuesheng dou bixu du mei-yi-pian Chomsky han
 every-one-CL student all must read every-one-CL Chomsky with
 mou-ge yuyanxuejia hexie de wenzhang
 some-CL linguist co-write REL article
 ‘Every student must read every article that Chomsky has co-written with someone.’
- b. Mei-yi-wei bingren dou bei mei-yi-wei juyou mou-xiang
 every-one-CL patient all by every-one-CL possess some-CL
 zhuangchang de yisheng jiancha-guo
 expertise REL doctor examine-ASP
 ‘Every patient has been examined by every doctor who has a special expertise.’
- (28)a. Mei-yi-ge xuesheng dou bixu du liang-pian Chomsky han
 every-one-CL student all must read two-CL Chomsky with
 mou-ge yuyanxuejia hexie de wenzhang
 some-CL linguist co-write REL article
 ‘Every student must read two articles that Chomsky has co-written with someone.’
- b. Mei-yi-wei bingren dou bei san-wei juyou mou-xiang zhuangchang
 every-one-CL patient all by three-CL possess some-CL expertise
 de yisheng jiancha-guo
 REL doctor examine-ASP
 ‘Every patient has been examined by three doctors who has a special expertise.’

But it is also wrong to claim that universal determiners always block intermediate scope reading. In Chinese, a determiner-numeral-classifier sequence actually has two possible positions when the head noun is modified by a relative clause. It can either precede or follow the relative clause.⁵ This is illustrated by (29).

- (29)a. Na yi-ben [Zhangsan xie de] shu
 that one-CL Zhangsan write REL book
 ‘the book that Zhangsan wrote’
- b. [Zhangsan xie de] na yi-ben shu
 Zhangsan write REL that-one-CL book
 ‘the book that Zhangsan wrote’

In (27a) and (27b), the determiner-numeral-classifier sequence precedes the relative clause. Very interestingly, if the determiner-numeral-classifier sequence follows the relative clause, the missing intermediate scope reading becomes readily available. Compare (30) with (27).

- (30)a. Mei-yi-ge xuesheng dou bixu du Chomsky han mou-ge
 every-one-CL student all must read Chomsky with some-CL

⁵ If there is no determiner but just a numeral and classifier, it is generally odd to place the numeral and classifier after the relative clause unless the NP is construed as being specific. It is not clear to me how this fact should be accounted for. I refer the reader to Tsai (1999) for some discussion on this point.

reading even when there is a trigger and the situation is similar to the observation that normal indefinites cannot be subjects in Chinese. According to her, the following examples are ill-formed.

- (32)a. *Yi-ge ren lai-le
 one-CL person come-ASP
 ‘A person came.’
 b. *Shei xiang chi pingguo ma?
 who want eat apple Q
 ‘Does anyone want to eat apples?’

Cheng argues that if existential closure applies to only VPs, then the ungrammaticality of (32a) and (32b) immediately follows on the assumption that the relevant indefinites are never inherently quantificational and reconstruction back to VP in Chinese is not allowed. The two examples in (32) are out because they cannot be bound by existential closure.

Cheng’s above analysis of Chinese indefinite NPs is problematic for several reasons. First of all, although it is true that some examples do not allow normal indefinite subjects, it has been repeatedly pointed out that many other similar examples are grammatical (Fan 1985, Jiang, Pan and Zou 1997, Xu and Liu 1998, among many others). For instance, the following sentences are all well-formed.

- (33) Turan yil-iang xiao keche zhuangshang wo-de jiche
 suddenly one-CL small car hit my motorcycle
 ‘Suddenly a small car hit my motorcycle.’
 (34) Yi-tou shuiniu bei ta mai-le
 one-CL water-cow by him sell-ASP
 ‘One water cow was sold by him.’ (Xu and Liu 1998:168)
 (35) Yi-liang jipu ya-si shimin-de shi, zai renmen xinshang
 one-CL jeep crush-dead civilian-REL matter at people mind-on
 tou-xia nongzhong-de yinying.
 throw-down strong-DE shadow
 ‘The news that a jeep killed a civilian cast a dark shadow on people’s mind.’
 (Jiang, Pan and Zou 1997)

Similarly, it seems also wrong to exclude wh-words from occurring in subject position. We have already seen many such examples in (12), (13), (16). More examples can be given below.

- (36)a. Shi-bu-shi shei diao-le qian le?
 be-not-be who lose-ASP money ASP
 ‘Is it the case that someone lost his money?’
 b. Nandao shei mei jiao qian ma, buran zeme hui
 truly who not hand-in money Q otherwise how-come will
 shao-le wubai
 lack-ASP five-hundred

‘Should it be the case that someone does not hand-in the money? How come the total lacks five hundred dollars?’

I refer the reader to Lin (1998) for an explanation of why sometimes existential polarity wh-words are not allowed in subject position.

Second, if existential closure only applies to VP, we are certainly unable to account for scopal ambiguity of polarity existential wh-phrases. This analysis simply provides too few existential quantifiers. As we saw, polarity wh-phrases may sometimes scope over universal NPs in subject position or even scope out of a whole conditional. If existential closure applied only in the domain of VP, there would be no explanation of such facts.

6. Polarity Wh-phrases as Choice Functions

In the last section, I have argued that Cheng’s (1991) analysis of polarity wh-phrases cannot be right. However, my arguments only show that restriction of existential closure to the domain of VP is not correct. They do not imply that treating existential polarity wh-phrases as indefinites that introduce free variables is wrong. In fact, something along this line seems to be correct. However, rather than assuming that existential polarity wh-phrases introduce pure individual variables, I assume, in the spirit of Reinhart (1992, 1997) and her followers that they introduce choice function variables, because Reinhart’s arguments for such an analysis can be easily extended to Chinese existential polarity wh-phrases.

Reinhart (1992) has observed that in a sentence like (37),

(37) Who will be offended if we invite which philosopher?

The wh-phrase *which philosopher* has the same scope as the wh-phrase *who* but its scope cannot be obtained via movement, because this violates island constraints. Another way to explain the scope of *which philosopher* in (37) is to use Baker-Pesetskey’ style of unselective binding. Baker (1977) proposed that each question-sentence contains an abstract Q-morpheme and wh-in-situ are bound directly by it. This analysis has been revived by Pesetskey’ s (1987) work, who following Heim (1982) and Lewis (1975) suggests that the Q operator unselectively binds all the variables in the Wh-NPs which have not moved. However, as pointed out by Reinhart (1992), this approach will not do. If the wh-in-situ in (37) is bound directly to the Q operator, the final logical representation will be something like (38), using Karttunen’s (1977) semantics of questions.

(38) $\{P|\exists\langle x,y\rangle \ \& \ P = \wedge((\text{we invite } y \ \& \ \text{philosopher}(y)) \rightarrow (x \text{ will be offended}))\}$

However, in (38), the value of y can be anything in the world, since the restriction of the wh-phrase occurs in the antecedent clause of an implication.⁶ To solve this problem, Reinhart (1992,

⁶ A similar problem has already been pointed out by Heim (1982, p. 148-150) with respect to indefinite NPs such as *a friend of mine* in (i).

(i) If a cat likes a friend of mine, I always give it to him.

1997) proposes to treat a wh-in-situ such as *which philosopher* in (37) as a choice function f applying to a set and yielding an individual member of that set. Such a function variable can be bound arbitrarily far away by an existential quantifier. I reproduce her definition of choice function below.

(39) A function f is a choice function (CH(f)) if it applies to any non-empty set and yields a member of that set.

On this analysis, the logical representation of (37) now becomes (40), which correctly captures the wide scope interpretation of the wh-in-situ.

(40) $\{P \mid \exists x \exists f [(CH(f) \ \& \ P = \wedge ((\text{we invite } f(\text{philosopher}) \rightarrow (x \text{ will be offended}))))]$

The above analysis of wh-in-situ can be extended to indefinite NPs. Unlike Diesing (1990, 1992), who restricts application of existential closure to VP only, Reinhart assumes that existential closure can apply to anywhere, and this explains why indefinite NPs may have scope quite freely and do not need to obey island constraints.⁷

Returning to existential polarity wh-phrases, as we saw, they can be scoped out of a conditional clause if there is another potential licenser above the clause dominating the conditional clause. Thus, like Reinhart's (37), if an existential polarity wh-phrase is to be scoped out of the conditional clause by means of QR, it will be left unexplained why the island constraints need not be respected. On the other hand, if existential polarity wh-phrases only introduce individual variables, the problem of too weak truth conditions will arise. Therefore, we have to assume that existential polarity wh-phrases introduce choice function variables rather than just individual variables in the same way as Reinhart's examples imply.

If existential polarity wh-phrases are choice functions, the question that immediately arises is: Which version of choice functions better accounts for their behavior? Reinhart's (1992, 1997) and Winter's (1997) free existential closure or Kratzer's (1998) and Matthewson's (1999) contextual clue or topmost closure?

First, consider Kratzer's (1998) or Matthewson's (1999) approach. According to Kratzer, choice functions are left free and their values are supplied by the context. The interpretation of choice functions is therefore something like the speaker's intended reference, thus referring to specific individuals. Matthewson's (1999) approach is very similar to Kratzer's except that the choice functions are bound by the topmost existential closure rather than by being left free. Since choice functions must be bound by the topmost existential closure, her analysis predicts that choice function indefinites must refer to specific individuals, just like Kratzer's contextual clue. It must be clear from my above discussion that Kratzer-Matthewson's choice function analysis is not able to capture the behavior of Chinese existential polarity wh-phrases. As we saw, though

If the indefinite has scope over the conditional clause, then sentence will have only very weak truth conditions which can be satisfied by the mere existence of some individual which is not a cat of mine.

⁷ Notice that Reinhart (1997) does not claim that indefinite NPs are uniformly analyzed as choice function variables. According to her, they can still be inherent quantifiers.

existential polarity wh-phrases may have wide scope over other scope-bearing elements, they still must take narrow scope with respect to the highest operator that triggers their polarity interpretation. Thus, they can never refer to specific individuals or their licensing conditions will be violated. The data in Chinese clearly indicates that if there is existential closure for Chinese polarity wh-phrases, it must be able to apply to a level lower than the topmost one.

In contrast, Reinhart-Winter's free existential closure correctly predicts that choice functions introduced by existential polarity wh-phrases can be closed at the immediate scope of their licensing operators, thus without requiring them referring to specific individuals. However, this approach is not without problems, either. One major problem is that this approach allows too many existential quantifiers. As discussed, intermediate scope for existential polarity wh-phrases is only restricted to certain environments, but Reinhart-Winter's free existential closure may apply to even those environments that do not admit of intermediate scope. The data I discussed in section 5 thus strongly indicates that quantificational closure for choice functions must be restricted in a certain way so that it won't freely allow any intermediate scope.

Very interestingly, in his recent paper on long distance indefinites, Chierchia (2001) has reached a very similar conclusion, though the examples he examined are English. I now turn to the constraint that he has proposed and then show that the Chinese data points to a very similar constraint.

7. Chierchia's (2001) Constraint on Existential Closure

In discussing intermediate scope of English indefinites, Chierchia (2001) has found that their behavior is not consistent. In certain contexts (roughly the downward-entailing contexts), intermediate quantificational closure seems necessary for choice functions, thus in favor of Reinhart-Winter's free existential closure, but on the other hand, there are contexts where free existential closure over choice functions does not make sense, thus in favor of Kratzer-Matthewson's approach to choice functions. Let us first discuss the former type of contexts. Consider the two sentences in (41) against the situations depicted in (42a) and (42b).

- (41) a. Every linguist studied every solution that some problem might have.
b. Not every linguist studied every conceivable solution that some problem might have.
(42) a. Situation 1: systematic linguists

Linguist A (who considered many problems) studied every conceivable solution to the problem of weak crossover.

Linguist B (who considered many problems) studied every conceivable solution to the problem of donkey sentences.

Linguist C (who considered many problems) studied every conceivable solution to the projection problem of presuppositions .

...

b. Situation 2: the unsystematic linguist

Linguist A (who considered many problems) studied every conceivable solution to the problem of weak crossover.

Linguist B (who considered many problems) studied every conceivable solution to the problem of donkey sentences.

*Linguist C is such that there is no problem for which s/he studied all its solutions.

According to Chierchia, situation 1 depicted in (42a) is a natural situation in which (41a) can be felicitously uttered, but situation 2 depicted in (42b) would make (41a) false on the intended intermediate scope reading. To describe situation 2, one can use the negative sentence in (41b). Now let us see what Reinhart-Winter's approach and Kratzer-Matthewson's approach predict for the negative sentence (41b). (43a) and (43b) are the logical formulas of the two approaches, respectively.

- (43) a. $\neg\forall x[\text{linguist}(x) \rightarrow \exists f\forall z[\text{solution to } (z, f(\text{problem})) \rightarrow \text{studied}(x,z)]]$
b. $\exists f\neg\forall x[\text{linguist}(x) \rightarrow \exists f\forall z[\text{solution to } (z, f(x, \text{problem})) \rightarrow \text{studied}(x,z)]]$

As Chierchia points out, (43a) correctly predicts that (41b) is true in the case of the unsystematic linguist, by closing existentially the choice function between the two universal NPs. But (43b) would give too weak truth conditions for the sentence in question. Before explaining why, some words for the notation are necessary. As mentioned, on Kratzer-Matthewson's approach, intermediate existential closure is impossible. Therefore, one has to resort to a different strategy to explain intermediate scope reading. Choice functions are originally defined as functions from sets into some member of that set. Chierchia suggests that one can think of Kratzer-Matthewson's notion of choice functions as functions "from individuals and sets into some member of that set", represented by $f(x, \text{set})$. The individual part, represented by x , is the parameter of choice functions, which can be thought of as a null pronominal element. Thus, it can remain free or be bound by a c-commanding element. If it is free (or be bound by the topmost existential closure), it picks up the speaker's intended reference. When it is bound by a c-commanding NP, the intermediate scope reading arises. Returning to (43b), for this formula to be true, one only needs to find a function that makes the negative formula " $\neg\forall x[\text{linguist}(x) \rightarrow \exists f\forall z[\text{solution to } (z, f_x(\text{problem})) \rightarrow \text{studied}(x,z)]]$ " true. In other words, it suffices to find a function that falsifies the affirmative formula " $\forall x[\text{linguist}(x) \rightarrow \exists f\forall z[\text{solution to } (z, f(x, \text{problem})) \rightarrow \text{studied}(x,z)]]$ ". This is very easy: Just "pick any function that maps linguists into problems they never looked at". So (43b) is true in the unsystematic linguist situation. But the problem is that the same formula also makes (43b) true in the systematic linguist situation, because in situation 1, it is also easy to find some problem considered by some linguist that however, did not studied all of its solutions. Therefore, the truth conditions provided by (43b) are too weak. Chierchia thus concludes that intermediate quantificational closure is necessary in downward-entailing contexts. Examples like (43b) thus seem to favor Reinhart-Winter's approach to choice functions.

On the other hand, Chierchia also points out that there are evidence showing that pure choice functions as in Reinhart-Winter’s approach are not sufficient to derive all the readings that long distance indefinites might have. His argument is based on (44) attributed to Schlenker (1998).

(44) a. Situation

Every student in the semantics class has difficulty with a specific point of the program.

A has difficulty with assignment functions (but understands the rest).

B has difficulty with generalized quantifiers (but understands the rest).

...

b. So if every student manages to understand some problem, no body will flunk.

According to Chierchia, there are three admissible sites for existential closure that pure choice function approach may provide: “at the matrix level, at the level of the embedded if-clause and in the scope *every student*”. The first two possibilities force the problem to be the same for every student and the third possibility amounts to saying that if every student manages to understand any problem, nobody will flunk. But none of these three readings captures the situation depicted in (44).⁸ However, the intended reading can be easily obtained through parameterized choice functions, as represented in (45).

(45) $\exists f[[\forall x(\text{student}(x)) \rightarrow \text{understand}(x, f(x, \text{problem}))]] \Rightarrow \text{nobody will flunk}]$.

(Chierchia 2001, 71)

Chierchia further argues that in fact long distance indefinites always contain an implicit argument. His argument is based on interaction of the weak crossover constraint and scope of indefinites. Consider (46a) and (46b) against the situation in (46c).

(46)a. Every student was examined by every professor competent on some problem.

b. Every professor competent on some problem examined every student.

c. Student A was examined by every professor competent on OT.

Student B was examined by every professor competent on Creoles

...

(46a) has the familiar intermediate scope reading but (46b) does not seem to have such a reading. According to Chierchia, the lack of intermediate scope reading in (46b) can be easily explained if (unmodified) long distance indefinites always contain hidden parameters. On this assumption, to

⁸ It seems to me that Chierchia has missed another possible site where existential closure can apply. The third possibility mentioned by Chierchia corresponds to existential closure applying to the scope of the verb *manage*. However, theoretically, existential closure may also apply to the VP headed by *manage*. The last possibility captures the reading in (44b).

derive the intended reading, one needs the following logical form, where the superscript *i* on *some* indicates the hidden pronoun.

(47) every student_{*t*_i} [every professor_{*j*} competent on some^{*i*} problem [t_{*j*} examined t_{*i*}]]

Raising the universal NP *every student over someⁱ problem*, however, violates the weak crossover constraint. Thus, Kratzer-Matthewson's style of representing choice functions explains why (46b) does not have the intermediate scope reading. In contrast, the pure choice function approach as advocated by Reinhart and Winter may freely provide an existential quantifier between the two universal NPs in (47) and thus yields an unwanted intermediate scope reading for (46b).

In order to explain why Reinhart-Winter's theory seems to be right for a set of examples, whereas Kratzer-Matthewson's theory seems to be right for other examples, Chierchia has proposed a mixed approach which represents long distance indefinites as parameterized choice functions and constrains existential closure to apply to certain places. His proposal essentially consists of the following two statements (Chierchia 2001, 84):

- (48) a. Indefinites, when interpreted as choice functions, always have a hidden parameter.
- b. Existential closure of a function *f* is restricted to the (top and the) immediate scope of the quantifier that binds the argument of *f*.

8. A Revised Extension of Chierchia's Idea to Chinese Polarity Wh-phrases

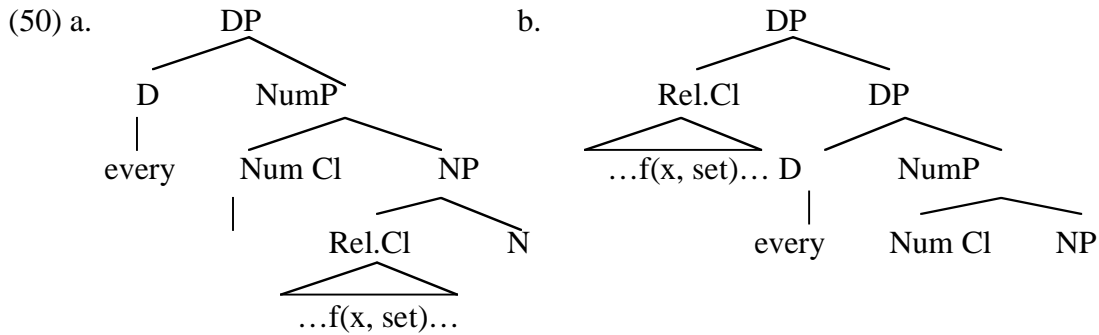
In this section, I will show that with a certain revision it is possible to extent Chierchia's idea to account for intermediate scope of existential polarity wh-phrases.

Recall that intermediate scope for existential polarity wh-phrases embedded in a relative clause arises in two kinds of environments, depending upon whether the object complex NP contains a determiner or a pure cardinal modifier and whether the determiner-numeral-classifier precedes or follows the relative clause. This can be schematically represented as follows:

- (49) *[every-Num-CI-N Verb [_{NP} every-Num-CI-[_{Rel.CI}...Wh...]-noun]] Intermediate scope out
 [every-Num-CI-N Verb [_{NP} [_{Rel.CI}...Wh...]- every-Num-CI -noun]] Intermediate scope OK
 [every-Num-CI-N Verb [_{NP} Num-CI-[_{Rel.CI}...Wh...]-noun]] Intermediate scope OK

As mentioned, if existential closure may apply to any level without any constraint, many unwanted intermediate scope readings would be generated, including the starred construction in (49). The fact that intermediate scope is possible for certain constructions but not for others indicates that some constraint must prevent existential closure from applying to every possible level as Reinhart (1997) and Winter (1997) have assumed. The problem is what the constraint is. Suppose we assume that the constraint is exactly the one proposed by Chierchia and that existential polarity wh-phrases and other indefinites may also contain a hidden argument. Does this work? Clearly, the answer is no, because the starred construction in (49) seems to have a construction similar to those English examples that are claimed to have intermediate scope readings. But if we compare the first two constructions in (49), an answer seems to suggest itself. When the determiner-numeral-classifier sequence precedes the relative clause, this means that

the former c-commands the latter. But when the former follows the latter, the c-command relation is reversed. The difference is shown by the following two tree structures:



With the above syntactic difference between (50a) and (50b), the blocking effect of intermediate scope can be restated as follows:

(51) When the determiner *mei* ‘every’ c-commands the hidden argument, intermediate scope is blocked; when the determiner *mei* fails to c-command the hidden argument, intermediate scope is allowed.

If the above statement is correct, the next question is how we can make sense of this restriction. I suggest that the key to understand the restriction in (51) lies in how the hidden argument is analyzed. Recall that Chierchia has proposed to treat the hidden argument as a pronominal element that can be free or bound. I would like to revise this assumption. I propose that the hidden argument introduced by a choice function must be bound by the possible closest quantifier. Thus, quantifiers that are too far away cannot bind the hidden argument. The binding constraint proposed can be seen as a kind of minimality effect familiar in the syntax literature. In fact, on this proposal, the status of the hidden argument is more like an anaphor rather than a pronoun. With this revised assumption, now reconsider the contrast between (27a) and (30a), reproduced as (52a) and (53a) below.

(52)a. Mei-yi-ge xuesheng dou bixu du mei-yi-pian Chomsky han
 every-one-CL student all must read every-one-CL Chomsky with
 mou-ge yuyanxuejia hexie de wenzhang
 some-CL linguist co-write REL article
 ‘Every student must read every article that Chomsky has co-written with someone.’

b. $\forall x[x \text{ is a student} \rightarrow \forall z\exists f [z \text{ is an article} \wedge \text{Chomsky write } z \text{ with } f(z, \text{linguist}) \rightarrow x \text{ must read } z]]$

Every student *x* is such that for every article *z*, there is a linguist selected by *f*(*z*, linguist) such that Chomsky has co-written with that linguist and *x* must read *z*.

(53)a. Mei-yi-ge xuesheng dou bixu du Chomksy han mou-ge
 every-one-CL student all must read Chomksy with some-CL
 yuyanxuejia hexie de mei-yi-pian wenzhang
 linguist co-write REL every-one-CL article
 ‘Every student must read every article that Chomksy has co-written with someone.’

- b. $\forall x \exists f [x \text{ is a student} \rightarrow \forall z [z \text{ is an article} \wedge \text{Chomsky write } z \text{ with } f(x, \text{linguist}) \rightarrow x \text{ must study } z]]$
 For every student there is a way of choosing *f* such that *x* must read every article that Chomsky has co-written with *f*(*x*, linguist).

In (52a), the possible closest quantifier c-commanding the hidden argument of the choice function is the determiner *mei* of the object NP. Therefore, the hidden argument must be bound by this *mei* rather than by the universal subject NP. In contrast, in (53a) the determiner *mei* of the object NP does not c-command the hidden argument but the universal subject NP does. Therefore, the hidden argument introduced by the choice function in (53a) must be bound by the universal subject NP. Now if we assume with Chierchia that existential closure of a function *f* may apply to the immediate scope of the quantifier that binds the argument of *f*, then the logical form of (52a) and (53a) are (52b) and (53b), respectively. In (52b), existential closure operator is inside the scope of the second universal quantifier, which in turn is in the scope of the first universal quantifier. It follows from this logical representation that (52a) does not have an intermediate scope reading. In contrast, in (53b), the existential closure operator is in between the two universal quantifiers. Thus, (53b) has an intermediate scope reading.

The above approach also explains why (54) has an intermediate scope, though the overt pronoun bound by the universal NP in the matrix subject position is not part of the indefinite description.

- (54) Haoxiang mei-ge ren dou shuo yaoshi shei bu qu de-hua, ta
 seem every-Cl man all say if who not go if he
 jiu bu qu
 then not go
 ‘It seems that everyone says that if somebody does not go, then he will not go.’

(54) clearly has a reading which says: It seems that for every person *x*, there is a specific person *y* in *x*’s mind such that if *y* does not go, then *x* will not go. This reading is possible because the possible closest binder of the hidden argument introduced by the polarity *wh*-phrase is the matrix universal subject NP. So existential closure may apply to the immediate scope of this universal subject NP. The existential quantifier binding the choice function thus scopes over the whole conditional, yielding the intermediate scope reading.

As we saw in section 4, not only quantificational determiners may block intermediate scope reading for indefinites but other types of operators such as the frequency adverb *henshao* ‘seldom’ also have a similar blocking capacity. The proposed analysis may accommodate these cases so long as we assume that the hidden argument need not always be an individual in the normal sense but can be a time or a situation.

In section 4, I also mentioned that if an intervening operator is a negation marker such as *bu* rather than a frequency adverb, an intermediate scope reading seems much better. Why is this the case? An answer that immediately comes to my mind is that the negation marker *bu* has a semantic function different from that of *henshao* ‘seldom’. As is well-known from the literature in logic, the main semantic function of a negation operator is to reverse the truth value of a formula rather than binding a variable. This means that a negation operator will not bind a hidden argument of a choice function, because it is not a potential binder. Thus, in examples

such as (22a) discussed earlier, the hidden argument should be bound by the higher universal subject NP. This gives the intermediate scope reading.

The last issue we have to deal with regarding intermediate scope is the fact that a cardinal modifier does not seem to block intermediate scope of indefinites even when the former c-commands the latter. Why is this the case? The simplest answer that I can think of is this: Cardinal modifiers are not quantifiers whatsoever. They are predicative words like adjectives. Or alternatively, we can think of them as something introducing (choice function) variables and thus are not quantifiers themselves. If cardinal modifiers are not quantifiers, it follows that they are not qualified as variable-binders. Thus, in a construction like the third one in (49), the closest binder of the hidden argument is the universal subject NP. Consequently, such constructions allow an intermediate scope reading, as is desired.

So far, I have shown how intermediate scope of Chinese existential polarity wh-phrases can be accounted for by assuming that they introduce a choice function with a hidden anaphoric argument and that existential closure may apply to the immediate scope of the quantifier that binds the argument of the function. Now let us turn to cases where an existential polarity wh-phrases has its possible highest scope—that is, it scopes over everything of the sentence except the highest polarity trigger. As mentioned, existential polarity wh-phrases with such scope do not refer to specific individuals, and it can even be the case that the individuals do not exist at all. Thus, choice functions introduced by existential polarity wh-phrases may not be closed by existential closure applying to the topmost level. Instead, the intended reading requires that it be existentially closed at the immediate scope of the highest polarity trigger. Is this allowed? If we adopt Chierchia’s original version, where existential closure of a function f is restricted to the top and the immediate scope of the quantifier that binds the argument of f , does this work? The answer seems to be no, because on this version of existential closure, the adverb *haoxing* ‘seem’ must bind the hidden argument of the existential polarity wh-phrase. But this does not seem to make much sense. In view of this, I would like to make another revision of Chierchia’s assumption. First, I propose that the topmost level to which existential closure can apply is parameterized depending upon what type of indefinites is involved. For normal non-polarity indefinites, “topmost” means the top of the whole sentence; but for those indefinites such as Chinese existential polarity wh-phrases, “topmost” means the immediate scope of the highest polarity trigger. In other words, “topmost” should mean “potential topmost”. For normal indefinites, their potential topmost scope is the top of the whole sentence; for Chinese existential polarity wh-phrase, their potential topmost scope is the immediate scope of the highest polarity trigger. Thus, I revise Chierchia’s (48b) as (55).

(55) Existential closure of a function f is restricted to the potential topmost level of an indefinite and the immediate scope of the quantifier that binds the argument of f .

Second, countering Chierchia (2001), I suggest that Chinese existential polarity wh-phrase only optionally contain a hidden argument. When they do not contain such a hidden argument, they will be existentially closed at their potential topmost site. It is worth pointing out here that changing this assumption of Chierchia’s will not affect his original account for (47), reproduced below.

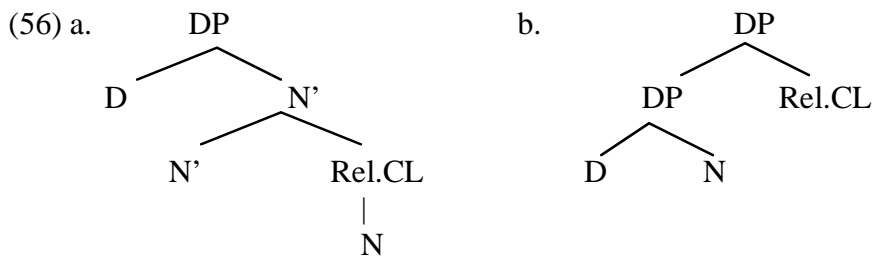
(47) every student [every professor competent on some problem [_t examined t_i]]

In (47), if the indefinite *some problem* contains a hidden argument, the intermediate scope reading will be ruled out by the weak crossover constraint as Chierchia originally proposed. But if no hidden argument comes with the indefinite, the choice function will not be existentially closed at an intermediate site because intermediate quantificational closure only applies to choice functions with a hidden argument. Instead, such pure choice functions must be closed by existential closure applying to the top of the sentence, yielding a reading where the indefinite refers to a specific individual in the speaker's mind. Indeed, (47) has this reading. So we see that letting indefinites optionally carry a hidden argument does not affect Chierchia's original account.

The final issue regarding the intermediate scope that I will discuss is concerned with the contrast between English and Chinese. In particular, I would like to address the question of whether the proposed theory of blocking effect may also apply to English. As observed by Chierchia and many other linguists, English examples such as (41a), reproduced below, may have an immediate scope reading.

(41a) Every linguist studied every solution that some problem might have.

The question thus arises as to why examples like (41a) do not display a similar blocking effect as Chinese examples such as (23) and (27) do. Notice that though traditionally, the structure for English noun phrases containing a relative clause is assumed to look like (56b), the more current theory tends to assume the structure to be (56a).



If (56a) is really the structure for noun phrases containing a relative clause, then the contrast between English example (41a) and the Chinese examples (23) and (27) will be a real puzzle. In order to explain this puzzle, I suggest that just as Chinese noun phrases containing a relative clause may have either the structure (50a) or (50b), English allows two possible structures as well, namely (56a) and (56b). The distinction between the two possible structures is blurred simply because unlike Chinese, where the relative clause precedes the head noun, English relative clauses happen to follow the head noun. If this view is correct, then we can say that whenever intermediate scope is available for an English sentence containing a relative clause, the structure is (56b) rather than (56a). This way, Chinese data and English data will be unified.

I should note here that an important argument for the structure (56a) over (56b) comes from a semantic consideration. According to Partee (1976), (56a) lends itself most easily to a compositional account of the semantics of a restrictive relative clauses, because by modifying N, the relative clause limits the reference of the NP containing it to a subset of the individuals denoted by N. Since the function denoted by a determiner such as the definite article *the* applies

to the translation of *N'* containing the relative clause rather than to that of *N*, the uniqueness requirement of *the* is relative to the extension of *N* plus the relative clause, not to the extension of *N* only. This analysis has been adopted or argued for by many other authors (McCawley (1988), Heim and Kratzer (1998), among others). In contrast, in (56b), the determiner forms a constituent with the common noun, so the function denoted by the determiner applies to the extension of the common noun only, entailing that uniqueness is relative to the extension of the common noun. It follows that the relative clause does not play a role in determining the referent of the whole NP, which seems to be a wrong result. However, this semantic consideration loses its force if Bach and Cooper's (1978) approach to semantic composition of noun phrases containing relative clauses is correct. (See also Cooper (1979) and McCloskey (1979).) They have argued that although Partee's remark on the structure (56a) and (56b) is reasonable, (56b) can still be the right structure for restrictive modification. The way they do it is to postulate a free property variable inside the translations of determiners. This property variable is abstracted over by a lambda-operator when the translation rule applies to combine the translation of the head NP with the translation of the relative clause. The resultant function then applies to the property denoted by the relative clause and lambda conversion will replace the free property variable by the translation of the relative clause. In fact, as Lin (1997) and Wu (1997) have argued, Chinese utilizes exactly this semantic mechanism to do semantic composition. If this is the case, there is no reason that English cannot utilize the very same mechanism.

Before closing this section, I should say a few words about indefinites with narrowest scope. Just like Chierchia's restriction on existential closure, my proposed condition on existential closure is a restriction on long distance indefinites. But what about existential polarity wh-phrases with narrowest scope? Are they existentially closed? Although Chierchia does not explicitly mention it, he seems to have assumed that indefinites with narrowest scope can be inherent quantifiers, a view shared by Reinhart (1997). I would like to make this assumption too. In fact there is one piece of evidence for this claim. Consider the following sentence, which contains the intensional verb *zhao* 'look'.

- (57) Zhangsan haoxiang zai zhao shenm dongxi de-yangzi
 Zhangsa seem PROG look-for what thing seem
 (i) "It seems that Zhangsan is looking for something or other."
 (ii) "It seems that there is something such that Zhangsan is looking for it."

(57) is ambiguous between two readings. In one reading, the existential polarity wh-phrase has narrow scope with respect to *zhao* 'look for'; In the other reading, it has wide scope with respect to *zhao* 'look for' but narrow scope with respect to *haoxiang* 'seem'. Now the problem is this. If existential polarity wh-phrases must always be existentially closed, then the reading (i) will not be able to be derived, because existential closure entails wide scope over the verb. But if existential polarity wh-phrases can also be inherent quantifiers, then reading (i) can be derived by assigning the opaque verb and the existential polarity wh-phrase a proper semantic type through the familiar Montague treatment.

9. Conclusion

A consensus about the interpretation of English indefinite NPs has seemed to emerge in the

recent literature since Reinhart's (1992) proposal that they may involve a choice function mechanism in their interpretation. However, there are diversified views concerning how the choice function mechanism should be executed; in particular there is a debate regarding which level(s) existential closure should apply to. Studies of indefinite NPs in languages other than English thus is quite important in settling this issue. Matthewson's (1998) article on indefinite NPs in St'át'imcets represents one such attempt. This paper is another attempt to contribute to the debate in question from the angle of Chinese existential polarity wh-phrases. Adopting Reinhart's (1992, 1997) analysis of indefinite NPs and interrogative wh-phrases, I have argued that Chinese existential polarity wh-phrases must be interpreted using the choice function mechanism. However, unlike Reinhart's (1997) and Winter's (1997) approaches to existential closure which may apply to any level of semantic composition, I have argued that free existential closure for long distance indefinites should be constrained in a certain manner as Chierchia (2001) has recently argued. Assuming that indefinites may optionally carry a hidden argument, I have proposed that existential closure of a choice function f is restricted to the potential topmost level of an indefinite and the immediate scope of the quantifier that binds the argument of f . This analysis not only applies to Chinese indefinites but may plausibly applies to English. As for Kratzer-Matthewson's approaches to choice functions, I have shown that they are falsified by the scopal behavior of Chinese existential polarity wh-phrases, because Chinese existential polarity wh-phrases obviously can be existentially closed at a level lower than the top. The data in Chinese thus show that the levels to which existential closure applies may be subject to parametric variation. In some languages, existential closure over choice function variables must apply to the top level as the non-polarity indefinites in St'át'imcets do, whereas in other languages, existential closure may be restricted in its application to certain places such as the potential topmost scope position or the immediate scope of the quantifier that binds the argument of a choice function. Our findings in Chinese thus should revive the possibility, rejected by Matthewson (1998), that the choice function mechanism may vary from language to language. The data also implies that the choice function mechanism may vary from indefinite NPs in one language to indefinite NPs in another language or even from one type of indefinite NP to another type of indefinite NP within the same language.

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