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THE SYNTAX AND SEMANTICS OF BARE CONDITIONALS IN CHINESE*

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Abstract

This paper investigates a Chinese construction that Cheng & Huang (1996) term the "bare conditional". Previous analyses have treated this construction as involving unselective binding. I argue against such an approach, and propose that the matching requirement observed in Chinese bare conditionals is derived through sideward movement (Hornstein & Nunes 2002, Nunes 2004). I show that this analysis can provide a principled account for the parallelism constraint and the apparent violation of vacuous binding reported in recent studies (Pan & Jiang, forthcoming, Leung 2006). Adopting Caponigro's (2003, 2004) semantic analysis of plain free relatives to bare conditionals in Chinese, I also show that it can nicely accommodate the universal reading as well as the quantificational variability effect.

1. Introduction

As originally observed by Cheng & Huang (1996, henceforth C&H), so-called "bare conditionals" (labeled after C&H) in Chinese exhibit a strict matching requirement on the use of wh-expressions. Specifically, the wh-expressions in the antecedent and consequent must be identical in number, form and referent, as in (1a, 2a). Hence, the deletion (represented as '*[e]*' below) or replacement of the matching wh-word *shei* 'who' in the consequent by a non-matching wh-word, a pronoun, or a definite NP is predicted to be ungrammatical, as illustrated in (1b, 2b).

(1) a. *Shei* jinlai, wo da *shei*.
who enter I hit who
'If X comes in, I hit X.'
b. **Shei* jinlai, wo da *[e]*/*shenme ren/ta/na-ge ren*.
who enter I hit what person/he/that person

(2) a. *Shei* yan *shei*, *shei* xiang *shei*.
who play who who resemble who
'If X plays Y, X resembles Y.'
b. **Shei* yan *shei*, *[e]/shenme ren/ta/na-ge ren* xiang *[e]/shenme ren/ta/na-ge ren*.
who play who what person/he/that person resemble what person/him/that person

C&H analyze wh-expressions in bare conditionals as variables subject to unselective binding, and attribute the matching requirement to a general prohibition against vacuous binding (Kratzer 1989). However, recent studies on bare conditionals reveal that the matching requirement is violable. For instance, Pan & Jiang (forthcoming) have reported the data in (3a-b), which show that the wh-word in the consequent clause is omissible.[1] Leung (2006) also notes that an unequal number of wh-expression is allowed when the verb involved in the

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[1] Pan & Jiang (forthcoming) show that the substitution of the wh-expression in the consequent by a pronoun is also possible in bare conditionals. Due to space limit, I will not discuss this type of data here. Interested readers are referred to their article for detailed discussion.

consequent is intransitive (i.e., *shuo chulai* 'say out'), as shown in his example (3c) (the glosses of (3a-c) are slightly modified).

(3) a. *Shei* xiang qu Beijing, *[e]* dei/bixu/yiding-yao dao wo zheli baodao.
who want go must to me here register
'If X wants to go to Beijing, X must register with me.'
b. *Shei* xiang qu Beijing, *[e]* qing dao wo zheli baodao.
who want go please to me here register
'If X wants to go to Beijing, please register with me.'
c. *Shei* xihuan *shei*, *shei* yinggai shuo chulai.
who like who who should say out
'If X likes Y, X should voice out.'

The above data cast reasonable doubt on the validity of the unselective binding account for Chinese bare conditionals, since the possibility of omitting the wh-expression implies that violating the prohibition against vacuous binding can be costless, contrary to the standard assumption.

In this paper, I argue that the matching requirement in bare conditionals is derived through sideward movement (Hornstein & Nunes 2002, Nunes 2004). Specifically, I propose that sideward movement of wh-expressions in bare conditionals is licensed by Last Resort as well as the Parallelism Constraint, which have been independently argued as licensing factors of sideward movement in Across-the-Board (ATB) constructions in English (Hornstein & Nunes 2002). I further offer new data on island effects and coordinate structures that provide crucial support for the view that the Parallelism Constraint is operative in Chinese bare conditionals. Before turning to the specifics of the sideward movement account (section 3) and the semantic analysis (section 4), I first discuss the problems that confront the unselective binding approach to Chinese bare conditionals (section 2), and that motivate us to seek an alternative account.

2. The unselective binding approach

C&H (1996) is the first thorough study on Chinese bare conditionals, which proposes that bare conditionals are best-analyzed as cases of unselective binding par excellence (cf. Tsai 1994, Lin 1996, a.o.). Following the DRT analysis of donkey sentences in Kamp (1981) and Heim (1982), C&H propose that wh-expressions in bare conditionals are variables unselectively bound by an implicit necessity operator (NEC), as in (4b). The NEC is semantically interpreted as a universal quantifier, hence giving rise to (4c) (Kratzer 1986).

(4) a. *Shei* xian lai, *shei* xian chi.
who first come who first eat
'If X comes first, X eats first.'
b. NEC_i [who_i comes first] [who_i eats first]
restriction nuclear scope
c. $\forall x$ [comes first(x)][eats first(x)]

In order to capture the matching requirement, C&H further make the following auxiliary assumptions:

(5) Prohibition Against Vacuous Quantification (Kratzer 1989):
For every quantifier Q, there must be a variable x such that Q binds an occurrence of x in both its restrictive clause and its nuclear scope.

(6) Revised Parallelism Constraint on Operator Binding (PCOB) (Safir 1985):
In a tripartite structure of quantification Q[A][B], [X_1, X_2, …,X_n] (where n≥1) are variables in A. For every variable in A, there must be an identical variable in B (C&H: 139).

The prohibition against vacuous quantification requires the wh-expressions in the antecedent and consequent to be identical in number, while the revised PCOB compels them to be

identical in form. However, as we have seen in (3a-c) (repeated below), the number of wh-expressions in the consequent need not correspond with that in the antecedent, regardless of whether the bare conditionals contain single or multiple pairs of wh-expressions. Given C&H's assumption of vacuous binding and revised PCOB, all the examples in (3a-c) will be wrongly ruled out.

(3) a. *Shei* xiang qu Beijing, *[e]* dei/bixu/yiding-yao dao wo zheli baodao.
who want go must to me here register
'If X wants to go to Beijing, X must register with me.'
b. *Shei* xiang qu Beijing, *[e]* qing dao wo zheli baodao.
who want go please to me here register
'If X wants to go to Beijing, please register with me.'
c. *Shei* xihuan *shei*, *shei* yinggai shuo chulai.
who like who who should say out
'If X likes Y, X should voice out.'

Another puzzling property of bare conditionals that fails to be captured by the unselective binding approach is the parallelism constraint. As originally observed by C&H, when identical definite NPs appear in both antecedent and consequent of bare conditionals, they denote the same referent, just like wh-expressions, as in (7) (taken from C&H: 139, fn. 17; italics added):

(7) Ni xihuan *nei-ge ren*, wo jiu da *nei-ge ren*.
you like that-CL person I then hit that-CL person
'If you like that person$_i$, I hit him$_i$/her$_i$.'
(NOT: 'If you like that person$_i$, I hit that person$_j$.')

An additional example is given below, which illustrates that the parallelism constraint can be extended to proper names:

(8) Ni xihuan *Zhangsan*, wo jiu da *Zhangsan*.
you like Zhangsan I then hit Zhangsan
'If you like Zhangsan$_i$, I hit him$_i$.'
(NOT: 'If you like Zhangsan$_i$, then I hit Zhangsan$_j$.')

Crucially, the parallelism constraint applies to definite nominals but not indefinites, as shown by the fact that the two occurrences of *yi-ge nanren* 'one man' below cannot denote the same referent, just like indefinites in English. This result is expected, since it is well-known that indefinites cannot be uniformly used as bound variables due to the *novelty condition* (Heim 1982, see also Chierchia 2000).

(9) *Ni xihuan *yi-ge nanren*$_i$, wo jiu da *yi-ge nanren*$_i$.
you like one-CL man I then hit one-CL man
Intended: 'If you like a man$_i$, I hit him$_i$.'

Since definites are not variables in Chinese, the fact that they must denote the same referents in (7) and (8) cannot be captured by the revised PCOB. In addition, the fact that the parallelism constraint is applicable to definite nominals and wh-expressions but not indefinites in bare conditionals provides prima facie evidence that the identical referent of the former can be derived through a similar mechanism, which must be different from the mechanism applied to indefinites in bare conditionals in Chinese.

Further evidence in support for the view that a parallelism constraint is at work in bare conditionals comes from island effects and the Coordinate Structure Constraint (CSC)[2]. The following examples show that when the wh-expression in either antecedent or consequent is

[2] According to Ross (1967), Coordinate Structure Constraint (CSC) basically states that in a coordinate structure, no conjunct can be moved nor can any element contained in a conjunct be moved out of that conjunct (cf. Grosu 1973, Pollard & Sag 1994, a.o.)

trapped inside a complex NP island (10a-b, 11a-b) or a coordinate structure (12a-b, 13a-b), the acceptability of the sentences is degraded.[3]

(10) Complex NP island
a. ??Zhangsan xiangxin [*shei* tou-le qian de shuofa], Lisi jiu qu daibu *shei*.
Zhangsan believe who steal-LE money DE rumor Lisi then go arrest who
Intended: 'If Zhangsan believes in the rumor that X has stolen the money, then Lisi will arrest X.'
b. ??Zhangsan huaiyi *shei*, Lisi jiu xiangxin [*shei* tou-le qian de shuofa].
Zhangsan suspect who Lisi then believe who steal-LE money DE rumor
Intended: 'If Zhangsan suspects X, then Lisi will believe in the rumor that X has stolen the money.'

(11) Complex NP island
a. ??Zhangsan xihuan [*shei* dasuan qing lai de zuojia], Lisi jiu taoyan *shei*.
Zhangsan like who plan ask come DE author Lisi then dislike who
Intended: 'If Zhangsan likes the author that X plans to invite, then Lisi dislikes X.'
b. ??Zhangsan xihuan *shei*, Lisi jiu taoyan [*shei* dasuan qing lai de zuojia].
Zhangsan like who Lisi then dislike who plan ask come DE author
Intended: 'If Zhangsan likes X, then Lisi will dislike the author that X plans to invite.'

(12) CSC
a. ??Zhangsan xihuan [*shei* he Mali], Lisi jiu taoyan *shei*.
Zhangsan like who and Mary Lisi then dislike who
Intended: 'If Zhangsan likes X and Mary, then Lisi will dislike X.'
b. ??Zhangsan xihuan *shei*, Lisi jiu taoyan [*shei* he Mali].
Zhangsan like who Lisi then dislike who and Mary
Intended: 'If Zhangsan likes X, then Lisi will dislike X and Mary.'

(13) CSC
a. ??*Shei* xihuan [*shei* he Mali], *shei* jiu hui yaoqing *shei*.
who like who and Mary who then will invite who
Intended: 'If X likes Y and Mary, then X will invite Y.'
b. ??*Shei* xihuan *shei*, *shei* jiu hui yaoqing [*shei* he Mali].
who like who who then will invite who and Mary
Intended: 'If X likes Y, then X will invite Y and Mary.'

However, when the wh-expressions in both antecedent and consequent occur inside identical islands or coordinate structures, the island effects and CSC disappear, as in (14-17). The

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[3]James Huang (p.c.) points out that island effects are ameliorated when the wh-expression occurs inside a 'light' relative clause, as evidenced by the grammaticality contrast between (i) and (11b):

(i) (?)Zhangsan xihuan [shei xie de shu], Lisi jiu zhao shei lai.
Zhangsan like who write DE book Lisi then find who come
'If Zhangsan likes the book that X wrote, then Lisi will invite X.'

I agree that the type of islands involved is crucial in determining the acceptability of the sentence, and it is important to explain why island effects do not show up uniformly in bare conditionals. I do not have an answer to that question, and I will leave it open for future research. Nevertheless, it should not undermine the main purpose of discussing the island effects and CSC in this section, which is to show that the parallelism constraint is at work in bare conditionals, and that it can salvage *some* island effects and CSC by having the wh-expressions in identical structures, as in (ii):

(ii) Zhangsan xihuan [shei xie de shu], Lisi jiu mai [shei xie de shu].
Zhangsan like who write DE book Lisi then buy who write DE book
'If Zhangsan likes the book that X wrote, then Lisi will buy it.'

I am grateful to Audrey Li (p.c.) for pointing out this important observation to me. As I will show shortly, wh-expressions can appear in similar but non-identical islands or coordinate structures in order to obviate the island effects or CSC.

contrast in well-formedness between (16a, 17a) and (16b, 17b) further substantiates that the parallelism constraint can be a licensing condition for illicit bare conditionals.

(14) Zhangsan xiangxin [*shei* tou-le qian de shuofa], Lisi jiu xiangxin
Zhangsan believe who steal-LE money DE rumor Lisi then believe
[*shei* tou-le qian de shuofa].
who steal-LE money DE rumor
'If Zhangsan believes in the rumor that X has stolen money, then Lisi will believe in the rumor that X has stolen money.'

(15) Zhangsan xihuan [*shei* dasuan qing lai de zuojia], Lisi jiu taoyan
Zhangsan like who plan ask come DE author Lisi then dislike
[*shei* dasuan qing lai de zuojia].
who plan ask come DE author
'If Zhangsan likes the author$_i$ that X plans to invite, then Lisi dislikes him$_i$/her$_i$.'

(16) a. Zhangsan xihuan [*shei* he Mali], Lisi jiu taoyan [*shei* he Mali].
Zhangsan like who and Mary Lisi then dislike who and Mary
'If Zhangsan likes X$_i$ and Mary$_j$, then Lisi dislikes them$_{i+j}$.'

b. *Zhangsan xihuan [*shei* he Mali$_j$], Lisi jiu taoyan [*shei* he ta$_j$].
Zhangsan like who and Mary Lisi then dislike who and him/her
Intended: 'If Zhangsan likes X$_i$ and Mary$_j$, then Lisi dislikes them$_{i+j}$.'

(17) a. *Shei* xihuan [*shei* he Mali], *shei* jiu hui yaoqing [*shei* he Mali].
who like who and Mary who then will invite who and Mary
'If X likes Y$_i$ and Mary$_j$, then X will invite them$_{i+j}$.'

b. **Shei* xihuan [*shei* he Mali$_j$], *shei* jiu hui yaoqing [*shei* he ta$_j$].
who like who and Mary who then will invite who and him/her
Intended: 'If X likes Y$_i$ and Mary$_j$, then X will invite them$_{i+j}$.'

Nevertheless, it should be pointed out that the island effects and CSC can be obviated without necessarily having identical islands or coordinate structures in antecedent and consequent. This is illustrated by the following examples, which show well-formed bare conditionals in *similar* but not identical islands or coordinate structures. For instance, the substitution of *shufao* 'rumor' in the consequent by *xiaoxi* 'news' in (14) or substitution of the head noun *zuojia* 'author' by *xiaozhang* 'principal' in the relative clause in (15) does not affect their acceptability, as shown in (18) and (19), respectively. Likewise, for coordinate structures, the replacement of *Mali* 'Mary' in (16a) by another proper name like *Wangwu* remains well-formed, as demonstrated in (20).

(18) Zhangsan xiangxin [*shei* tou-le qian de shuofa], Lisi jiu yiding
Zhangsan believe who steal-LE money DE rumor Lisi then definitely
zhidao [*shei* tou-le qian de **xiaoxi**].
know who steal-LE money DE news
'If Zhangsan believes in the rumor that X has stolen money, then Lisi definitely knows the news that X has stolen money.'

(19) Zhangsan xihuan [*shei* dasuan qing lai de zuojia], Lisi jiu taoyan
Zhangsan like who plan ask come DE author Lisi then dislike
[*shei* dasuan qing lai de **xiaozhang**].
who plan ask come DE principal
'If Zhangsan likes the author that X plans to invite, then Lisi dislikes the principal that X plans to invite.'

(20) Zhangsan xihuan [*shei* he Mali], Lisi jiu taoyan [*shei* he **Wangwu**].
Zhangsan like who and Mary Lisi then dislike who and Wangwu
'If Zhangsan likes X$_i$ and Mary, then Lisi dislikes X and Wangwu.'

In other words, the parallelism constraint on islands and coordinate structures can be satisfied as long as the islands and coordinate structures in antecedent and consequent are *parallel* in structures.

To sum up, I have shown that the unselective binding approach to bare conditionals has three major problems: (i) it wrongly rules out bare conditionals with unequal number of wh-expressions; (ii) it fails to explain the similarity of wh-expressions and definite nominals in terms of their requirement to refer to the same referent when they come in pairs in bare conditionals, and their different behavior from indefinites;[4] (iii) it cannot capture the important role of parallelism constraint with respect to island effects and CSC in bare conditionals.

3. Sideward movement and bare conditionals

In this section, I show that analyzing wh-expressions in bare conditionals as copies resulting from sideward movement resolves the problems encountered by the unselective binding approach.[5] Moreover, this proposal has a number of appealing features: (i) it can provide a principled explanation of the apparent violation of matching requirement, which follows from the interplay of θ-role assignment/checking (or Last Resort) and Parallelism Constraint; and (ii) the parallelism constraint observed in bare conditionals can be attributed to a general output condition, which is not unique to Chinese; rather it has been independently motivated in ATB constructions in English, following Hornstein & Nunes (2002).

3.1 Similarities of ATB constructions and bare conditionals

Sideward movement has been ascribed to a number of constructions with gaps resulting from wh-movement, including parasitic gap (PG) and ATB constructions (Hornstein 2001, Hornstein & Nunes 2002, Nunes 1995, 2001, 2004). To account for the well-known fact that ATB constructions admit a wider range of categories than PG constructions, Hornstein & Nunes (2002) argue that sideward movement of wh-expressions in ATB constructions can be licensed not only by Last Resort but also by the so-called "Parallelism Constraint". Since ATB constructions share many common properties with bare conditionals (e.g., both involve coordinate structures) and admit nearly the same range of categories, including wh-arguments (21a), PPs (21b), APs (21c), AdvPs (21d-e), non-referential NPs (21f), etc., it seems plausible to extend the sideward movement analysis of ATB constructions in English to bare conditionals in Chinese.

(21) a. Ni shuo *shenme*, wo xin *shenme*.
you say what I believe what
'If you say X, I believe X.'

b. Ni *zai nali*, wo jiu *zai nali*.
You at where I then at where
'If you are at X, I am at X'

c. Ni you *duo gao*, ta jiu you *duo gao*.
you have how tall he then have how tall
'If you are X tall, he is X tall.'

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[4] The divergent behavior of wh-expressions and indefinites in bare conditionals has been a major concern in the semantic literature, since it is well-known that indefinites cannot be used uniformly as bound variables (e.g., in a conditional sentence like *If a dog barks, I like a dog*, the two indefinites cannot refer to the same dog), which is generally attributed to the *novelty condition* (Heim 1982). The fact that wh-expressions in the consequent seem anaphoric to those in the antecedent hence poses a great challenge to the novelty condition. Interested readers are referred to Chierchia (2000) for detailed discussion.

[5] Note that Bruening & Tran (2006) independently arrive at the same conclusion that the matching effect in Chinese bare conditionals is derived through sideward movement, and their analysis is primarily motivated by the data of similar conditional sentences in Vietnamese.

d. Ta *weishenme* gaoxing, wo jiu *weishenme* shangxin.
he why happy I then why hurt-feeling
'If he is happy for reason X, then I am sad for reason X.'
e. Ta *zenme* lai, wo jiu *zenme* likai.
he how come I then how leave
'If he comes in way X, then I leave in way X.'
f. Ni qu-le Meiguo *ji* *nian*, wo jiu qu-le Meiguo *ji* *nian*.
you go-LE US how.many year I then go-LE US how.many year
'If you went to the US for X many years, then I went to the US for X many years.'

Another motivation of assimilating the two constructions is that both exhibit the parallelism requirement: ATB constructions require that all conjuncts be identical, hence explaining the following data:

(22) [Which book]$_i$ did you read e_i and Mary recommended e_i/*[that magazine]?

This parallelism requirement is reminiscent of the matching requirement in bare conditionals. Moreover, note that strict identity is imposed on wh-expressions with a following noun phrase in bare conditionals, as shown below.

(23) Mali tuijian-le *shenme shu*, wo jiu kan-le *shenme shu*/**shenme zazhi*.
Mary recommend-LE what book I then read-LE what book/what magazine
'If Mary recommended X book, I read X book.'

Thus, in terms of the parallelism requirement, bare conditionals are akin to ATB constructions with the only difference being that the wh-expressions remain in situ in the former.

3.2 Sideward movement

Following Hornstein & Nunes (2002), I assume sideward movement is licensed by Last Resort and the Parallelism Constraint: the former is triggered to fulfill formal feature checking or θ-role assignment of a predicate. For the latter, Hornstein & Nunes assume that it is an output condition that licenses wh-adjuncts to undergo sideward movement in order to capture the wider range of categories permitted in ATB constructions in English. Given the data on island effects and CSC observed in Chinese bare conditionals, I propose that the Parallelism Constraint should be revised as an output condition applying to ensure that (i) the wh-expressions involved are identical in form, and (ii) the wh-expressions in antecedent and consequent must appear in *parallel* structures. (i) is a general requirement that applies to ATB constructions as well as bare conditionals, while (ii) is an extension of the original Parallelism Constraint proposed by Hornstein & Nunes in order to capture the role of parallel structures in obviating island effects and CSC in bare conditionals in Chinese. Furthermore, I assume that all operations, Copy, Merge and Delete are costly, and hence they must be properly licensed by Last Resort and the (revised) Parallelism Constraint. Given these assumptions, let us see how bare conditionals like (1a) (repeated below) can be derived through sideward movement.[6]

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[6] One might wonder whether (1a) violates the Parallelism Constraint, since it is well-known ATB constructions in English disallow extraction of wh-expressions from different syntactic positions, as in (i):

(i) *Whom$_i$ did John invite t_i and t_i rejected Mary?

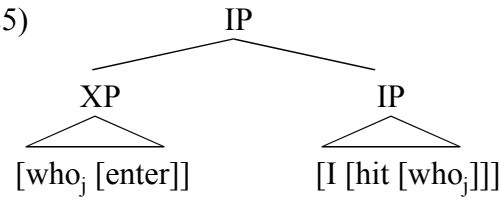
However, the ill-formedness of (i) is presumably due to the mismatch of Case features. This view is supported by the data from Polish, which show that ATB typically applies to wh-words of the same Case feature, as in (iia-b) but this matching requirement can be violated for syncretic forms, as in (iii) (data below are taken from Citko 2003):

(ii) a. Co_{ACC} Jan lubi t_{ACC} i Maria uwielbia t_{ACC}?
what Jan likes and Maria adores
'What does Jan like and Maria adore?'

(1) a. *Shei* jinlai, wo da *shei*.
who enter I hit who
'If X comes in, I hit X.'

First, the computational system selects the appropriate lexical items in the Numeration (N) in (24a), and they form the two objects, K and L, in (21b-c) (for convenience, I use the English gloss below; also the wh-word is subscripted for clarity). The wh-word *who* is merged as a direct object of the transitive verb *hit* to satisfy its θ-role requirement, yielding (24b). Since *enter* is an intransitive verb that requires a subject, in order to fulfill its θ-role assignment, the computational system makes a copy of the wh-word (24d). The copy then undergoes sideward movement and merges with *enter*, giving rise to (24e). The corresponding (simplified) tree diagram is shown in (25).

(24) a. N = {who$_j$, enter, I, hit}
b. K = [hit [who$_j$]]
c. L = enter
d. [hit [who$_j$]] [who$_j$]
|_____|
Copy
e. [who$_j$ [enter]]

(25)


A natural question arises regarding the copy and its status with respect to the operation Delete for linearization purposes. Since we have seen that bare conditionals typically exhibit matching requirement, the copy plainly cannot be subject to deletion. One possible explanation is to attribute this restriction to economy conditions, which ban the operation Delete unless it is properly licensed. Given that the two wh-words in bare conditionals do not c-command each other, no binding principle will be incurred to rule out the derivation, and hence there is no need to delete any one of the copies to ensure convergence.

Following Hornstein & Nunes' assumption that sideward movement must be licensed by Last Resort and the (revised) Parallelism Constraint, we can now provide a straightforward explanation for cases of apparent violation of matching requirement shown in section 1. Let us consider (3c) (repeated below). Since the verb *xihuan* 'like' in the antecedent is a transitive verb, we expect that it will take two wh-words to satisfy its θ-role requirement. As mentioned

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b. *Co_{ACC} Jan lubi t_{ACC} i Maria nienawidzi t_{GEN}?
what Jan likes and Maria hates
'What does Jan like and Maria hate?'

(iii) Kogo$_{ACC/GEN}$ Jan lubi t_{ACC} i Maria nienawidzi t_{GEN}?
who Jan likes and Maria hates
'Who does Jan like and Maria hate?'

Since Chinese does not have overt Case feature, it is plausible to assume that the (revised) Parallelism Constraint is obeyed in (1b), despite the fact that the wh-words appear in different positions. Moreover, the data in (iii) provide additional support to my proposal that the (revised) Parallelism Constraint should only require the wh-expressions to be identical in form, and the requirement of wh-expressions to have the same (i and iia-b) or non-distinct Case features (iii) in ATB constructions should be attributed to a different principle that can be subject to parametric variation.

in Leung (2006), the verb *shuo chulai* 'say out' in the consequent is intransitive. In other words, it only bears one θ-role to assign, i.e., to its subject. Hence, sideward movement of the wh-word only applies to the subject, resulting in an unbalanced number of wh-words in the antecedent and consequent.

(3) c. *Shei* xihuan *shei*, *shei* yinggai shuo chulai.
who like who who should say out
'If X likes Y, X should voice out.'

To corroborate this account, compare (3c) with (2a) below, which also contains two wh-words in the antecedent. Given that the two verbs *yan* 'play' and *xiang* 'resemble' are both transitive, sideward movement is licensed to apply to both subject and object positions to satisfy their θ-role assignment, thus explaining the matching requirement. If this line of reasoning is correct, the unbalanced number of wh-expressions in bare conditionals cannot be taken to result from arbitrary deletion at PF.

(2) a. *Shei* yan *shei*, *shei* xiang *shei*.
who play who who resemble who
'If X plays Y, X resembles Y.'
b. **Shei* yan *shei*, *[e]/shenme ren/ta/na-ge ren* xiang *[e]/shenme ren/ta/na-ge ren*.
who play who what person/he/that person resemble what person/him/that person

Turning to (2b), an immediate question arises as to what rules out the non-matching wh-expressions and definite nominals. An obvious candidate is the Parallelism Constraint. Even though *shei* 'who' and *shenme ren* 'what person' seem alike in meaning, the sentence fails to converge due to the revised Parallelism Constraint, an output condition requiring that the arguments in both clauses are identical in form. The same explanation will rule out the pairing of *shei* 'who' with pronouns or definite nominals in (2b). If this analysis is on the right track, it goes without saying that the absence of matching wh-words in the consequent in bare conditionals will always be ruled out by the Parallelism Constraint. This is indeed the case, as supported by the ill-formedness of the following examples:

(26) a. **Shei* jinlai, wo jiu hui bu gaoxing.
who enter I then will not happy
Intended: 'If X comes in, then I will be unhappy.
b. **Shei* yan *shei*, wo jiu hui bu gaoxing.
who play who I then will not happy
Intended: 'If X plays Y, then I will be unhappy.'

Now, let us consider other cases of apparent violation of matching requirement reported by Pan & Jiang (forthcoming) in (3a-b) (repeated below). They analyze both examples as having an empty subject in the consequent, which apparently contradicts what I have just asserted, namely, that arbitrary deletion should not apply to wh-expressions in bare conditionals. However, as noted in Pan & Jiang, bare conditionals that allow omission of subject in the consequent usually carry an existential reading, which is the reading available in *ruguo* 'if' conditionals in Chinese. Since *ruguo* 'if' conditionals are known to permit omission of subject in the consequent (see C&H), it seems plausible to analyze the following sentences as licensed by a *covert* 'if'.

(3) a. *Shei* xiang qu Beijing, *[e]* dei/bixu/yiding-yao dao wo zheli baodao.
who want go must to me here register
'If X wants to go to Beijing, X must register with me.'
b. *Shei* xiang qu Beijing, *[e]* qing dao wo zheli baodao.
who want go please to me here register
'If X wants to go to Beijing, please register with me.'

Evidence in support of this view comes from the fact that when an overt *ruguo* 'if' is inserted in the above examples, they receive exactly the same reading:

(27) a. Ruguo *shei* xiang qu Beijing, *[e]* dei/bixu/yiding-yao dao wo zheli baodao.
if who want go must to me here register
'If X wants to go to Beijing, X must register with me.'
b. Ruguo *shei* xiang qu Beijing, *[e]* qing dao wo zheli baodao.
if who want go please to me here register
'If X wants to go to Beijing, please register with me.'

If this explanation is correct, we can maintain the proposal that the operation Delete cannot apply for free, following Minimalist assumption of economy principle.

Let us now consider cases of island effects and CSC discussed in section 2. Recall that island effects and CSC are ameliorated when wh-expressions in the antecedent and consequent are trapped inside identical islands or coordinate structures, as in (14-16a) (repeated below).

(14) Zhangsan xiangxin [*shei* tou-le qian de shuofa], Lisi jiu xiangxin
Zhangsan believe who steal-LE money DE rumor Lisi then believe
[*shei* tou-le qian de shuofa].
who steal-LE money DE rumor
'If Zhangsan believes in the rumor that X has stolen money, then Lisi will believe in the rumor that X has stolen money.'

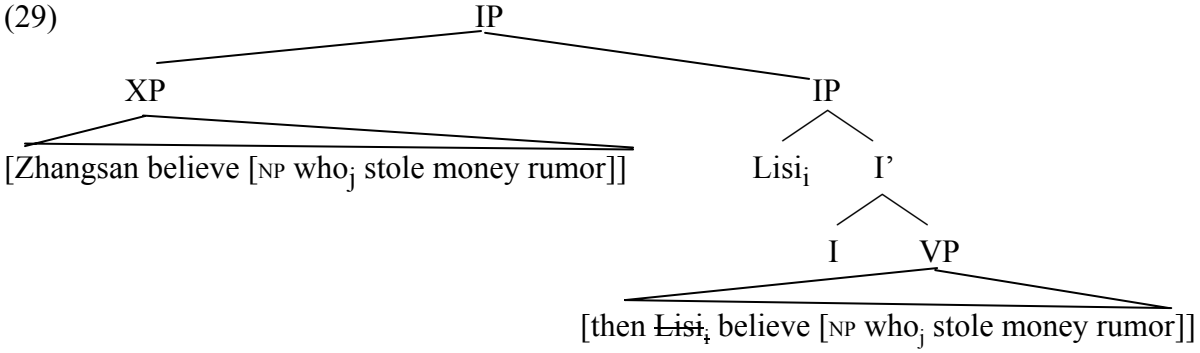
(15) Zhangsan xihuan [*shei* dasuan qing lai de zuojia], Lisi jiu taoyan
Zhangsan like who plan ask come DE author Lisi then dislike
[*shei* dasuan qing lai de zuojia].
who plan ask come DE author
'If Zhangsan likes the author$_i$ that X plans to invite, then Lisi dislikes him$_i$/her$_i$.'

(16) a. Zhangsan xihuan [*shei* he Mali], Lisi jiu taoyan [*shei* he Mali].
Zhangsan like who and Mary Lisi then dislike who and Mary
'If Zhangsan likes X$_i$ and Mary$_j$, then Lisi dislikes them$_{i+j}$.'

I suggest that for the above examples, Parallelism licenses sideward movement of the wh-expressions and the definite nominals. As an illustration, consider (14). As before, appropriate lexical items are selected in the Numeration, as in (28a) (irrelevant items are omitted), which subsequently form two objects, K and L, in (28b-c). Since the verb *stole* requires a subject, the computational system makes a copy of the wh-word (28d), and merges it with L, giving rise to (28d). The corresponding (simplified) tree diagram for (14) is given in (29).

(28) a. N = {Zhangsan, believe, who$_j$, stole, money, rumor, Lisi, then, believe, stole, money, rumor}
b. K = [who$_j$ [stole money]]
c. L = [stole money]
d. [who$_j$ [stole money]] [who$_j$]
Copy

(29)



I do not assume that the whole island is copied and then undergoes sideward movement, since recall that *parallel* structures are sufficient to fulfill the Parallelism Constraint in case of islands and CSC (see (18-20) for relevant examples). Furthermore, if the Parallelism Constraint is an output condition, we would expect it to filter out non-parallel structures. Hence, there is no need to assume that the operation Copy should apply to the whole island especially from the Minimalist perspective, since one of its methodological guidelines is that all operations are costly, and need to be properly licensed.

In sum, I have shown that analyzing wh-expressions in bare conditionals as derived through sideward movement can provide us with a uniform account for cases of apparent violation of vacuous binding as well as the island effects and CSC. If this analysis is correct, it implies that the anaphoric character of the wh-expressions follows as an epiphenomenon of sideward movement, hence resolving the mystery of the apparent violation of the novelty condition (Heim 1982, Chierchia 2000) by wh-expressions in bare conditionals (see fn. 4).

4. The semantics of bare conditionals

According to C&H, wh-expressions in bare conditionals are interpreted as universal, which is derived through unselective binding of the wh-expressions by an implicit necessity operator (section 2). However, the fact that wh-expressions pattern like definite nominals rather than indefinites casts doubt on the analysis of wh-expressions as indefinites. Nevertheless, there is strong evidence from Li (1992), who convincing argues that wh-expressions in Chinese are polarity items lacking quantificational force on their own. Given these considerations, I adopt Caponigro's (2003, 2004) analysis of plain free relatives (FRs), and apply it to Chinese bare conditionals, since according to his analysis, wh-words in plain FRs *universally* denote sets of entities, and they lack quantificational force. I further show that analyzing wh-expressions in bare conditionals as having the same semantics as plain FRs is well-motivated, given the many commonalities shared by the two constructions.

4.1 Wh-expressions as free relatives

Caponigro (2003, 2004) proposes that plain free relatives (FRs) like *who*, *what*, etc. do not encode maximality (i.e., their ability to refer to maximal entities) in their lexical semantics, unlike Jacobson (1995). Rather, they behave like set restrictors that apply to a set of entities, and return a subset of those entities. In particular, he proposes the following semantics for wh-words in FRs, which is argued as universally the same:

(30) wh $\rightarrow \lambda X \lambda x\ [P(x) \wedge X(x_1)]$
P = animate (*who*), inanimate (*what*), place/location (*where*), time/situation (*when*), and manner (*how*) (Caponigro 2004: [25])

The capital X in (3) stands for a variable over properties or sets of entities. Since a wh-word is akin to a set-restrictor that applies to a set according to Caponigro, the returned subset will depend on the choice of the wh-word, i.e., +animate entity/entities for *who*, -animate entity/entities for *what*, place(s) or location(s) for *where*, time or situation(s) for *when*, and manner(s) for *how*, and this is what the capital P stands for in (30). To derive the maximality reading, Caponigro (2004) proposes that it results from a type-shifting rule akin to *iota* (ι), which serves to resolve type mismatches, and turns the set (of type <e, t>) denoted by a wh-word to the maximal entity (of type <e>). The type-shifting rule proposed by Caponigro is given below:

(31) $\delta \rightarrow \lambda X \iota x\ [X(x)]$

To see how Caponigro's analysis can apply to bare conditionals, consider (1a). Following Caponigro's analysis, the semantic representation of (1a) would be (32).

(1) a. *Shei* jinlai, wo da *shei*.

who enter I hit who
'If X comes in, I hit X.'

(32) $\iota x_1[+\text{animate}'(x_1) \wedge \text{enter}'(x_1)] \rightarrow \iota x_1[+\text{animate}'(x_1) \wedge \text{hit}'(x_1)(I)]$

What (32) says is if a maximal animate entity comes in, then I hit the same maximal animate entity. I suggest that the maximal entity corresponds to the alleged universal reading observed in bare conditionals, since plain FRs in English are known to be capable of carrying a universal reading, as shown in the following example from Jacobson (1995):

(33) Do what the babysitter tells you.
(=Do everything the babysitter tells you.)

Moreover, there is evidence in support of the view that bare conditionals need not carry universal force. For instance, Lin (1996) notices that wh-expressions in bare conditionals can be interpreted as singular, as in (34) (taken from Lin (1996: 217) with slight modification):

(34) Shei shang xueqi na di-yi-ming, shei zhe xueqi jiu keyi/bixu dang banzhang.
who last semester get top-one who this semester then may/must serve class-leader
'If X was the first (in the class) last semester, X may/must serve as the class leader this semester.'

The above example can have a singular reading, given our world knowledge that typically only one student can get the first in a class. However, it does not mean that this is the only reading for (34). As pointed out by Pan & Jiang (forthcoming), (34) can also have a multi-case reading, since it is possible to apply (34) to different classes, and hence *shei* 'who' can refer to the top-one student in each class, giving rise to a plural set of top-one students. Nevertheless, their observation does not affect my proposal that wh-expressions in bare conditionals have the same semantics as plain FRs, since according to Caponigro, a maximal entity denoted by plain FRs can be singular or plural. For instance, the maximal entity of a singleton set is an atomic entity, which is singular, while when two or more entities are grouped together by Link's (1983) operation **sum**, the maximal entity will become a plural entity. The fact that the wh-expressions in (34) can be interpreted as singular or plural thus lends support to my proposal that wh-expressions in bare conditionals have the same semantics as plain FRs.

Note that the assimilation of bare conditionals to plain FRs is well-motivated by their common properties. Similar to bare conditionals, plain FRs also exhibit the so-called 'quantificational variability effect' (QVE), which is observed in many languages other than English, as reported in Caponigro (2003: Ch. 5). The following examples (taken from Caponigro 2003: 145) show that QV-reading is available with adverbs of frequency, as can be seen in the paraphrases in the (b) examples below.

(35) a. [$_{FR}$ What you find at a yard sale] is often junk.
b. [$_{DP}$ Many things you find at a yard sale] are junk.

(36) a. I almost never like [$_{FR}$ where he takes me to dinner], but the restaurant we went to last night was not bad at all.
b. I like [$_{DP}$ almost none of the places he takes me to dinner], but the restaurant we went to last night was not bad at all.

(37) a. I always hate [$_{FR}$ when you yell like that].
b. I hate [$_{DP}$ every occasion when you yell like that].

(38) a. [$_{FR}$ How he dances] often looks really ridiculous.
b. [$_{DP}$ Many of the ways he dances] look really ridiculous.

Likewise, bare conditionals in Chinese are known to exhibit QVE with an adverb like *tongchang* 'usually':

(39) Tongchang, shei yong-gong, shei jiu shang-de-liao daxue.
Usually who exert-effort who then go-can-finish college
a. 'Usually, if X studies hard, X can go to college.'
b. QV-reading: 'Most people who study hard can go to college.'

The presence of QV-reading is supported by the fact that (39) is judged true under the situation described in (40) in which most students who study hard can go to college.

(40)

Occasion	A
Student who study hard	1000
Student who can go to college	900

I propose the following semantics to capture the QV-reading in (39b), assuming the situation-based approach (Heim 1990, von Fintel 1994, a.o.)

(41) Usually {s: ιx_1[+animate'(x_1) $\wedge$ study-hard'(x_1) in s]]
$\rightarrow \exists s'[s \leq s' \wedge \iota x_1$[+animate'($x_1$) $\wedge$ can-go-to-college'(x_1) in s']]}

As shown above, *usually* quantifies over a minimal situation (s), which contains the maximal individual (ιx_1) who study hard, and this minimal situation is contained in a larger situation (s') in which the same maximal individual (ιx_1) can go to college. Given that most minimal situations that contain a maximal individual who study hard are extendable to s' in which the same maximal individual can go to college, it allows us to derive the QV-reading, i.e., the majority of individuals who study hard can go to college.

It should be pointed out that any attempt to analyze wh-words in bare conditionals as existentially quantified expressions is problematic, given that C&H have observed that the presence of existential quantifier *you* 'have' in bare conditionals always results in ungrammaticality with wh-words like *shei* 'who', regardless of whether an adverb of quantification like *tongchang* 'usually' is present, as in (42a-e) ((42a, 43a) is taken from C&H 1996: 141), unlike indefinites in Chinese, which require the presence of *you* 'have', as in (43a-c):

(42) a. *You shei xian lai, shei xian chi.
have who first come who first eat
b. *Shei xian lai, you shei xian chi.
who first come have who first eat
c. *You shei xian lai, you shei xian chi
have who first come have who first eat
d. *Tongchang, you shei xian lai, (you) shei xian chi.
usually have who first come have who first eat
e. *You shei xian lai, (you) shei tongchang xian chi.
have who first come have who usually first eat

(43) a. *(You) ren lai-le.
have person come-LE
'Someone came.'
b. *(You) yi-ge ren lai-le.
have one-CL person come-LE
'A person came.'
c. *(You) ren lai-le, ni jiu yiding yao tongzhi wo.
have person come-LE you then definitely need inform me
'If someone comes, you definitely need to inform me.'

Furthermore, recall that definite nominals including pronouns and proper names are akin to wh-expressions in that they denote the same referents in bare conditionals, as shown in (7-8) (repeated below):

(7) Ni xihuan *nei-ge ren*, wo jiu da *nei-ge ren*.
you like that-CL person I then hit that-CL person
'If you like that person$_i$, I hit him$_i$/her$_i$.'
(NOT: 'If you like that person$_i$, I hit that person$_j$.')

(8) Ni xihuan *Zhangsan*, wo jiu da *Zhangsan*.
you like Zhangsan I then hit Zhangsan
'If you like Zhangsan$_i$, I hit him$_i$.'
(NOT: 'If you like Zhangsan$_i$, then I hit Zhangsan$_j$.')

Thus, any analysis that treats wh-expressions as existentially quantified expressions will have to explain why wh-expressions differ from indefinites in terms of their compatibility with an overt existential *you*, and even if one succeeds in doing so, such an analysis will fail to capture the similarity of wh-expressions and definite nominals in bare conditionals in Chinese.

To briefly summarize, I have shown that analyzing wh-expressions in bare conditionals as having the same semantics as plain FRs not only allows us to derive the desired readings of bare conditionals but it also provides a unified explanation for the common properties shared by the two constructions.

5. Conclusion

This paper provided a syntax-semantics analysis of bare conditionals in Chinese. With respect to the syntax of bare conditionals, I have proposed that the matching requirement is derived through sideward movement of wh-expressions motivated by θ-checking (or Last Resort) as well as the revised Parallelism Constraint. There are a number of advantages of this proposal: first, it can provide a straightforward explanation of the identical referent denoted by the wh-expressions in bare conditionals, given that they are copies of the same syntactic object. Hence, it resolves the mystery as to why wh-expressions can violate the novelty condition, and allows us to maintain that the novelty condition holds universally, including Chinese. Second, it can provide a systematic account for cases of apparent violation of the matching requirement in bare conditionals reported in recent studies. Third, it allows us to capture the important role of parallel structures in obviating island effects and CSC. Fourth, it can correctly capture the similarity of definite nominals and wh-expressions in terms of their ability to refer to the same referents in bare conditionals, assuming that the former are also derived through sideward movement. Furthermore, I have showed that these facts will either be wrongly ruled out or fail to be captured under the unselective binding approach to bare conditionals, hence providing strong arguments against Cheng & Huang's (1996) claim that unselective binding mechanism is required by UG.

With respect to the semantics of bare conditionals, I have proposed that wh-expressions in bare conditionals share in essence the same semantics as plain free relatives proposed by Caponigro (2003, 2004). I have also showed that this analysis can correctly capture the different readings available in bare conditionals as well as the quantificational variability effect.

If the analysis advanced in this paper is on the right track, an important consequence is that it removes yet another domain thought to require unselective binding, continuing the general elimination of these cases begun in Heim (1990).

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