Mandarin *wh*-conditionals as interrogative conditionals

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Abstract

This talk examines *wh*-conditionals in Mandarin Chinese. It argues that *wh*-conditionals involve embedding two questions within a conditional, one in the antecedent and one in the consequent. Transition from a Hamblin/Karttunen question meaning to a conditional semantics is achieved by answerhood operators. The meaning obtained in this way is simple and intuitive: answers to the antecedent question already contains information to answer the consequent question.

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Introduction: The talk discusses Mandarin *wh*-conditionals. It argues that *wh*-conditionals involve embedding two questions within a conditional, one in the antecedent and one in the consequent. Transition from a Hamblin/Karttunen question meaning to a conditional semantics is achieved by answerhood operators. The meaning obtained in this way is simple and intuitive: answers to the antecedent question already contains information to answer the consequent question.

The basics: (1) illustrates *wh*-conditionals, the defining property of which is that they contain a pair (or multiple pairs) of co-varied *wh*-phrases, one in the antecedent and one in the consequent.

(1) *Zhangsan qing shei, Lisi jiu qing shei.*
Zhangsan invite who, Lisi JIU invite who
If Zhangsan invites X, Lisi invites X.
a. UNSELECTIVE BINDING: $\forall_x[\mathsf{invite}(\mathsf{Z},x) \rightarrow \mathsf{invite}(\mathsf{L},x)]$
b. CORRELATIVE/FREE-RELATIVE: $\mathsf{invite}(\mathsf{L},\sigma x[\mathsf{invite}(\mathsf{Z},x)])$

Two very different types of analyses have been proposed for *wh*-conditionals. One sees them as involving UNSELECTIVE BINDING (1a) (Cheng & Huang, 1996; Chierchia, 2000), the other takes them to be kin to CORRELATIVES/FREE-RELATIVES (1b) (Huang, 2010; Crain & Luo, 2011).

Our proposal takes *wh*-conditionals to be interrogative conditionals: the *wh*-words are real question words, and the antecedent and the consequent clauses both embed questions. Specifically, we take *jiu* to be an indicator of conditionals and adopt a semantics of conditionals/counterfactual that utilizes exemplifying situations (2) (Fine 2012, cf. Heim 1990; Schwarz 1998). We also adopt a Hamblin/Karttunen semantics of questions (Hamblin, 1973; Karttunen, 1977), where a question denotes a set of propositions — the set of its possible answers. Finally, transition from Hamblin/Karttunen questions to conditionals is achieved by answerhood operators (Dayal, 1996; Beck & Rullmann, 1999) (3). Together, these ingredients deliver (4).

(2) $[\![p\ jiu\ q]\!] = 1$ at $s*$ iff $\forall s[s \in \text{MIN}\{s : p(s) = 1 \wedge C_{s*}(s) = 1\} \rightarrow q(s) = 1]$,
where C is conversational background.
In words: a conditional [p *jiu* q] is true at $s*$ iff every minimal situation s such that p is true at s, coupled with the conversational background C obtained at $s*$, is also a situation such that q is true. (A variant of Fine 2012 using Kratzer 1989 situation semantics)

(3) $\text{ANS}(Q)(s*) = \iota p \in Q[p(s*) = 1 \wedge \forall q \in Q[q(s*) = 1 \rightarrow p \subseteq q]]$ (Dayal, 1996)

(4) SEMANTICS OF *wh*-CONDITIONALS:
$[\![\text{ANS}(Q_A)(s*)\ jiu\ \text{ANS}(Q_C)(s*)]\!] = 1$ at $s*$
iff $\forall s[s \in \text{MIN}\{s : \text{ANS}(Q_A)(s*)(s) = 1 \wedge \text{PRE}(Q_C)(s) = 1\} \rightarrow \text{ANS}(Q_C)(s*)(s) = 1]$
In words: every minimal situation that supports the answer to $Q_{antecedent}$ in $s*$ and the presupposition of $Q_{consequent}$ supports the answer to $Q_{consequent}$ in $s*$.

Different from ordinary conditionals, *wh*-conditionals have a nearly empty conversational background C (it has in it only the presupposition of the consequent, an existential presupposition in the case of questions). This is not hard to imagine: conditionals do have different modal flavors, captured by varying choices of the conversational background (Kratzer, 1981). The meaning captured in this way matches our intuition: the answer to the antecedent question (without any other background inforamtion) provides enough inforamtion to answer the consequent question.

An illustration: Suppose in $s*$ Zhangsan invited John and Mary, and Lisi invited Bill and Sue. (1) is false in $s*$: the minimal situation s that supports the answer to *who did Z invite?* in $s*$ and the presupposition of Q_C (an existential presupposition *that L invited someone*) consists of *Z, L,*

John$\oplus$*Mary*; s does not support the answer to Q_C in $s*$ — *that L invited Bill and Sue*. In general, our semantics using minimal situations guarantees that the short answer to the consequent question is identical to the antecedent-short-answer, thus capturing the 'co-variation' of the two *wh*.

Next, we show puzzles unexpected under previous analyses receive natural explanation in our account.

***Wh*-licensing:** non-question *wh*-words in Mandarin are polarity items (Lin, 1996; Chierchia & Liao, 2014). It is mysterious under previous analyses (where the *wh*'s are treated as non-question *wh*'s) how the *wh* in the consequent of a conditional (an upward-entailing context) is licensed.

Our proposal provides a ready answer: *wh*-words in *wh*-conditionals are simply question words, not the type of polarity items that need licensing. Even better, a unified semantics for *wh*'s can be achieved, by treating Mandarin polarity *wh*'s as Chierchia-existentials (Chierchia, 2013; Chierchia & Liao, 2014) and *wh*'s in questions and *wh*-conditionals as Karttunen-existentials.

No quantificational variability: Consider (5), with an overt quantificational adverb *usually*.

(5) *Tongchang, Z qing shei, L qing shei*
usually, Z invt who, L invt who
L usually invites who Z invites.$\neq$
$\textsc{Most}_x(\mathsf{invite}(\mathsf{Z},x),\mathsf{invite}(\mathsf{L},x))$

Parties	Invitees$_Z$	Invitees$_L$
1st	{a,b,c}	{a,b}
2nd	{d,e,f}	{d,e}
3rd	{g,h,i}	{g,h}

In a context where there were three parties, and the invitees of Z and L are as depicted in the table above, (5) is false, unexpected under unselective-binding. For (5) to be true, there has to be a majority of party-*situations/events*, where L invited *all* the people Z invited. This can be explained under our proposal: assuming quantificational adverbs in *wh*-conditionals quantify over pragmatically determined subsituations of a topical situation (in the case of (5) a set of parties, represented by $Cov(s*)$, cf. Beck 2012), we have (6) as the analysis of (5).

(6) $[\![(5)]\!]$=1 at $s*$ iff $\textsc{Most}[\lambda s.s \in Cov(s*), \lambda s.[\![\textsc{Ans}(Q_A)(s)\ jiu\ \textsc{Ans}(Q_C)(s)]\!] = 1$ at $s]$

Uniqueness presupposition is shown in (7), where *who* in (1) is replaced by *which two persons*.

(7) *Z qing na.liang.ge.ren, L jiu qing na.liang.ge.ren.*
Z invite which.two.CL.person, L JIU invite which.two.CL.person
Whichever two persons Z invites, L invites them.

(7) presupposes Z and L each invite exactly two persons. Unselective binding – $\forall_X[\mathsf{2.persons}(X) \wedge \mathsf{invite}(\mathsf{Z},X) \rightarrow \mathsf{2.persons}(X) \wedge \mathsf{invite}(\mathsf{L},X)]$ – says nothing about these presuppositions.

Our proposal using Dayal's answerhood operator (which is designed to capture uniqueness in questions) captures the uniqueness presuppositions. $\textsc{Ans}(Q)(s*)$ presupposes that there is a proposition in Q that is true at $s*$ and entails all the other true-at-$s*$ propositions in Q. For quantized question set such as $[\![$which 2 persons does Z invite?$]\!]$, this amounts to uniqueness.

Minimal *wh*-conditionals involve upward-scalar predicates as in (8) (Beck & Rullmann, 1999).

(8) *duoshao qian gou chi kaoyao, wo jiu gei ni duoshao qian*
how.much money sufficient eat roast.duck, I JIU give you how.much money
I will give you the (minimal) amount of money that is sufficient to eat roast duck.
$\neq$ I will give you every amount of money x such that x is sufficient to eat roast duck.
$\neq$ I will give you σx [x is an amount of money and x is sufficient to eat roast duck].

(8) means that I will give you the (minimal) amount of money that is sufficient to eat roast duck. Neither unselective binding nor correlative/free-relative based on standard σ gets this right.

Our proposal using Dayal's answerhood operator naturally account for minimal *wh*-conditionals: ANS is informationality-based. Applied to questions with upward-scalar predicates like *sufficient*, it delivers the proposition that involves the minimal x that is sufficient to eat roast duck.

Existential *wh*-conditionals are cases like (9) where the antecedent is interpreted existentially.

(9) *nar neng maidao jiu, wo jiu qu nar.*
where can buy liquor, I JIU go where
'I will go where I can get liquor.'= I will go to some place where I can get liquor.
$\neq$ I will go to all the places where I can get liquor.
$\neq$ I will go to σx[I can get liquor at x].

Existential *wh*-conditionals have a natural correspondence to mention-some questions in our account. We use a variant of Beck and Rullmann's ANS_3 (10) to analyze existential *wh*-conditionals[1].

(10) $\text{ANS}_3(Q)(s*) = \lambda P \exists p[P(p)(s*) = 1 \wedge Q(p) \wedge p(s*) = 1]$

A complication: ANS_3 requires its Q-argument to QR. Since we don't want QR out of a conditional antecedent, we modify (10) into (11) using choice functions. (12) is the analysis of (9).

(11) $\text{ANS}_{some}(Q)(s*) = f_{CH}(\lambda p[Q(p) \wedge p(s*) = 1])$

(12) $[\![(9)]\!]$= 1 in $s*$ iff $\exists f_{CH} \forall s[s \in \text{MIN}\{s : f_{CH}(\lambda p[Q_A(p) \wedge p(s*) = 1]) \wedge \text{PRE}(Q_C)(s) = 1\} \rightarrow \text{ANS}(Q_C)(s*)(s) = 1]$

Of course, the use of ANS_{some} should be constrained to avoid over-generation (not every question allows mention-some answers and not every *wh*-conditional allows existential reading), but these constraints are not well understood and we are not going into that either. But at least one prediction is made within our analysis: since *wh*-conditionals are built out of questions, whenever a question cannot receive a mention-some answer, the corresponding *wh*-conditional does not have an existential reading. We will show in the talk this is a correct prediction.

The Exhaustive flavor:*Wh*-conditionals are interpreted exhaustively. Consider (13), where the exhaustive flavor is indicated by the *only/exactly* in the gloss.

(13) *chi duoshao, cheng duoshao.*
eat how.much, fill how.much
Fill the plate with *only/exactly* the amount of food that you will eat.

Neither unselective binding nor correlative/free-relative gets this: both of them deliver *fill the plate with the amount of food that you will eat*, weaker than (13). Furthermore, the exhaustive flavor is not due to pragmatic strengthening: it survives in downward entailing contexts, in contrast to other pragmatic strengthening phenomena such as scalar implicatures which usually disappear in such contexts. This suggests a semantic way of capturing it.

Our proposal captures the exhaustive flavor. Suppose in $s*$ Lisi (the addressee) would eat exactly 1 pound of rice but he filled his plate with 1.5 pounds of rice. (13) is false in $s*$ according to our proposal: the minimal situation that supports the antecedent question contains exactly 1 pound of rice, which is unable to support the consequent answer which involves 1.5 pounds of rice. For (13) to be true in $s*$, Lisi would have to fill his plate with only 1 pound of rice[2].

Conclusion: Embedding one question within a conditional is not an entirely new idea; see for example, Lin 1996; Rawlins 2013 on *unconditionals*. But the option of embedding two questions within a conditional has not been explored. We investigate this theoretical possibility, and show that it can be employed to explain a wide range of puzzling facts concerning *wh*-conditionals.

[1]Our account is compatible with other ways of capturing the mention-some reading of questions, such as by appealing to pragmatic principles or partial answers. See Dayal to appear:§3 for relevant discussion.

[2]Our proposal uses a weak exhaustive answerhood operator to capture the so called strong exhaustiveness. This is due to our use of minimal/exemplifying situations. Within situation semantics, we can say p is a strong exhaustive answer to Q in $s*$ iff the exemplifying situation of p also exemplifies $\text{ANS}(Q)(s*)$. This is similar to the position Dayal to appear takes: p is a strong exhaustive answer to Q at w iff p is the proposition expressed by $\text{ANS}(Q)(w)$.

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