Wh-conditionals

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Co-referring *wh*-expressions

A special kind of conditional

In Mandarin, there is a special kind of conditionals that consists of two *wh*-clauses.

(1) Lǐbái qù nǎr, Dùfǔ jiù qù nǎr.
LB go where DF just go where
'For every place *x*, if LB goes to *x*, DF goes to *x*.'

Jiù is often treated as a conditional marker.

(2) Lǐbái qù, Dùfǔ jiù qù.
LB go DF just go
'If LB goes, Dufu will go, too.'

A co-referring requirement

In a *wh*-conditional, the *wh*-expressions in the antecedent clause and in the consequent clause must co-refer.

(3) Lǐbái qù nǎr$_1$, Dùfǔ jiù qù nǎr$_1$.
LB go where DF just go where
'For every place *x*, if LB goes to *x*, DF goes to *x*.'

Every *wh*-expression in the antecedent clause must correspond to a *wh*-expression in the consequent clause, and vice versa.

(4) ??Shéi dǎpò-le shěnme, wǒ jiù mǎi shěnme.
who break-PERF what I just buy what
Intended 'If someone broke something, I will buy the same thing.'

(5) ??Shéi chídào, nǎr-gè lǎoshī jiù pīping shéi.
who late which-CL teacher just criticize who
Intended 'If someone is late, a teacher will criticize him.'

Ordinary *wh*-expressions don't co-refer

(6) #Who$_1$ praised who$_1$?
↝ Who praised herself?

(7) #Who$_1$ knows who$_1$ was late today?
↝ Who knows she was late today?

(8) #Shéi$_1$ zhīdào Lǐbái dǎ-le shéi$_1$?
who know LB hit-PERF who
Intended 'Who knows LB hit him?'

Even in *wh*-conditionals, ...

Wh-expressions don't ALWAYS co-refer.

(9) Nǎ-gè háizi fàn-le cuò, nǎ-gè jiāzhǎng jiù fùzé pīpíng jiàoyù tā.
which-CL child make-PERF mistake which-PERF parent just response criticize educate him
'For every child *x*, if *x* makes a mistake, *x*'s parent must educate *x*.'

Context: A couple goes to a store which is selling matching shirts for young couples, and the man says to his wife:

(10) Nǐ mǎi nǎ-jiàn nǚshì-de, wǒ jiù mǎi nǎ-jiàn nánshì-de.
you buy which-CL women's I just buy which-CL men's
'For every women's shirt *x*,if *x* is what you want to buy, the matched men's shirt is what I will buy.'

Unique to Chinese?

Wh-conditionals are not found in English, and even not in other East Asian languages, like Japanese and Korean.

However, Udihe, a Tunguisic language spoken in the southern part of Russian Fast East, has a similar construction (Bark 2016).

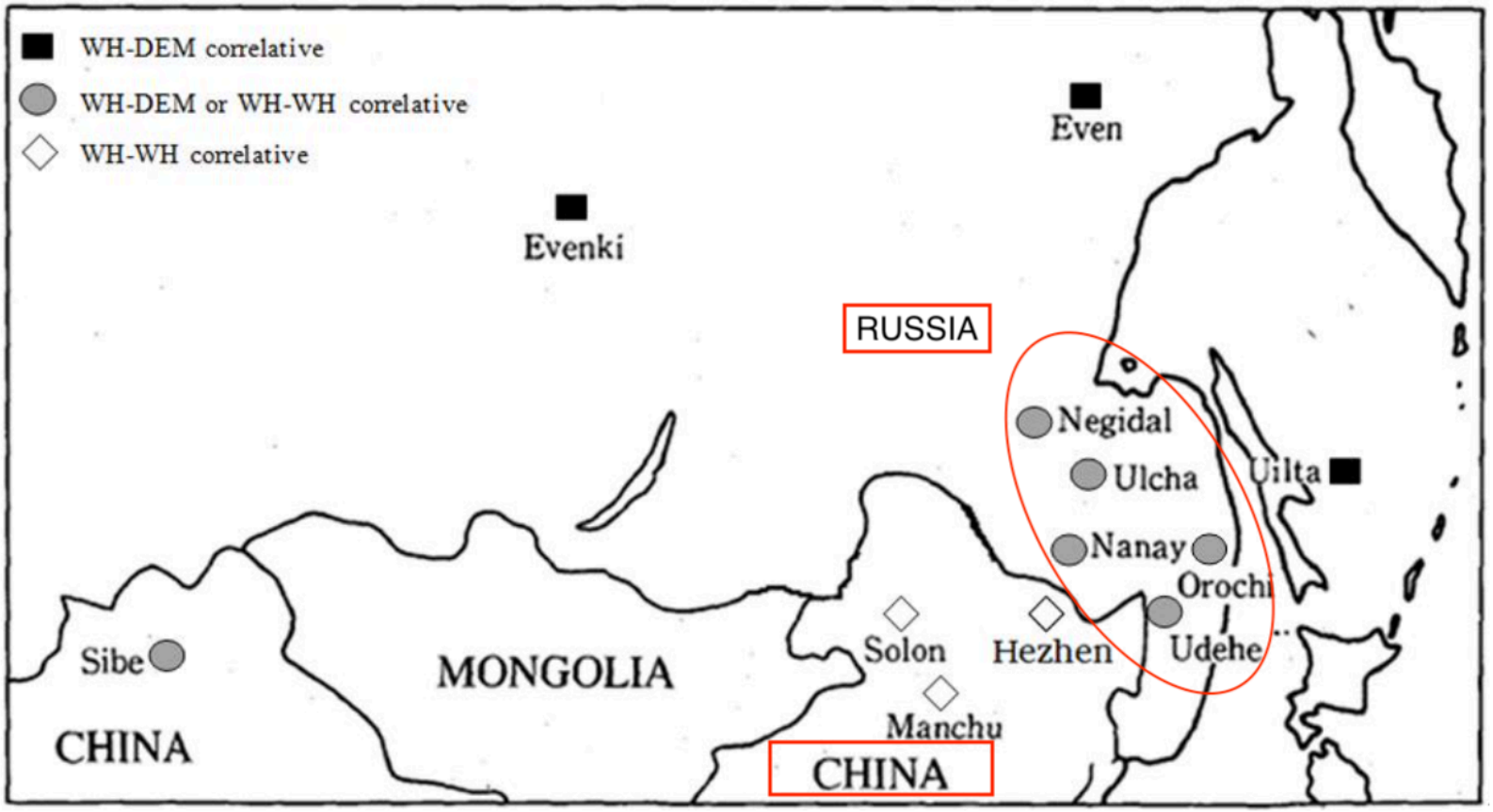
(11) ni galakta-mi, ni b'a.
who seek-SIM.CVB who find
'Whoever seeks something finds it.' (Udihe)

Comparing with Russian correlatives, ...

(12) nii caala-mi, uti baa-ŋaŋa-ni.
who want-SIM.CVB that get-FUT.PTCP-3SG
'Whoever wants obtains.' (Russian)

Geographic distribution

Map 6-1. Distribution of Tungusic in terms of correlative type



Indefinite era

Unselective binding

Main points:

- *Wh*-expressions are indefinites introducing variables.
- They are bound by the quantificational operator contributed by a conditional.

Lewis-Kratzer-Heim approach: a conditional is interpreted as quantification over possible worlds (or situations).

(13) ⟦LB goes where, DF JUST goes where⟧

$= \mathbf{NEC}_{w,\,x}\,\mathbf{go}_w(x)(\mathbf{l}) : \mathbf{go}_w(x)(\mathbf{d})$

$= \lambda w'.\forall x, w.(w \in \mathbf{ACC}_{w'} \wedge \mathbf{go}_w(x)(\mathbf{l})) \rightarrow \mathbf{go}_w(x)(\mathbf{d})$

Wh-expressions without indefinite uses

A *wh*-expression in Mandarin can be interpreted as indefinites when occurring in the antecedent clause of a conditional.

(14) Rǔgǔo Lǐbái mǎi-le shěnme, tā yídìng hùi lái gàosù wǒ.
if Libai buy-PERF what he must will come tell me
'If Libai bought something, he surely would come to tell me.'

However, not all *wh*-expressions have indefinite uses when they are embedded in the antecedent clause of a conditional.

(15) *Rǔgǔo Lǐbái wèishěnme bèi jiěgù, tā yídìng hùi lái gàosù wǒ.
if LB why PASSIVE fire he must will come tell me
'If LB was fired for some reason, he surely would come to tell me.'

(16) *Rǔgǔo Lǐbài diū-le dūoshǎo dōngxī, tā yídìng hùi lái gàosù wǒ.
if Libai lose-PERF how.many thing he must will come tell me
'If Libai lost some number of items, he surely would come to tell me.'

Wh-expressions without indefinite uses

The *wh*-expressions without indefinite uses may form *wh*-conditionals.

(17) Lǐbái wèishěnme bèi jiěgù, Dùfǔ jiù wèishěnme bèi jiěgù.
Libai why PASSIVE fire Dufu then why PASSIVE fire
'For every *x*, if *x* is the reason why L. was fired, *x* is the reason why D. was fired.'

(18) Lǐbái chī-le dūoshǎo, Dùfǔ jiù chī-le dūoshǎo.
Libai eat-PERF how.many Dufu then eat-PERF how.many
'For every *x*, if *x* is the amount of food L. ate, *x* is the amount of food D. ate.'

Association with WH

Mandarin *wh*-expressions have both interrogative and indefinite uses, but they can be focused only when used interrogatively.

(19) Zhècì shì shěi shū-le?
this.time be who lose-PERF
'Who is it that lost the bet this time?'

(20) *Rúgǔo zhècì shì shéi shū-le, tā jiù yào qǐngkè.
if this.time be who lose-PERF he then must pay

In *wh*-conditionals, *wh*-expressions can associate with focus-sensitive particles.

(21) Zhāopìn, qùnián shì shéi fùzé, jìnián jiù hái shì shéi fùzé.
recruiting last.year be who in.charge this.year just also be who in.charge
'For every *x*, if *x* is the one who was in charge of recruiting last year, *x* is also the one who is in charge of recruiting.'

Quantificational invariability

Unselective binding wrongly predicts that *wh*-conditionals exhibit quantificational variability.

(22) **Tōngcháng**, Lǐbái qǐng **shéi**, Dùfǔ jiù qǐng **shéi**.
usually Libai invite who Dufu then invite who
'In most cases s, whoever Libai invites, Dufu will invite them.'

L's invitation	D's invitation
$\langle a, s_1 \rangle$	$\langle a, s_1 \rangle$
$\langle b, s_1 \rangle$	$\langle b, s_1 \rangle$
$\langle c, s_1 \rangle$	$\langle c, s_1 \rangle$
$\langle d, s_2 \rangle$	$\langle e, s_2 \rangle$
$\langle f, s_3 \rangle$	$\langle g, s_3 \rangle$

False

L's invitation	D's invitation
$\langle a, s_1 \rangle$	$\langle a, s_1 \rangle$
$\langle b, s_1 \rangle$	$\langle b, s_1 \rangle$
$\langle c, s_1 \rangle$	$\langle c, s_1 \rangle$
$\langle d, s_2 \rangle$	$\langle d, s_2 \rangle$
$\langle f, s_3 \rangle$	$\langle g, s_3 \rangle$

True

Unselective binding

most$_{s,x}$ [Libai invites x in s] (Dufu invites x in s)
≈ Dufu will invite most people that Libai invites.

Mention-some

However, *wh*-conditionals don't always have universal quantificational force.

(23) Nár néng mǎi-dào jǐu, wǒ jìu qù nár.
where can buy-ASP wine I then go where
'Wherever can buy wine, I will go to that place.'
⇝ I will go to one place where I can buy wine.

Comparing with mention-some questions:

(24) Where can I buy coffee? — Stevenson Cafe

Interrogative era

Short answers

Main point:

- *Wh*-clauses in *wh*-conditionals share defining properties with *wh*-questions.
- *Wh*-conditionals express a dependency between short answers

$$\underbrace{\textbf{short answer}(\text{LB goes where})}_{\text{New York}} = \underbrace{\textbf{short answer}(\text{DF goes where})}_{\text{New York}}$$

The issue is how to derive short answers in a *wh*-conditional.

Categorial approach

A *wh*-question denotes a set of possible answers.

$$\begin{aligned}[\![\text{where LB goes}]\!]^{w_0} &= \lambda x \lambda w : \mathbf{place}_{w_0}(x).\mathbf{go}_w(x)(\mathbf{l}) \\ &= \{\langle x, w\rangle \mid x \in \mathbf{place}_{w_0}, \mathbf{go}_w(x)(\mathbf{l})\}\end{aligned}$$

Deriving short answers

$$\mathbf{Ans}^S_{w_0}(P) = \iota x.x \in \mathrm{Dom}(P) \wedge P(x)(w_0)$$

Wh-coordination

The categorial approach has a problem of deriving short answers for *wh*-coordinations.

(25) Which professor met which student and when did he$_1$ meet him$_2$?

$$\rightsquigarrow \sqcap \left\{ \begin{array}{l} \lambda x \lambda y.\mathbf{prof}(x) \wedge \mathbf{stdt}(y) \wedge \mathbf{met}(y)(x) \\ \lambda x.\mathbf{place}(z) \wedge \mathbf{met}(g_2)(g_1) \end{array} \right. \quad \text{(different types)}$$

$= ??$

Wh-coordination is allowed in *wh*-conditionals.

(26) Nǐ [chī **shá**], [yòng **shá**], wǒ jiu yào [chī **shá**], [yòng **shá**].
you eat what use what I then must eat what use what
'No matter what you eat and what you use, I must eat and use the same things.'

How about unselective binding: $\forall x, y.$ if you eat x and drink y, then I eat x and drink y

Over-generation

Conditionals cannot embed polar (A-not-A) questions.

(27) *Lǐbái lái-bù-lái, Dùfǔ jiu lái-bù-lái.
Libai come-not-come Dufu then come-not-come

Polar questions definitely have short answers—*yes* and *no*. Then, nothing prevents *jiu* from connecting two polar questions.

How about unselective binding: Polar questions don't contain a *wh*-phrase which can be bound.

A dynamic approach

Wh-expressions introduce discourse referents

Wh-expressions support cross-sentential anaphora.

(28) Who went to the party? I hope they didn't get covid.

(29) Which linguists did you talk to and when did you talk to them?

Donkey anaphora in *wh*-conditionals

Canonical donkey anaphora

(30) If a[1] farmer owns a[2] donkey, he$_1$ feeds it$_2$ very well.

In *wh*-conditionals, *wh*-expressions can bind pronouns cross-sententially.

(31) Nǎ-gè háizi fàn-le cuò, nǎ-gè jiāzhǎng jiù fùzé
which-CL child make-PERF mistake which-PERF parent just response
pīpíng jiàoyù tā.
criticize educate him
'For every child *x*, if *x* makes a mistake, *x*'s parent must educate *x*.'

Dynamicizing the Hamblin approach

Questions denote sets of dynamic propositions.

$$[\![\text{who danced}]\!] = \left\{ \begin{array}{l} \mathbf{E}\, x \mathbin{\underline{\wedge}} x = [\![\text{Annie}]\!] \mathbin{\underline{\wedge}} \mathbf{danced}(x) \\ \mathbf{E}\, x \mathbin{\underline{\wedge}} x = [\![\text{Becky}]\!] \mathbin{\underline{\wedge}} \mathbf{danced}(x) \\ \mathbf{E}\, x \mathbin{\underline{\wedge}} x = [\![\text{Cindy}]\!] \mathbin{\underline{\wedge}} \mathbf{danced}(x) \end{array} \right\}$$

Suppose the true answer is 'Annie danced':

The short answer 'lives inside' the propositional answer

Retrieving discourse referents

We can refer to x in the output and get its value

Existential disclosure ?

$$\mathbf{ED}(\mathbf{E}\ x \underline{\wedge} P(x)) = \lambda y.\mathbf{E}\ x \underline{\wedge} P(x) \underline{\wedge} x = y$$

Given an input i, **ED** gives us a set of entities introduced as discourse referents:

$$\{y \mid [\mathbf{ED}(\mathbf{E}\ x \underline{\wedge} P(x))](y) = \mathbf{TRUE}_i\}$$

(32) $\{y \mid [\mathbf{ED}(\mathbf{E}\ x \underline{\wedge} x = [\![\text{Annie}]\!] \underline{\wedge} \mathbf{danced}(x))](y) = \mathbf{TRUE}_i\} = \{\text{a}\}$

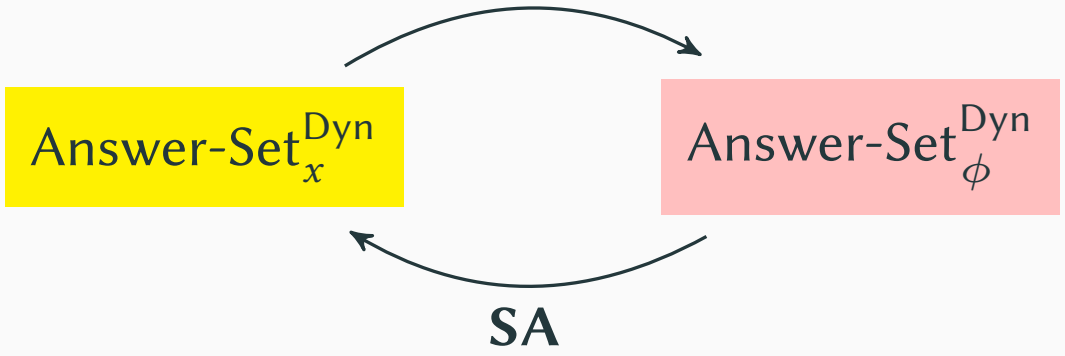
A shifter

(33) $\mathbf{SA}_i(Q) = \cup_{\phi \in Q}\{y \mid \mathbf{ED}(\phi)(y) = \mathbf{TRUE}_i\}$

$$\mathbf{SA}_i[\![\text{who danced}]\!] = \bigcup \left\{ \begin{array}{l} \{y \mid [\mathbf{ED}(\mathbf{E}\ x \underline{\wedge}\ x = \text{a} \underline{\wedge}\ \mathbf{danced}(x))](y) = \mathbf{TRUE}_i\} \\ \{y \mid [\mathbf{ED}(\mathbf{E}\ x \underline{\wedge}\ x = \text{b} \underline{\wedge}\ \mathbf{danced}(x))](y) = \mathbf{TRUE}_i\} \\ \{y \mid [\mathbf{ED}(\mathbf{E}\ x \underline{\wedge}\ x = \text{c} \underline{\wedge}\ \mathbf{danced}(x))](y) = \mathbf{TRUE}_i\} \end{array} \right\}$$

$$= \{\text{a}, \text{b}, \text{c}\} \text{ (possible short answers)}$$

$$\pi := \lambda A\{\phi \mid \exists x.\phi = A(x)\}$$

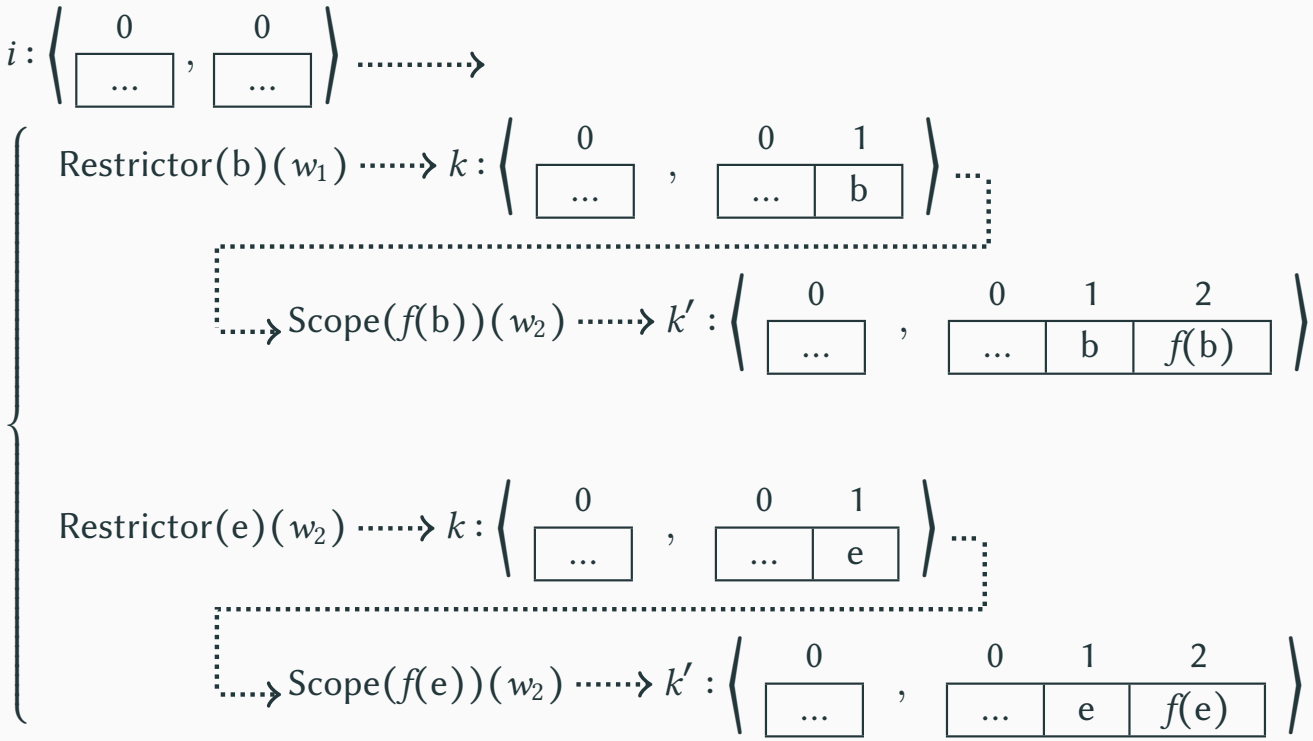


Quantifying over short answers

$[\![$LB goes where, DF JUST goes where$]\!]$ =

$$\mathbf{NEC}_{i,x}[\mathbf{SA}_i[\![\text{LB goes where}]\!](x)] : \mathbf{SA}_i[\![\text{DF goes where}]\!](x)$$

In prose, for each state i and x, if x is the short answer to *LB goes where* in i, then x is the short answer to *DF goes where* in i


i :
0
...
0
...
Restrictor(b)(w_1) ⇢ k :
0
...
0 1
... b
⇢ Scope(f(b))(w_2) ⇢ k' :
0
...
0 1 2
... b f(b)
Restrictor(e)(w_2) ⇢ k :
0
...
0 1
... e
⇢ Scope(f(e))(w_2) ⇢ k' :
0
...
0 1 2
... e f(e)

Wh-coordinations and possible short answers

Possible short answers are retrieved from possible propositional answers. We can generate possible short answers for *wh*-coordinations.