# *WH & SELF*: ON CORRELATING *WH*-CONDITIONALS AND REFLEXIVE DOUBLING

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## ABSTRACT

Chinese *wh*-conditionals hold a very special status in linguistic typology. Cheng and Huang (1996) argues that the construction can be properly analyzed by treating a pair of identical *wh*-expressions as syntactic variables unselectively bound by an implicit necessity operator. Over the years, this line of thinking has been challenged by various proposals based on the comparison with indefinites, correlatives, E-type pronouns and questions. This Insight article argues for the unselective binding approach to this particular type of donkey sentences by alluding to quantificational reflexive doubling. Our findings not only lend support to the idea that an operator-variable pair is built on a sentential scale in Chinese, but also call for a fine-grained syntax and semantics of the typological correlations between reflexives and *wh*-in-situ.

## KEYWORDS

*Wh*-conditionals   **R**eflexive doubling   **U**nselective binding   **C**hinese syntax   **S**yntax-semantics interface

## 1. INTRODUCTION

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Mandarin Chinese, a robust analytic language in Huang's (2015) sense, constructs an operator-variable pair on a sentential scale (Tsai 1994b, 1999). In this article, we explore the intuition that an operator-variable pair functions as a single syntactic object, just like an expletive-argument pair (Chomsky 1986, 1995), while tracing back to Chomsky's (1977, 1981) original insight that *wh*-question formation, relativization and topicalization share a basic design, i.e., all involving an operator-variable dependency. We single out a defining property of the robust analyticity for our investigation: That is, bare expressions such as *wh*-words and simplex *self* may participate in the quantificational dependency either as a quantifier or as a variable, more or less according to their "height of interpretation".

## 2. THE ROLE-PLAYING NATURE OF *WH* AND *SELF*

As noted in Tsai (2015), *how*-expressions merged to the left periphery tend to behave like an operator, whereas those merged within the *v*P/VP domain tend to function as variables (see also Stepanov and Tsai 2008; Tsai 2008, 2015; Lau and Tsai 2020). This intuition about their structural difference is also shared by Murphy (2017) and Kim and Park (2021), though we depart from the two analyses in maintaining that the categorial distinction (i.e., noun vs. adverb) still plays a crucial role in determining the island sensibility and intervention effects (cf. Huang 1982; Tsai 1994a, b). As a matter of fact, the structural distinction may well follow from the operator-variable design of a quantificational dependency in terms of its intrinsic c-command relationship. We adopt Reinhart's (1997, 1998) seminal work in treating a nominal *wh* as a choice function variable, which proposal has a great impact on how unselective binding works to ensure a proper interpretation for the in-situ construals of indefinites and polarity items (cf. Heim 1982; Pesetsky 1987; Cheng 1991; Aoun and Li 1993; Lin 1998; Tsai 1999). In parallel, as extensively argued in Tsai (2019), a similar dichotomy can be drawn between the operator and variable usages of *ziji* 'self', a simplex reflexive in Chinese.

Under the unselective binding approach, Cheng and Huang (1996) takes a *wh*-conditional such as (1a) to be licensed by an implicit necessity operator (the paired *wh*-expressions are highlighted in boldface), as illustrated by its semantic representation (1b) (NEC: implicit necessity

operator; *f(wh)*: choice function of *wh*-in-situ):

(1) a. **shéi** xiān lái,    **shéi** xiān chī.
    who  first  come  who  first  eat
    'If x comes first, x eats first.'
  b. NEC$_f$ [$_{\text{antecedent clause}}$ ... *f(shéi)* ... ] [$_{\text{consequent clause}}$ ... *f(shéi)* ... ]

Here *shéi* 'who', being nominal, is subject to the choice function construal (see Reinhart 1998; Tsai 1999; Chung 2005; Fujii and Takita 2007; Fujii et al. 2014 for cross-linguistic support).

Given what we have presented above, a natural question in this context is how this analysis fairs with a variety of *how*-expressions exemplified below. We may start from the following bare conditional built upon a pair of predicate nominals as in (2):

(2) nǐ    ài    **zěnme-yàng**, **zěnme-yàng**.    (Common Mandarin)
   you  love  how-manner  how-manner
  'If you love to do in x manner, then do in x manner.'

The same construal is also attested in a dialect of Mandarin spoken in the north-eastern area of China, as evidenced by (3):

(3) ài    **zǎ**,    **zǎ**-dì. (愛咋咋地, North-eastern Mandarin)
  love  how  how-manner
  'You do whatever you like.'

The predicate nominal usage of *zěnme(yàng)* 'how(manner)' can also be seen within the resultative complements, as evidenced by (4):

(4) nǐ  zuò-de  **zěnmeyàng**,  wǒ jiù  zuò-de  **zěnmeyàng**.
  you do-RES  how.manner  I    then do-RES  how.manner
  'If you do with x result, then I will do with x result.'

As illustrated below, a *wh*-conditional construal, and hence unselective binding from NEC, does discriminate between the pair of instrumental *wh's* in (5) and that of causal *wh's* in (6):

(5) nǐ    **zěnme(yàng)** qù, wǒ (jiù)    **zěnme(yàng)** qù.
   you   how(manner) go  I    then   how(manner) go
   'If you go by x means, then I will go by x means.'

(6) *nǐ   **zěnme** huì  qù, wǒ (jiù)    **zěnme** huì  qù.
    you  how    will go  I   then   how    will go
   'If you will go for x cause, then I will go for x cause.'

Crucial to our inquiry here, the parallel between *wh* and *self* in Chinese can be extended to this typologically unique construal: As noted in Tsai (2012), simplex *self* can also be paired to form a bare conditional like (7) and (8), albeit with much more restricted distribution:[1]

(7) zì    zuò, zì    shòu. (自作自受, Classical Chinese)
   self  do   self  undertake
   'If x does (something), x will undertake (the responsibility).'

(8) zìjǐ   zuò, zìjǐ   chī.   (Modern Chinese)
   self  do   self  eat
   'If x does (a meal), x will eat (it).'

The next logical step is to look into the inner working of this curious construal of Chinese reflexives, dubbed as "reflexive doubling".

## 3. THE SYNTAX AND SEMANTICS OF QUANTIFICATIONAL REFLEXIVE DOUBLING

According to Tsai (2012), there are two types of reflexive doubling, predicational and quantificational. Here we will concentrate on the latter, which builds a bare conditional upon a pair of simplex *self* in a way now familiar to us, as in (9):

(9) **zìjǐ**   fàn-le     cuò,    **zìjǐ**   fùzé.
   self   make-PRF mistake self    accountable
   'If one has made a mistake, s/he must be accountable.'

The construal is very much reminiscent of *wh*-conditionals such as

(10), where an implicit necessity operator (NEC) merges to the CP layer according to the parameter-setting of Chinese (cf. Cheng and Huang 1996; Tsai 1999), as in (11a). NEC unselectively binds the pair of *shéi* 'who' as choice function variables, with the one in the antecedent clause mapped into its restriction, and the one in the consequent clause mapped into its nuclear scope, as in (11b):

(10) **shéi**   fàn-le       cuò,      **shéi**   fùzé.
      who    make-PRF  mistake  who    accountable
      'If x has made a mistake, x must be accountable.'

(11) a. NEC$_f$[$_{\text{antecedent clause}}$ $f$(**shéi**)   fàn-le       cuò],
                              who       make-PRF  mistake
          [$_{\text{consequent clause}}$ $f$(**shéi**)   fùzé]
                              who       accountable
     b. NECx [$_{\text{restriction}}$ x has made a mistake] ($_{\text{nuclear scope}}$ x must be accountable)

One way to think of this issue is to propose that, in parallel to the *wh*-conditional in (10), the pair of *zìjǐ* 'self' in (9) undergo the same unselective binding construal, as shown in (12a). As a result, the first reflexive variable is mapped into the restriction of NEC, while the second one is mapped into its nuclear scope, as illustrated in (12b):

(12) a. NEC$_f$[$_{\text{antecedent clause}}$ $f$(**zìjǐ**)   fàn-le       cuò],
                              self      make-PRF  mistake
          [$_{\text{consequent clause}}$ $f$(**zìjǐ**)   fùzé]
                              self      accountable
     b. NECx [$_{\text{restriction}}$ x has made a mistake] ($_{\text{nuclear scope}}$ x must be accountable)

This parallel between *wh* and *self* thus points to the conclusion that *zìjǐ* 'self' can also function as a quantificational variable through reflexive doubling, where the first *self* must not c-command the second *self*.

## 4. INTERACTION BETWEEN CONDITIONAL AND INTERROGATIVE CONSTRUALS

In light of our variable analysis of simplex *self* in Chinese, we are

able to account for a peculiar contrast of quantificational reflexive doubling: Namely, an adverb of quantification such as *zǒngshì* 'always' is blocked in a bare conditional such as (13):[2]

(13)  $NEC_f$ [*f*(**zìjǐ**) è-le,        *f*(**zìjǐ**) (\*zǒngshì) mǎi dōngxī lái   chī].
              self hungry-INC self    always    buy thing   come eat
          'If x becomes hungry, x will buy something to eat.'

The reason is quite straightforward under our approach: According to Cheng and Huang (1996), the *wh*-conditional of (10) can be built either on individual variables (or choice function variables in Reinhart's (1998) sense), as in (14a), or on both individual and situation variables, as in (14b):

(14)  a. $NEC_x$  [x has made a mistake]    (x must be accountable)
      b. $NEC_{x, s}$  [x has made a mistake in s]  (x must be accountable in s)

In both cases, there is no room for a lexical operator such as *zǒngshì* 'always' to maneuver. It is thus ruled out in (13). This pairing account of operators and variables is further supported by the fact that *zǒngshì* 'always' is again blocked in *wh*-conditionals, as evidenced by (15):

(15)  $NEC_f$ [*f*(**shéi**) è-le,        *f*(**shéi**) (\*zǒngshì) mǎi dōngxī lái   chī].
              who hungry-Inc who      always buy thing    come eat
          'If x becomes hungry, x will buy something to eat.'

One of the predictions of our unselective binding analysis is that an interrogative operator may "hijack" the pair of *wh*-variables to induce a hybrid construal. This is indeed borne out: As shown in (16a), a lexical Q-operator such as *ne* may cut in to form a *wh*-question, as long as the NEC operator stands to maintain the conditional construal by binding the pair of situation variables, as illustrated in (16b) (see Tsai 1994b, 1999; Yang and Tsai 2022):[3]

(16)  a.  (banshang,)  **shéi**   è-le,              **shéi**  huì   mǎi
          class.in        who    hungry-INC    who    will   buy

| dōngxī | lái | chī | ne? |
|---|---|---|---|
| thing | come | eat | $Q_{wh}$ |

'In this class, who is the person x such that if x becomes hungry, x will then buy something to eat?'

b.  $Q_x$ (NEC$_s$ [x becomes hungry in s] (x will buy something to eat in s))

## 5. CORRELATING QUANTIFICATIONAL REFLEXIVE DOUBLING AND *WH*-CONDITIONALS

The correlation between reflexive doubling and *wh*-conditionals thus adds yet another piece of evidence to the unselective binding approach to Mandarin *wh*-conditionals. First note that genuine *wh*-conditionals do not allow an E-type pronoun construal involving either a lexical pronoun *tā* or a pro in the consequent clause, as in (17) (cf. Cheng and Huang 1996, 2020; Lin 1999; Pan and Jiang 2015; Huang 2018).[4] Quantificational *zìjǐ* 'self' behaves in exactly the same manner, as evidenced by (18) (cf. Tsai 2012):[5]

(17) ***shéi** fàn-le    cuò,    **tā/pro** fùzé.
     who   make-PRF mistake s/he    accountable
     'If one has made a mistake, s/he must be accountable.'

(18) ***zìjǐ** fàn-le    cuò,    **tā/pro** fùzé.
     self  make-PRF mistake s/he    accountable
     'If one has made a mistake, s/he must be accountable.'

More importantly, while not-so-bare conditionals headed by *rúguǒ* 'if' and *dōu* 'all' do license an E-type pronoun in the consequent clause, as in (19a–b), it is impossible for them to host quantificational *zìjǐ* 'self', as in (20a–b). Quantificational reflexive doubling thus provides a solid case of NEC binding which can be reduced neither to an indefinite pronoun construal (contra. Chierchia 2000), nor to an E-type pronoun construal (contra. Pan and Jiang 2015).

(19)  a.  **rúguǒ  shéi**    fàn-le     cuò,
          If     who       make-PRF   mistake

|  | **tā/pro** | jiù | děi | fùzé. |
|---|---|---|---|---|
|  | s/he | then | must | accountable |

'If one has made a mistake, s/he must be accountable.'

b. | **shéi** | fàn-le | cuò, | **tā/pro** |
|---|---|---|---|---|
|  | who | make-PRF | mistake | s/he |
|  | **dōu** | děi | fùzé. |
|  | all | must | accountable |

'No matter who has made a mistake, s/he must be accountable.'

(20)  a.* | **rúguǒ** | **zìjǐ** | fàn-le | cuò, |
|---|---|---|---|---|
|  | If | self | make-PRF | mistake |
|  | **tā/pro** | jiù | děi | fùzé. |
|  | s/he | then | must | accountable |

'If one has made a mistake, s/he must be accountable.'

b.* | **zìjǐ** | fàn-le | cuò, | **tā/pro** |
|---|---|---|---|---|
|  | self | make-PRF | mistake | s/he |
|  | **dōu** | děi | fùzé. |
|  | all | must | accountable |

'No matter who has made a mistake, s/he must be accountable.'

Furthermore, quantificational reflexive doubling cannot be accounted for through the correlative/free relative analysis (cf. Luo and Crain 2011), not only because *wh*-expressions are not employed in Chinese relative constructions, but also because a simplex *self* does not play a part in relativization in general. In other words, genuine *wh*-conditionals and quantificational reflexive doubling can never be interpreted as "the person who has made a mistake is the person who must be accountable." This approach has been rejected by a number of analyses of *wh*-conditionals in the literature (cf. Cheng and Huang 1996, 2020; Huang 2018; Li 2021; Zhang 2022, among others).

Finally, the *wh-self* correlation also argues against a recent proposal by Liu (2016) and Xiang (2020): *Wh*-conditionals are licensed through a semantic association between two embedded questions. This is made possible through answerhood operator binding in the sense of Dayal (1996).

The idea can be roughly represented as "the answer to the question who has made a mistake contains enough information to answer the question who must be accountable".

For one thing, it is unclear how a solution along this line may be extended to quantificational reflexive doubling, as the interrogative pragmatics simply plays no part in the interpretation of pairing reflexive variables in Chinese. For another, under the answerhood operator approach, it remains unexplained why typical *wh*-adverbs such as outer *how* do not license *wh*-conditionals. As exemplified in (21a–b), it is impossible to pair outer *zěnme* 'how'.

(21)  a.*  nǐ      **zěnme**   huì   qù,   wǒ   (jiù)
           you     how        will  go    I    then
           **zěnme**   huì    qù.   [*pairing causal *how*]
           how        will    go

      b.*  **zěnme**  nǐ    huì   qù,   **zěnme**   wǒ
           how        you   will  go    how         I
           (jiù)      huì   qù.   [*pairing disapproval *how*]
           then       will  go

Cheng and Huang (1996) also points out that A-not-A and reason *why*-questions are not cut for *wh*-conditional either, as illustrated by (22a–b) respectively:[6]

(22)  a.*  nǐ    **qù-bu-qù**,          wǒ   (jiù)
           you   go-not-go              I    then
           **qù-bu-qù**.          [*pairing A-no-A]
           go-not-go

      b.*  nǐ    **wèishénme**   qù,   wǒ   (jiù)
           you   why            go    I    then
           **wèishénme**   qù.   [*pairing outer *why*]
           why            go

The solution under the unselective binding approach is straightforward: Both outer *wh*-adverbs and A-not-A morphemes function as operators rather than choice function variables, hence not subject to

NEC binding (cf. Reinhart 1997, 1998; Tsai 1999).[7] We would miss the generalization that interrogative, indefinite, polarity and conditional construals of Chinese *wh's*-in-situ are essentially multiple facets of the same diamond, so to speak, if we subject ourselves to the tunnel vision of technicalities.

## 6. CONCLUDING REMARKS

In sum, reflexive doubling patterns with Chinese *wh's*-in-situ in allowing bare conditionals, but differs from them with regard to λ-operator and Q-operator binding, as summarized in Table 1 (cf. Tsai 2012).

**Table 1** Quantificational construals of reflexive doubling and *wh*-in-situ

|  | λ-operator binding | donkey-conditional | Q-operator binding |
|---|---|---|---|
| reflexive doubling | yes | yes | no |
| *wh*-in-situ | no | yes | yes |

Our findings not only lend support to the idea that Chinese constructs an operator-variable pair on a sentential scale, but also call for a fine-grained syntax and semantics of the typological correlation between reflexives and *wh*'s-in-situ. In addition, we add yet another piece of evidence to the robust analyticity of Chinese (cf. Huang 2015): Simplex *self* is shown to allow a plethora of quantificational and predicational construals according to its syntactic distribution: It may serve either as a bound variable in reflexive doubling, or as an operator in adverbial, intensifier, and logophoric construals. Along this line, Chomsky's (1995) idea that Merge preempts Move may not follow from any UG principles. Rather, it is the end result of a Chinese-type setup where an operator-variable dependency is built on a sentential scale. As a result, simplex expressions enjoy the freedom of being either an "operator-in-situ" or a "variable-in-situ" according to their height of interpretation. Hence the role-playing nature of *wh* and *self* in Chinese.

By correlating the pairing of *wh's* to that of *self's* in typological terms, this study lends substantial support to the unselective binding approach in that simplex reflexives are in no way subject to correlative,

interrogative and E-type pronominal construals. The correlation thus casts doubt on the recent endeavors to reduce *wh*-conditionals to equative constructions in terms of (free) relative or answerhood operator binding.

NOTES

1. As an anonymous reviewer points out, there are quite a few pairing constructions in Mandarin that do not involve *wh* and *self*. For example, (i) contains a pair of bare nouns, while (ii) contains a pair of indefinite NPs with the numeral *yī* 'one':

(i) rén     jiàn, rén     ài.   (人見人愛)
    person see   person love

(ii) jiàn yī-ge,   ài     yī-ge. (見一個，愛一個)
     see  one-Cl love   one-Cl

Mandarin bare nouns are known for their variable-like behavior, which can be interpreted either as definite or as non-specific indefinite. Moreover, a numeral indefinite marked by *yī* 'one' can be either specific (similar to *a certain person* in English) or non-specific, depending on the contexts and their syntactic distributions (subject vs. object). Therefore, I agree with the reviewer that these examples may well fall under the domain of NEC operator binding, though the exact licensing mechanism is still not well understood (especially with respect to strong/weak existential quantification). Also, in some cases the pair of numeral indefinites need not be identical (though semantically equivalent):

(iii) lái      liǎng-ge,  shā yī-shuāng.(來兩個，殺一雙)
      come    two-Cl,    kill one-pair

Since all these interesting issues are beyond the scope of this Insight article, I will leave them to future research.

2. An anonymous reviewer mentioned an interesting example similar to (15), but with a modal instead of *zǒngshì* 'always' in the consequent clause:

(i) shéi    fàn-le      cuò,
    who    make-PRF mistake
    shéi jiù  kěnéng/yīnggāi bèi  kāichú.
    who  then might/should   Pass fire
    'If one makes a mistake, it is possible that one gets fired.'

We propose that *kěnéng* 'might' and *yīnggāi* 'should', being a modality operator, only scope over the consequent clause. As a result, the conditional construal of (i) is still licensed by the NEC operator.

3. As noted by an anonymous reviewer, for speakers who have issues with the interrogative reading of (16a), it could be due to dialectal differences. Equally, the success of pairing *wh's* can also depend on prosodic and contextual factors, as argued by Yang and Tsai (2022).

4. Genuine *wh*-conditionals do not require the presence of *jiù* 'then' in the consequent clause, as observed by Cheng and Huang (1996, 127), though admittedly it may appear as an epiphenomenal marker in most of the cases. In the case of (i), *jiù* 'then' is obligatory for the E-type pronoun construal of *tā* 'he' in the consequent clause. Accordingly, *shéi* 'who' in the antecedent clause is existentially closed rather than bound by the NEC operator.

(i) shéi     shuō-cuò-le     huà,
    who     say-wrong-asp   words
    tā     jiù     yào chéngdān   zérèn.
    s/he then    will bear       consequence
    'If one says wrong things, s/he will bear the consequences.'

5. See Cheng and Huang (1996, 2020) and Pan and Jiang (2015) for a debate on how to draw a line between E-type and genuine unselective binding construals of *wh*-conditionals. In other words, there is still a grey area between the two types of donkey sentences, which may well result from the (sometimes obligatory) epiphenomenal usage of *jiù* 'then' due to the lack of proper prosodic/contextual support (see Yang and Tsai 2022).

6. As reported by Cheng and Huang (1996: 147), *wèishénme* 'why' is not allowed in bare conditionals, though some speakers do mark (22b) as marginal or even acceptable. The reason may lie in the inner-outer distinction between *wèishénme* 'why' and *wèi(-le) shénme* 'for what' (cf. Tsai 1994a,b). For the former, the *wh*-conditional construal is unavailable. This is because an *wh*-adverb functions as an operator, hence not subject to the choice function application in Reinhart's (1997) sense:

(i) *nǐ    **wèishénme** huì   qù,
    you   why         will go
    wǒ (jiù)   **wèishénme** huì   qù.    [*pairing outer *why*]
    I     then   why        will go

'If you will resign for x reason, then I will resign for x reason.'
By contrast, it is much easier to pair two PPs such as *wèi(-le) shénme*, where it is *shénme* 'what' that is subject to a choice function construal, as shown below:

(ii) nǐ    huì    **wèi(-le)**    **shénme**   cízhí,
      you   will   for(-LE)   what      resign
      wǒ (jiù) huì   **wèi(-le)**    **shénme**   cízhí.    [pairing inner *why*]
       I   then   will   for(-LE)     what      resign
      'If you will resign for x purpose, then I will resign for x purpose.'

It may well be the case that a genuine *wh*-adverb such as *wèishénme* cannot provide an N-set, hence not subject to the NEC operator binding in question (cf. Reinhart 1998, 44–45; Tsai 1999, 67).

7. See also Li (2021) for a comprehensive review of relevant issues, as well as an alternative unselective binding analysis based on the notion of discourse referents introduced by *wh's* (dubbed as *wh*-drefs).

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疑问词和反身词：
谈疑问词条件句与反身重复的类型关联

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摘要

汉语的疑问词条件句在语言类型学中有其特殊的地位：Cheng & Huang (1996) 认为，将一对相同的疑问词分析为句法变量，并藉由隐性必要算子进行无择约束，即可正确分析这类结构。基于无定名词组、对接关系句、E 型代词和疑问结构的比较，多年来此一思路受到了来自各方的挑战。本文鉴于量化性反身重复的平行用法，指出无择约束仍是这类特殊驴子句的最佳分析。此一发现不仅支持汉语以语句规模来建构「算子—变项」配对的观点，更敦促学界对反身词和在位疑问词的类型关联进行更为细致的句法和语义研究。

关键词
疑问词条件句　反身重复　无择约束　汉语句法　句法—语义界面