Logophoricity and Mandarin Exempt Reflexives

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Abstract

Anaphors in many languages do not obey the 'canonical' Binding Condition A (Chomsky 1986), such as Icelandic 'sig' and Mandarin 'ziji'. Two main competing approaches have been proposed to capture binding beyond the local domain: (i) The LONG-DISTANCE BINDING (LDB) theory derives non-local binding via covert cyclic movement and turns non-local binding into local binding which always obeys Condition A. (Pica 1987, Huang & Tang 1991) (ii) The LOGOPHORICITY (LOG) theory explains exempt anaphors by logophoric rather than pure structural constraints (Sells 1987, Huang & Liu 2001, Charnavel 2019). The two theories make distinct predictions on the referential dependencies between reflexives and their antecedents. The LDB theory predicts that antecedents should always c-command the reflexives, while the LOG theory predicts that reflexives need not be c-commanded by their antecedents if they are logophoric. This paper aims to experimentally test the two competing theories by investigating the binding conditions of Chinese reflexive 'ziji' and 'taziji' using acceptability judgment tasks. The results about 'ziji' support the LOG theory against the LDB theory. Furthermore, our results reveal that 'taziji', though usually considered as a local anaphor (e.g., Cole, Hermon & Huang 2006), can in fact similarly be exempt from binding under logophoric conditions.

Logophoricity and Mandarin Exempt Reflexives

Yingtong Liu*

1 Introduction

Reflexives across languages, though sharing similarities, demonstrate diverse properties in terms of their binding conditions, which challenges the canonical Binding Condition A (BCA; see Chomsky 1986). Reflexives from several languages, such as Mandarin *ziji*, Icelandic *sig*, and Japanese *zibun,* have been shown to be exempt from BCA: they are known as exempt anaphors (see Pollard & Sag 1992, Charnavel & Sportiche 2016, i.a.). Two main competing approaches have been proposed to capture their behavior. One approach - the logophoricity (LOG) theory - explains exempt anaphors by perspective-related discourse constraints rather than pure structural constraints (Sells 1987, Huang & Liu 2001, Charnavel 2019, i.a.). The other account - the long-distance binding (LDB) theory - is purely structural and derives non-local binding via cyclic movement that turns non-local binding into local binding which always obeys BCA (Pica 1987, Cole et al. 1990, Huang & Tang 1991, i.a.). The two accounts make distinct predictions on the syntactic distribution of reflexives and the referential dependencies between reflexives and their antecedents. In particular, the LDB theory predicts that antecedents should always **c-command** the reflexives, while the LOG theory predicts that reflexives need not be c-commanded by their antecedents if they are **logophoric**.

This paper aims to test the two competing theories by investigating the binding conditions of Chinese reflexive *ziji* and *taziji* using acceptability judgment tasks. On the theoretical side, the results shed light on the debate between LOG and LDB theories. This paper also has implications on the typology of (non-)local reflexives and the binding conditions of *taziji* discussed in the literature. On the empirical side, this paper contributes to evaluating diagnostics used in the syntactic literature for logophoric and non-logophoric conditions in Mandarin Chinese.

The structure of this paper is as follows. Section 2 reviews previous LOG and LDB theories of Chinese *ziji* and the binding conditions of *taziji*. Section 3 presents the tests I applied in the experiments to disentangle the two competing theories, and the distinct predictions of the two theories. Experiment 1 applies these diagnostics on *ziji*, and the results support the LOG theory against the LDB theory. Experiment 2 tests the binding conditions of *taziji*, and the results reveal that *taziji*, though usually considered as a local anaphor (e.g., Tang 1989, Cole, Hermon & Huang 2006), can in fact be long-distance bound just like *ziji*. Experiment 3 further tests whether non-local *taziji* could be better explained by LOG or LDB theories. The results show that contrary to the predictions made by LDB theories, *taziji* can be exempt from binding under logophoric conditions. The three experiments taken together thus reveal that bi-morphemic *ziji* and tri-morphemic *taziji* are not subject to locality requirements, which challenges the traditional claim that long-distance reflexives are usually monomorphemic (Giorgi 1984, Pica 1987).

2 Previous Binding theories of *ziji* and *taziji*

2.1 LDB and LOG Theories of *ziji*.

In this section, I will first review the LDB theories of *ziji*, and then move to the LOG theories.

Unlike English *himself*, Chinese reflexive *ziji* can be exempt from BCA. In (1), *ziji* can refer to either local *Lisi* or long-distance *Zhangsan*. To capture the fact that *ziji* can be anteceded by non-local *Zhangsan*, three types of pure structural LDB accounts[1] have been proposed: cyclical re-indexing (e.g, Tang 1989), head movement (e.g., Cole, Hermon & Sung 1990), and IP adjunction (e.g.,

Huang & Tang 1991).

(1) Zhangsan_k shuo Lisi_j piping-le   ziji_{k/j}.
     Zhangsan   say   Lisi criticize- PFV   REFL
     'Zhangsan_k said that Lisi_j criticized himself_j/him_k.'

Despite some differences in their technical details, the three kinds of theories are similar in spirit: they turn long-distance binding into local binding via syntactic operations. I will discuss the head movement account as an example. The head movement accounts (e.g., Cole, Hermon, & Sung 1990) typically assume that *ziji* is a monomorphemic head that moves to I^0 of the most local IP and optionally moves I^0-to-I^0 to a higher IP. In (1), *ziji* can thus move to the matrix INFL position, where it is locally bound by the matrix subject and thereby obeys BCA.

One of the pioneering works on logophoricity is Sells (1987), which claims that non-local reflexives are logophorically interpreted. Sells (1987) also argues that there is no unified notion of logophoricity, but three possible primitive roles for the antecedent of a logophor: Source, Self, and Pivot. Source is usually the speaker, Self is the person whose attitude or consciousness are reported, and Pivot represents the person whose spatio-temporal point of view is expressed.

There are potential problems of the LDB theories, while the LOG theories seem to be more on the right track. First, one purported advantage of LDB accounts is that they can derive the correlation between the binding conditions of reflexives and their morphology: the head movement accounts require LD reflexives to be monomorphemic given that only monomorphemic elements can undergo head movement. Assuming that *ziji* is morphologically 'simplex', this correctly predicts that it can be LD bound. But this argument is undermined by the fact that like English *himself*, exempt *ziji* is in fact bi-morphemic (Bergeton 2004, Liu 2016, Reuland 2018). The first morpheme *zi-* can form words with other morphemes, such as *zi-kua* ('self-brag').[2] Second, some data of *ziji* can hardly be captured by a pure structural account such as LDB, which motivated researchers to adopt logophoricity to explain these phenomena. As Yu (1992, 1996) pointed out, *ziji* can be sentence-free and refers to the speaker, the Source of the statement, as in (2). Besides Yu (1992, 1996), another influential work arguing *ziji* is a logophor (in some syntactic positions) is Huang & Liu (2001), which I will address in Section 3.

(2) Chule   ziji,   zhiyou   san-ge   ren   zancheng.
     Besides REFL,   only   three-CLF people approve
     'Besides myself, only three people agree.'

2.2 Binding Conditions of *taziji* and a Logophoric Explanation

There are two distinct claims about the binding conditions of another Chinese reflexive *taziji* in the literature: (i) *taziji* is a local anaphor, strictly obeying BCA; (ii) *taziji* can be logophoric and be exempt from BCA.

It is widely accepted that unlike *ziji*, *taziji* must be locally bound (e.g., Tang 1989, Cole, Hermon & Huang 2006). This claim is mainly based on contrasts such as that between (3) and (1): while *ziji* in (1) can refer to either local *Lisi* or LD *Zhangsan*, *taziji* in (3) can only refer to the local antecedent *Lisi*[3].

(3) Zhangsan_i renwei Lisi_j piping-le   taziji_{*i/j}
     Zhangsan   think Lisi. criticize- PFV   REFL
     'Zhangsan_i thought that Lisi_j criticized himself_{*i/j}.'

Distancing himself from this standard claim, Yu (1992) firstly points out that the reflexive *taziji*

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[1]Pure structural accounts here refer to accounts that do not consider discourse factors such as logophoricity.
[2]Note that similarly, Japanese *zi-bun* is also exempt and morphologically complex (Kishida & Sato 2012).
[3]According to the literature stating that *taziji* obeys BCA, the only scenario under which *taziji* can be exempt from BCA is sub-command, which, they assume, is not related to logophoricity. For details, please see Tang (1989).

can be LD bound across an animate local subject and therefore be exempt[4]. For instance, in (4), *taziji* cannot be bound by the local subject *Mali* due to mismatch in gender, but it can refer to the matrix subject *Yuehan*.

(4) Yuehan$_i$ jiao Mali$_j$ chuipeng taziji$_{i/*j}$ (Male).
  John ask Mary flatter REFL
  'John$_i$ asked Mary$_j$ to flatter him$_{i/*j}$'

This idea is developed in Yu (1996), which further states that *taziji* shares other properties with *ziji*, such as the possibility of lacking an antecedent in its sentence, as exemplified in (5).

(5) Ni wen taziji
  You ask REFL
  'You ask himself.'

Though Yu (1996) treats exempt *taziji* as logophoric, he does not provide any minimal pair based on logophoricity, thus leaving unclear what kind of logophoric constraints exempt *taziji* should obey.

3 Tests That Can Tease Apart LOG and LDB Theories

In this section, I introduce three tests that can tease apart the two competing theories (LOG vs. LDB) and their distinct predictions.

Test 1 - Preposition Phrase contrast: One way to disentangle the two competing theories is to test if *ziji/taziji* can take a non c-commanding antecedent while manipulating the logophoric status of the antecedent, as in (6) (cf. Charnavel 2019). In (6a), 'according to *Lisi*' introduces *Lisi*'s attitude, while 'speaking of *Lisi*' in (6b) usually expresses the speaker's rather than *Lisi*'s perspective (cf. Kuno 1987, Sells 1987). The LOG theory thus predicts (6a) to be **more** acceptable than (6b). The LDB theory predicts both (6a) and (6b) to be **ungrammatical**, because the antecedents do not c-command *ziji*.

(6) a. Ju Lisi$_k$ shuo, zhejianshi shanghai-le ziji$_k$/taziji$_k$
  According to Lisi say, this event hurt-PFV REFL
  '**According to** Lisi$_k$, this event hurt himself$_k$.'
  b. Shuodao Lisi$_k$, zhejianshi shanghai-le ziji$_k$/taziji$_k$
  Speaking of Lisi, this event hurt- PFV REFL
  '**Speaking of** Lisi$_k$, this event hurt himself$_k$.'

Another way is to test whether *ziji* can always take a c-commanding antecedent both in logophoric and non-logophoric conditions, as in Tests 2 and 3.

Test 2 - Adjunct Clause contrast: 'Because'-clauses in (7ab) can express the perspective of the matrix subject *Lisi*, while 'when'-clauses in (7c) must be from the perspective of the speaker (Huang & Liu 2001). The LOG theory thus predicts (7ab) to be **more** acceptable than (7c). However, the LDB theory predicts **no acceptability difference** between (7ab) and (7c):[5] in (7a-c), *Lisi* c-commands the reflexive and should therefore be a legitimate antecedent according to the LDB theory.

(7) a. Lisi$_k$ likai-le gongsi, yinwei nvjingli piping-le ziji$_k$/taziji$_k$
  Lisi leave-PFV company, because female manager criticize-PFV REFL
  'Lisi$_k$ left the company, **because** the female manager criticized herself$_k$.'

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[4]Yu (1996) follows Reinhart and Reuland (1993) in defining the local domain as the co-argumenthood domain.

[5]'When'-clauses in Mandarin can only precede the main clause, while 'because'-clauses could precede (7b) or follow (7a) the main clause, and the latter is more commonly used than the former (at least in Northern dialects). To avoid potential effects due to linear order or frequency, I included both cases in the experiment.

b. Yinwei   nvjingli   piping-le   ziji$_k$/taziji$_k$, suoyi Lisi$_k$ likai-le   gongsi.
   because female manager criticize-PFV   REFL,   so Lisi leave-PFV company
   'Because the female manager criticized himself$_k$, Lisi$_k$ left the company.'

c. Dang   nvjingli   piping-le   ziji$_k$/taziji$_k$ de shihou, Lisi$_k$ likai-le gongsi.
   When female manager criticize-PFV   REFL   DE time, Lisi leave-PFV company
   'When the female manager criticized herself$_k$, Lisi$_k$ left the company.'

Test 3 - Relative Clause contrast: *Lisi* is the logophoric center in (8a), but not of (8b), because logophoricity implies consciousness and *Lisi* cannot be aware of the killing event described in the relative clause where *ziji* occurs in (8b) (Huang & Liu 2001). The LOG theory thus predicts that (8a) should be **more** acceptable than (b). But given that *Lisi* c-commands *ziji/taziji* in (8ab), the LDB theory predicts **no significant difference** between (8a) and (b).

(8) a. Lisi$_k$ hen   xiang   mai yi-zhi neng baohu ziji$_k$/taziji$_k$ de shouqiang.
       Lisi really want   buy a-CLF   can   protect   REFL   DE   gun
       'Lisi$_k$ really wants to buy a gun that **can protect** himself$_k$.'

    b. Lisi$_k$ buxiaoxin   diudiao-le houlai shasi-le ziji$_k$/taziji$_k$ de shouqiang.
       Lisi accidentally drop-PFV   later   kill-PFV   REFL   DE   gun
       'Lisi$_k$ accidentally dropped a gun that **later killed** himself$_k$.'

4   Experiment 1

Experiment 1 aims to tease apart the LOG and LDB theories by testing *ziji* using acceptability judgement tasks. The LDB theory predicts that all possible antecedents of *ziji* should **c-command** it; in other words, a non-c-commanding antecedent should not be acceptable for *ziji*. The LOG theory, however, predicts that *ziji* can refer to a non-c-commanding antecedent as long as it is **logophoric**.

4.1 Participants

80 Mandarin speakers participated in this experiment via a crowdsourcing platform, Witmart, in exchange for $2.

4.2 Materials and Design

The acceptability task included the three diagnostics that can disentangle LOG and LDB theories discussed in Section 3: the Preposition Phrase (PP) contrast, the Adjunct Clause (AC) contrast, and the Relative Clause (RC) contrast.

17 pairs of sentences were constructed for the PP contrast, and 7 pairs of clauses were made for the AC and the RC contrast, respectively. To avoid any potential misunderstanding, I indicated the intended reference of *ziji* in brackets for all sentences as shown in (9). To check if participants have paid attention to the task, 10 attention check sentences were also included - 5 uncontroversially acceptable and 5 uncontroversially unacceptable ones. Only one member of each pair of contrasts in test stimuli was presented to each person, so each participant saw 41 sentences in a random order. Participants were asked to rate each sentence on a binary scale ('acceptable' or 'unacceptable') based on how natural they thought the sentence was.

(9) Ju   Lisi shuo, zhejianshi shanghai-le ziji.   [ziji=Lisi]
    According to Lisi say, this event   hurt- PFV   REFL
    'According to Lisi, this event hurt himself.'

4.3 Results

Acceptability judgments were analyzed with mixed-effects logistic regressions using the *lme4* package in *R*.

For the PP contrast, a model was fit with *logophoric condition* as the predictor, and random by-*subject* and by-*item* intercepts as well as by-*logophoric condition* slopes. The results were in line

with the LOG theory, contrary to the LDB theory: *ziji* with 'according to' was significantly more acceptable than with 'speaking of' (β=-5.4315, z=-5.765, p<0.001), as plotted in the first column of Fig.1.

For the AC contrast, two mixed-effects logistic regressions were fit to compare acceptability of the two 'because'-clauses and the 'when'-clause. Both models were fit with the same structure as the model analyzing the PP contrast. Model 1 compared ratings of *ziji* in 'because'-clause preceding main clause and in 'when'-clause. Model 2 compared the acceptability of *ziji* in 'because'-clauses following the main clause and in 'when'-clauses. Both models show that *ziji* in 'because'-clauses are significantly more acceptable than in 'when'- clauses (βs < -5.42, zs < -3.1, ps < 0.01), which supports the LOG theory against the LDB theory, as shown in the second column of Fig.1.

For the RC contrast, the same model as the PP contrast model was applied. No significant difference was found between conscious and unconscious relative clause conditions (p=0.38) (pace Huang & Liu 2001), as shown by the third column of Fig.1. A possible explanation might be that the contrast in logophoricity between (8a) and (8b) is not salient enough; if confirmed in future research, this result would question the use of this contrast as a diagnostic for logophoric reflexives in Chinese.
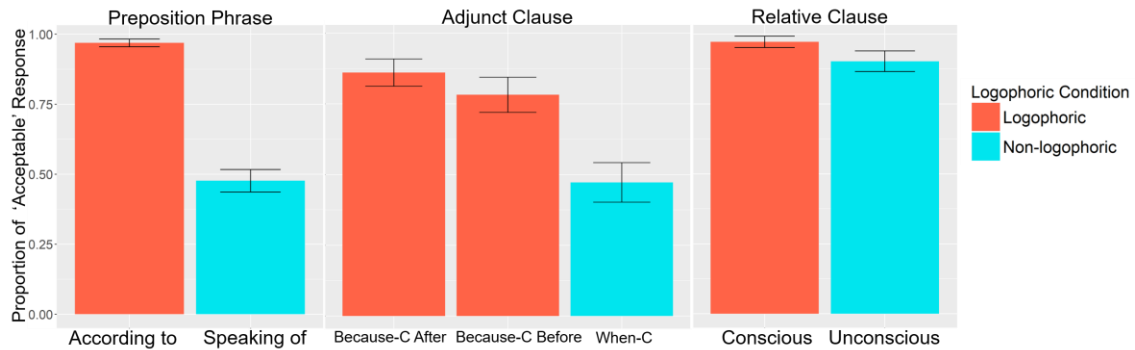

Figure 1: Proportion of 'acceptable' responses by contrast (preposition phrase, relative clause, and adjunct clause) and by logophoric condition (logophoric vs. non-logophoric). The error bars show 95% confidence interval.

4.4 Discussion

Two out of three tests of Experiment 1 support the hypothesis that non-local *ziji* is a logophor, not a LD anaphor, given that it can be bound by a logophoric but non-c-commanding antecedent.

The results of Experiment 1 confirm that the Preposition Phrase and Adjunct Clause contrasts are reliable tests for logophoricity in Chinese, as stated in the literature. However, whether the Relative Clause contrast is a proper logophoricity test remains unclear.

Tables 1 and 2 offer a summary of the contributions of Experiment 1 to current syntactic theories and an evaluation of diagnostics in theoretical studies of *ziji*, respectively.

Theoretical issues	Previous studies	Present study
Explanation of Non-local binding	Debate between LDB theory and LOG theory	LOG theory, not LDB theory
Morphology	Mono-morphemic, simplex	Bi-morphemic, complex

Table 1: Theoretical implications on reflexive *ziji* and its binding condition.

Diagnostics	Works or not
'Speaking of' vs. 'According to'	Works as in the literature
'When'-clause vs. 'Because'-clause	Works as in the literature
Consciousness vs Unconsciousness in Relative Clauses	Unclear

Table 2: Empirical implications on diagnostics of logophoricity in Mandarin Chinese

Besides the pure structural LDB accounts, note that several mixed approaches have also been proposed, stating that *ziji* is syntactically bound in the local domain and a logophor in the non-local domain, such as Xue et al (1994) and Huang & Liu (2001), but there are also studies showing that local reflexives might be logophoric (Sloggett & Dillon, 2018 on English *himself*). This paper mainly tests non-local *ziji*; I leave the question whether *ziji* is purely syntactic or logophoric in the local domain for future research.

5 Experiment 2

There is a non-trivial debate whether *taziji* can be exempt, as mentioned in Section 2.2. Experiment 2 aims to test the empirical claim that *taziji* can be non-locally bound in order to better understand the binding conditions on *taziji*.

To this end, we included two types of verbs in the embedded clauses: 'mutual-direction' verbs and 'other-direction' verbs. The former type of verbs represents actions that one can do to oneself or others, such as *zeguai* ('blame'); the latter type of verbs denote actions that one can only do to others like *genzong* ('follow'). A norming study was performed to diagnose the two groups of verbs.

5.1 Participants

42 Mandarin speakers participated in the norming study and another 60 participants performed the acceptability task for *taziji* via Witmart, in exchange for $2.

5.2 Norming Study

The goal of the norming study was to distinguish between mutual and other-direction verbs. Given that *ziji* can refer to either the local or the LD subject, we used *ziji* as a probe. For test items like (10), participants were asked to choose their preferred antecedent between the two options. Matrix and embedded subjects were systematically common Chinese proper names of the same gender (stereotypically) and the matrix verb was 'say' in all sentences. 100 embedded verbs were tested.

(10) **Sentence**: Zhangsan shuo Lisi   xihuan ziji.
       'Zhangsan says Lisi likes *ziji*.'

   Question: Who does *ziji* refer to in this sentence?
              A. Zhangsan
              B. Lisi

Our threshold for 'other-direction' and 'mutual-direction' verbs was 75% or more responses choosing the LD subjects, and 25-75% responses choosing the LD subjects, respectively. Among the 100 embedded verbs that were tested, 48 verbs were selected, including 24 'other-' and 24 'mutual-' direction verbs.

5.3 Materials and Design

For each of the 48 verbs, a set of sentences were constructed for the following three conditions: local match, LD match and no match/ungrammatical control. The distinction across the conditions relied on the fact that there is gender marking on the 1st morpheme *ta-* in the writing system (他自己 for *himself* and 她自己 for *herself*). In the local match case, the gender feature of *taziji* is in line

with that of the local antecedent (11a). In the LD case, the gender of *taziji* matches that of the LD antecedent (11b), while the no-match case includes local and LD antecedents whose gender features do not correspond to the gender of *taziji* (11c). A set of sample stimuli for 'mutual-direction' and 'other-direction' verbs is illustrated in (11) and (12) respectively.

(11) 'Mutual-direction'
    a. Local match   Zhangxiansheng$_i$ shuo Lixiaojie$_k$ piping-le taziji$_{*i/k}$ (Female).
                                  'Mr.Zhang$_i$ said Ms.Li$_k$ criticized herself$_{*i/k}$.'
    b. Long-distance match   Zhangtaitai$_i$ shuo Lixiansheng$_k$ piping-le taziji$_{i/*k}$ (Female).
                                  'Ms.Zhang$_i$ said Mr.Li$_k$ criticized herself$_{i/*k}$.'
    c. No match   Zhangxiansheng$_i$ shuo Lishushu$_k$ piping-le taziji$_{*i/*k}$ (Female).
                                  'Mr.Zhang$_i$ said Uncle Li$_k$ criticized herself$_{*i/*k}$.'

(12) 'Other-direction'
    a. Local match   Zhangxiansheng$_i$ shuo Lixiaojie$_k$ genzong-le taziji$_{*i/k}$ (Female).
                                  'Mr.Zhang$_i$ said Ms.Li$_k$ followed herself$_{*i/k}$.'
    b. Long-distance match   Zhangtaitai$_i$ shuo Lixiansheng$_k$ genzong-le taziji$_{i/*k}$ (Female).
                                  'Ms.Zhang$_i$ said Mr.Li$_k$ followed herself$_{i/*k}$.'
    b. No match   Zhangxiansheng$_i$ shuo Lishushu$_k$ genzong-le taziji$_{*i/*k}$ (Female).
                                  'Mr.Zhang$_i$ said Uncle Li$_k$ followed herself$_{*i/*k}$.'

Besides the 48 sets of test items, 10 attention checks were included, involving 5 uncontroversially acceptable and 5 uncontroversially unacceptable ones. Only one member of each set of test stimuli was presented to each person, so that each participant saw 58 sentences in a random order. Participants were asked to rate sentences on a 1 (very unacceptable) - 7 (very acceptable) Likert scale.

5.4 Results

Three mixed-effects linear regression models were fit for the two groups of verbs separately, each with *match condition* as the predictor, and random by-*subject* and by-*item* intercepts as well as by-*match condition* slopes.

The results indicate that non-local binding of *taziji* is legitimate in Mandarin Chinese. In the mutual-direction case, the ratings of LD match were significantly higher than no match/ungrammatical control (β=-2.42, z=-8, p<0.001), though lower than the local match (β=-0.65, z=-2.47, p<0.05). In the other-direction case, the LD match condition was significantly more acceptable than both the local match and no match conditions (βs >2.53, zs > 9, ps <0.001), as shown in Fig.2.
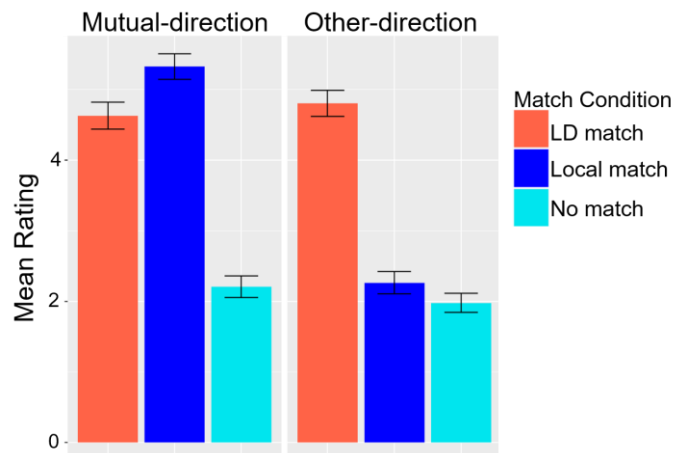

Figure 2: The mean ratings of *taziji* by verb direction ('mutual' vs. 'other') and match condition (local vs. LD vs. no match). The error bars show 95% confidence interval.

5.5 Discussion

Overall, the results suggest that *taziji* can in fact be exempt, and its binding possibilities are sensitive to the pragmatics of the sentence (especially, the meaning of the embedded verb). The fact that tri-morphemic *taziji* can be exempt from BCA further demonstrates that morphologically complex re-flexives can be non-local, confirming that there is no clear correlation between reflexive morphol-ogy and binding conditions.

6 Experiment 3

Experiment 2 showed that *taziji* can be exempt. The goal of Experiment 3 is to test if exempt *taziji* is sensitive to logophoricity in order to determine whether it is a logophor or a LD anaphor. If non-local *ziji* and *taziji* are similarly affected by logophoricity, a unified theory should be possi-ble for both Chinese reflexives.

6.1 Participants

80 Mandarin speakers participated this experiment via Witmart in exchange for $2.

6.2 Materials and design

The design and materials are identical to Experiment1, except that *ziji* was replaced with *taziji*.

6.3 Results

Acceptability responses were analyzed in the same way as in Experiment 1.

For the PP contrast, the proportion of 'acceptable' responses for *taziji* with 'according to' [0.92] was numerically higher than with 'speaking of' [0.79], though the difference was not significant ($p=0.13$), as shown in the first column of Fig.3. The results suggest that (i) *taziji* is not a LD anaphor which must be c-commanded by its antecedent, given that over 79% participants judged as accepta-ble *taziji* referring to the non-c-commanding complement of 'according to'/ 'speaking of'; (ii) the numerical difference here indicates that *taziji* might be influenced by logophoricity, but to a lesser extent than *ziji*.

For the AC contrast, *taziji* in 'because'- clauses preceding or following the main clauses was significantly more acceptable than in 'when' – clause (βs < -1. 08, zs < -2.1, ps<0.03), as plotted in the second column of Fig.3. The results thus suggest that *taziji* is at least sensitive to some logo-phoric contrasts, which further confirms that it is not a pure LD anaphor.

As for the RC contrast, just as in the case of *ziji*, no significant difference was found between conscious and unconscious relative clause conditions containing *taziji* (p=0.8), further suggesting that the RC test is not a reliable diagnostic for logophoricity contrasts in Chinese.
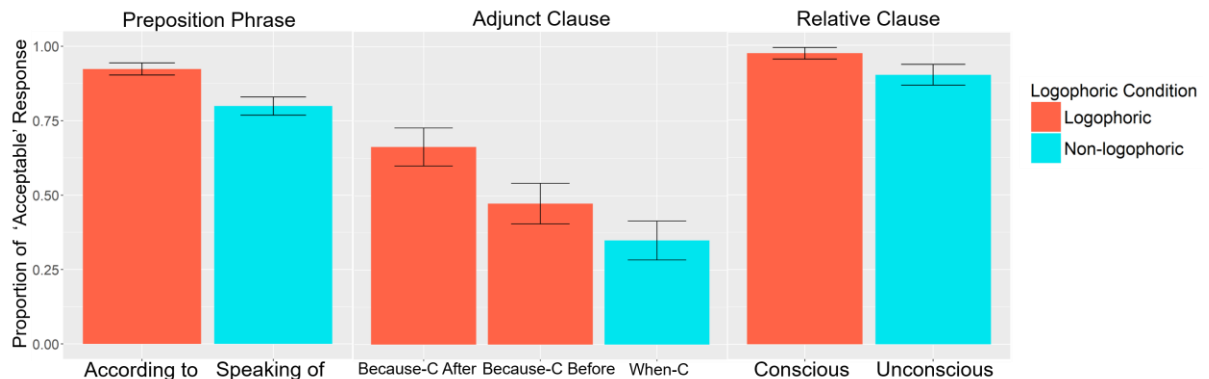

Figure 3: Proportion of 'acceptable' responses by contrast (preposition phrase, relative clause, and adjunct clause) and by logophoric condition (logophoric vs. non-logophoric). The error bars show 95% confidence interval.

6.4 Discussion

The results of Experiment 3 confirm that *taziji* can be exempt in various syntactic positions, in contradiction to some previous proposals. Although the LOG theory cannot capture all the obtained variance in acceptability, it is more promising than the LDB theory for *taziji*. First, the LDB theory cannot explain why *taziji* can refer to non-c-commanding antecedents in the PP contrast. Second, the LDB theory cannot capture the acceptability variability of *taziji* in different adjunct clauses ('because' vs 'when'), given that these structures are syntactically identical.

Previous studies have argued that the referential properties of *taziji* and *ziji* derive from distinct mechanisms, namely, BCA and LDB/logophoricity theories. The results of exepriments 1-3 reveal that *taziji* and *ziji* are in fact much more similar than usually claimed: both of them are (i) non-locally bindable, (ii) morphologically complex, and (iii) sensitive to logophoricity.

Theoretical issues	Previous studies	Present study
Binding Condition	Debate between local anaphor vs. exempt anaphor	Not local, can be exempt
Explanation of Non-local Binding	Logophoricity	Sensitive to logophoricity
Comparison with *ziji*	Binding condition of *ziji* and *taziji* are very different and should be derived by fundamentally different mechanisms.	*Ziji* and *taziji* are very similar, and their binding mechanisms might be the same in nature.

Table 3: Theoretical implications of Experiment 2&3 to reflexive *taziji* and its binding conditions.

7 Discussion

This paper focused on disentangling the two major competing theories on exempt anaphors, LDB theory and LOG theory, by testing the binding conditions of the two Chinese reflexives *ziji* and *taziji*. The results of Experiments 1-3 show that the distribution of *ziji* is better captured by the LOG theory than by the LDB theory. Furthermore, *taziji* is in fact more similar to *ziji* than usually claimed: this suggests that a unified theory taking into account discourse factors such as logophoricity might explain the behavior of both reflexives.

In order to develop a unified theory for Chinese *ziji* and *taziji*, there remain many open questions that require future research. One puzzle is whether local *ziji/taziji* are logophoric or not. Charnavel and Huang (2018) demonstrate that local *ziji* can be inanimate, thus not logophoric, but whether local animate *ziji* is logophoric or not remains unclear (see Charnavel 2019 for tests that could be used). Another related question is if multiple *ziji* within the same clause can take different antecedents. Judgements about this issue in the literature are not uniform (Huang & Liu 2001, Shuai, Gong & Wu, 2013), so that large-scale experimental studies (ideally, studies concerning judgement differences due to dialectal and other factors) would be useful to investigate this topic.

On the empirical side, Experiments 1&3 suggest that a logophoricity-based contrast is relatively salient in the PP and AC tests, but not in the RC test. This suggests that relative clauses contrasting in consciousness interpretation may not be a reliable test for logophoricity/perspective contrasts in Chinese.

This paper also suggests that contrary to the traditional claim (Giorgi 1984, Pica 1987), there is no correlation between the morphology of reflexives and their binding conditions. Morphologically complex reflexives can in fact be local (e.g, English *himself*, Dutch *zichzelf*) or exempt (e.g., Chinese *ziji, taziji*, Japanese *zibun*, Dong *agen*). Likewise, morphologically simplex reflexives can be local (German *sich*) or exempt (Icelandic *sig*).

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