The processing of Chinese reflexives as plain anaphors and intensifiers

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Introduction It is generally agreed that in contexts where the local and non-local antecedents are similar in discourse prominence, the two Chinese reflexives, *ziji* ('self') and *ta-ziji* ('s/he-self'), tend to be construed as 'plain anaphors,' adhering to the locality constraint (or Principle A, Chomsky'81) (e.g., Dillon et al.'14,'16; Qian & Wu'16; Wang'17; Chang et al.'20; Lyu & Kaiser'23).

However, there are two questions open for further research. **First**, while previous research suggests that anaphors of differnt forms may exhibit differing sensitivities to syntactic and non-syntactic (e.g., semantic, discourse) information (e.g., Kaiser et al.'09), insufficient attention has been paid to the distinct processing patterns of *ziji* and *ta-ziji* from a comparative perspective (but see Dillon et al.'16; Wang'17). **Second**, it remains unclear whether the intensified use of Chinese reflexives results in different processing and interpretation patterns compared to their anaphoric use.

To address these two questions, this study employs self-paced reading (SPR) and compares the processing of *ziji* and *ta-ziji* as plain anaphors and as intensifiers. To preview our findings, we discovered that when used as plain anaphors, *ta-ziji* shows locality bias effects at an earlier stage compared to *ziji*. However, when used as intensifiers (in the *it*-cleft construction in Chinese), both reflexives show (delayed) anti-locality bias effects. These results offer novel insights into online anaphora resolution theories.

Methods In **Exp.1** on plain anaphors ($N_{participants}$ = 49), we manipulated the factors Reflexive (*ziji*/*ta-ziji*) and Distance (local/non-local) in a 2x2 factorial design. We used animacy to establish local vs. non-local antecedent-reflexive dependencies, shown in example (1). **Exp.2** (N = 50) on intensifiers also controls these two factors, except that subordinate clauses are always in a *it*-cleft construction (*shi*…), shown in example (2). Note that, for both experiments, the reflexive is in subject position of the subordinate clause, a position that is relatively less tested but is argued to be in the same binding domain as its closest antecedent in the matrix clause (Huang & Liu'01). In both experiments, native Chinese participants read 24 target sentences and 36 fillers at their own pace (**SPR**) and indicated their acceptability judgment (**AJ**) of the sentences on a 1-7 Likert scale.

Results Mixed-effect linear regressions were run over logged RTs and acceptability ratings. In **Exp.1** on plain anaphors (see **Fig.1-2**), we found clear locality bias effects in offline acceptability judgments due to a main effect of Distance (p < .01). In the self-paced reading task, we found a main effect of Distance at the critical (reflexive) region (p <.05), in addition to a main effect of Reflexive (p < .005, as *ta-ziji* is syllabically longer; we omit this detail below). However, pairwise comparisons indicate that the locality bias is only significant for the processing of *ta-ziji* (p < 0.001) but not for *ziji* (p > .1). Crucially, we discovered a Reflexive x Distance interaction (p < .05) at the second spillover region (e.g., 'research'), because the locality bias effect only exists for *ta-ziji* (p < .05). Only at the final region does *ziji* show a delayed, strong locality bias effect (p < .001).

In **Exp.2** on intensifiers (see **Fig.3-4**), no effect has been detected in the offline judgment task. In the self-paced reading task, from the reflexive to the pre-final region, we only found a main effect of Reflexive at the reflexive region (p < .001) due to longer reading times of *ta-ziji* compared to *ziji*. Interestingly, at the final region, we discovered a reversed main effect of Distance (p < .05) as local binding leads to slower reading times compared to non-local binding.

Conclusions The present study has produced three key findings. **First**, we replicated in Exp.1 the locality bias of *ziji* and *ta-ziji* in contexts where neither antecedent is more discourse-prominent (e.g., Dillon et al.'14,'16). **Second**, unlike some previous studies, we found that *ta-ziji* exhibits a stronger locality bias than *ziji*, which fits with a form-specific approach to anaphora resolution (e.g., Kaiser et al.'09). **Third**, the intensified uses of *ziji* and *ta-ziji*, as examined in Exp.2, drastically altered the processing and interpretations of these reflexives, which suggests that discourse-level information can have an early impact on the processing of reflexives (at least for *ta-ziji*).

(1) An example set (24 in total) of target sentences in **Exp.1** on plain anaphors (sentences are translated into English; word order kept intact). Square backets indicate local binding domains.

a. **Local binding** (dependency length created using animacy (mis)match; BA is a light verb that introduces an SOV word order; subscripts indicate presentation regions in SPR)
Company$_1$ *stated*$_2$ *[****Xiaoli***$_3$ *thought*$_4$ *{****ziji/ta-ziji****}*$_5$ *BA*$_6$ *research*$_7$ *plan*$_8$ *screwed up.*$_9$*]*

b. **Non-local binding**
Xiaoli$_1$ *stated*$_2$ *[****company***$_3$ *thought*$_4$ *{****ziji/ta-ziji****}*$_5$ *BA* $_6$ *research*$_7$ *plan*$_8$ *screwed up.*$_9$*]*

(2) An example set (24 in total) of target sentences in **Exp.2** on intensifiers (**SHI** introduces an *it*-cleft ***focus*** construction in Chinese, thus forcing an intensifier reading)

a. **Local binding**
Company$_1$ *stated*$_2$ *[****Xiaoli***$_3$ *thought*$_4$ *SHI*$_5$ *{****ziji/ta-ziji****}*$_6$ *BA* $_7$ *research*$_8$ *plan*$_9$ *screwed up.*$_{10}$*]*

b. **Non-local binding**
Xiaoli$_1$ *stated*$_2$ *[****company***$_3$ *thought*$_4$ *SHI*$_5$ *{****ziji/ta-ziji****}*$_6$ *BA* $_7$ *research*$_8$ *plan*$_9$ *screwed up.*$_{10}$*]*

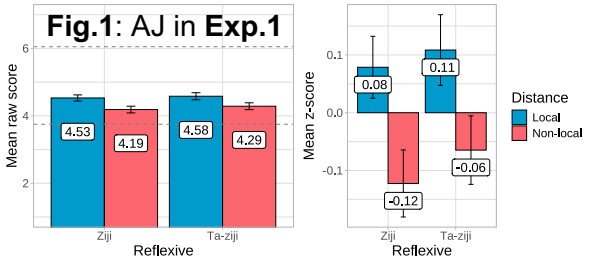

Fig.1: AJ in **Exp.1**

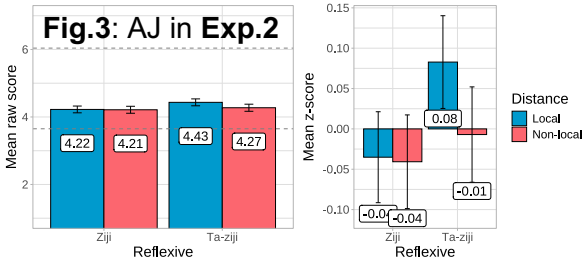

Fig.3: AJ in **Exp.2**

Fig.1 (left) and **Fig.3** (right): Acceptability judgment results from **Exp.1** and **Exp.2**, respectively. The left panel in each figure uses a raw rating scale; the right panel uses a z-score scale. Dashed lines at upper and lower parts of the graphs indicate 'acceptable' and 'unacceptable' fillers.

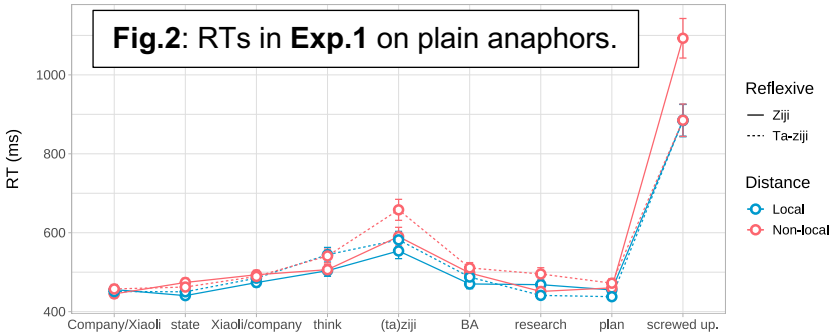

Fig.2: RTs in **Exp.1** on plain anaphors.

Fig.4: RTs in **Exp.2** on intensifiers.

Selected references

Dillon et al.'14. The structure-sensitivity of memory access: Evidence from Mandarin Chinese.

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