Is there a difference between 'you' and 'I'? A psycholinguistic investigation of the Chinese reflexive *ziji*

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We report two experiments examining Binding-Theoretic (BT) effects during on-line processing. Prior work on English produced mixed results. [2] examined sentences like Ex.1 and argued that inaccessible/non-BT-licensed referents (John) are temporarily activated during reference resolution and compete with accessible/BT-licensed referents. However, [7] argue inaccessible/non-BT-licensed referents do not compete (see also [10]).

To further our understanding of constraints influencing referents' ability to compete, we examined a situation where referents' accessibility depends on intervening referents' features, namely, the *Blocking Effect* in Chinese: **(i)** If the local subject is **3rd person**, the reflexive *ziji* 'self' can refer to a long-distance (LD) *or* a local antecedent (ex.2b,d). **(ii)** If the local subject is a **1st/2nd person** pronoun, LD binding is blocked (2c) ([5],[8]).

Although these facts are standardly reported in the literature, native speaker judgments suggest that Blocking effects may be less absolute than is often assumed. Thus, in addition to ***(i)*** *probing the effects that person-feature Blocking has on the availability of potential antecedents during real-time processing, we also* ***(ii)*** *test whether naïve Chinese speakers exhibit Blocking effects with 1p/2p interveners.* We use offline question-answer data and on-line reading times to test whether an intervening 1p/2p pronoun blocks LD referents from competing with local antecedents.

To gain insights into the reasons underlying Blocking, ***(iii)*** *we also tested whether 1p and 2p differ.* Existing research disagrees regarding the underlying reasons for Blocking (e.g., perspective-taking, animacy, feature checking, [5],[9],[4]). We explore a novel prediction related to perspective-taking: Existing (non-BT) work by [3] found that in 3-sentence discourses, 2p pronouns were actually more effective at triggering perspective-taking than 1p. *If Chinese Blocking effects are attributable to perspective taking, we may find stronger Blocking with 2p than 1p.*

Exp1: Matrix and embedded subjects (1p pronoun/3p name) were manipulated in a self-paced reading study with 4 conditions: **(a) 1p-1p:** both matrix and embedded subjects are 1p (ex.1a); **(b) 1p-3p**: Matrix subject is 1p; embedded subject is 3p (ex.1b); **(c) 3p-1p**: matrix is 3p; embedded is 1p (ex.1c); **(d) 3p-3p:** both are 3p (ex.1d). Participants (n=20) read sentences word-by-word; reading times (RT) were recorded. Forced-choice questions testing interpretation of *ziji* followed targets (n=32). **Exp2** was the same, but *2p pronouns* were used instead of 1p. 28 new participants took part in Exp2.

Predictions – Antecedent choices: If Blocking determines final interpretation, the LD antecedent should be available in 1p-3p/2p-3p and 3p-3p but crucially not in 3p-1p/3p-2p, due to intervening 1p/2p.

Predictions – RTs: According to prior work, RT slowdowns indicate *competition*. 1p-3p, 2p-3p and 3p-3p should exhibit slowdown from matrix-vs.-embedded-subject competition because both LD and local referents are accessible. 1p-1p/2p-2p should show no competition/slowdown because only one referent is present. *If inaccessible referents are filtered out* ([7]), 3p-1p/3p-2p should show no competition/slowdown. *If inaccessible referents compete* ([2]) and the matrix subject is prominent enough, 3p-1p/3p-2p should exhibit competition/slowdown. Results were analyzed with linear mixed-effects regression ([1],[6]).

Results Exp1: Antecedent choices reveal a *bias for local subjects* (3p-3p: 85.7% local subject, 1p-3p: 95.9%, 3p-1p: 73.1%). Strikingly, this preference is weakest in 3p-1p (26.9% *matrix subject* choices), the condition where Blocking predicts the matrix subject to be unavailable. RTs: At *ziji* and onwards, RTs in 1p-3p, 3p-3p and 3p-1p were significantly longer than in 1p-1p, suggesting that even in 3p-1p, the matrix subject was not blocked from competing. (3p were overall slower than 1p; this is expected (cf.[11]) and not crucial here.) However, could 3p-1p slowdowns be driven by the subset of trials where participants (unexpectedly) chose the matrix subject (violated Blocking)? What about trials where participants chose the local subject (Blocking is effective) – do we still see competition from the matrix subject? When we look only at trials with *local-antecedent-interpretations*, slowdowns in 3p-1p are no longer significant. In sum, (i) 1p does not consistently block access to the matrix subject, (ii) but when it does (Blocking is effective), Blocking is strong enough to reduce competition from the matrix subject.

Results Exp2: Antecedent choices reveal a *strong bias for local subjects* (3p-3p: 87% local subject, 2p-3p: 100%, 3p-2p: 93.8%). 3p-2p shows a stronger local preference than 3p-1p in Exp1 ($p<.005$): An intervening 2p produces a more consistent blocking effect than 1p. RTs: 3p-2p was not significantly slower than 2p-2p (marginally slower, $p=.069$), suggesting 3p is not accessible enough to cause a significant slowdown. As a whole, it appears that an intervening 2p may be a stronger block (reduce competition more) than an intervening 1p.

In sum, our results suggest that person-feature blocking can reduce competition during on-line processing, but that 2p pronouns block more effectively than 1p pronouns, as illustrated by antecedent choices and reading times. On the basis of [3]'s findings, this difference may be caused by perspective taking: We suggest

that identifying with the addressee (2p pronoun) leads comprehenders to more consistently interpret the reflexive as referring to the addressee (local 2p subject), resulting in a consistent blocking effect.

Examples:

(Ex.1) 'John thought that Bill owed himself another chance to solve the problem.'

(Ex.2) {Wo/Zhansan} gaosu bieren {wo/Lisi} juede ZIJI nenggou jin hao daxue.
{I/Zhangsan} told others {I/Lisi} feel SELF could get-into a good university.

(Ex.2a).1p-1p	**Wo**$_1$ *I*$_1$	gasubieren *tell others*	**wo**$_1$ *I*$_1$	juede *feel*	**ziji**$_1$.. ***SELF***$_1$…
(Ex.2b).1p-3p	**Wo**$_1$ *I*$_1$		**Lisi**$_2$ ***Lisi***$_2$		**ziji**$_{1/2}$… ***SELF***$_{1/2}$…
(Ex.2c).3p-1p	~~Zhangsan~~$_1$ ~~*Zhangsan*~~$_1$		**wo**$_2$ *I*$_2$		**ziji**$_{*1/2}$… ***SELF***$_{*1/2}$…
(Ex.2d).3p-3p	**Zhangsan**$_1$ ***Zhangsan***$_1$		**Lisi**$_2$ ***Lisi***$_2$		**ziji**$_{1/2}$… ***SELF***$_{1/2}$…

(Ex.2e).[wrap-up]…nenggou jin hao daxue. *…can get into a good university.*

(Ex.3.) Sample forced choice question:
Zhansan gaosu bieren Lisi juede ZIJI nenggou jin hao daxue.
'*Zhangsan told others Lisi feel SELF could get-into a good university.*'

Question: Shui neng jin hao daxue?
Who can get-in a good university?
(A).Zhangsan or (B). Lisi

References:

[1] Baayen, R.H., Davidson, D.J. and Bates, D.M. (2008). Mixed-effects modeling with crossed random effects for subjects and items. *Journal of Memory and Language,* 59, 390 – 412.

[2] Badecker, W. & K. Straub. (2002). The processing role of structural constraints on the interpretation of pronouns and anaphors. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 28, 748—769.

[3] Brunyé, T.T., T. Ditman, C.R. Mahoney, J.S. Augustyn, & H.A. Taylor. (2009). When you and I share perspectives: pronouns modulate perspective taking during narrative. *Psychological Science, 20,* 27 – 32.

[4] Cole, P. & C. Wang. (1996). Antecedents and blockers of long-distance reflexives: the case of Chinese *ziji*. *Linguistic Inquiry*, *27*(3), 357 – 390.

[5] Huang, C.-T. J. & C.-S. L. Liu. (2001). Logophoricity, attitudes and ziji at the interface. In *Syntax and Semantics 33: Long Distance Reflexives*. Eds. Peter Cole, et al., 141-195. New York: Academic Press.

[6] Jaeger. T.F. (2008). Categorical data analysis: away from ANOVAs (transformation or not) and towards Logit Mixed Models. *Journal of Memory and Language*, *59*, 434–446.

[7] Nicol, J. & D. Swinney. (1989). The role of structure in coreference assignment during sentence comprehension. *Journal of Psycholinguistic Research*, 18, 5—19.

[8] Pan, H. (2000). Why the blocking effect? In *Syntax and Semantics 33*: *Long Distance Reflexives.* Eds. Peter Cole, et al., 279 – 316. New York: Academic Press.

[9] Pollard, C. & P. Xue. (1998). Chinese reflexive *ziji*: syntactic reflexives vs. nonsyntactic reflexives. *Journal of East Asian Linguistics, 7,* 287 – 318.

[10] Sturt, P. (2003). The time-course of the application of binding constraints in reference resolution. *.Journal of Memory and Language*, 48, 542— 562 .

[11] Warren, T. & E. Gibson. (2005). Effects of NP type in reading cleft sentences in English. *Language and Cognitive Processes,* 20(6), 751 -767.