

Coreference vs. Variable Binding in L2 English Pronoun Resolution: Evidence from Eye-Tracking and Offline Antecedent Choice

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The reference of a 3rd-person pronoun, as in Table 1(a), can be linked to either a referent in the discourse via coreference assignment ('James'), or to a c-commanding quantified phrase (QP, 'every soldier') via variable binding (VB) in logical syntax. According to Reuland's Economy Principle [1,2], VB is preferred over coreference, as the latter involves additional discourse-level operations. While there is evidence supporting this hypothesis [3], Cunnings et al. [4] found that L1 English speakers preferred the closest antecedent, showing a recency bias. Furthermore, it remains understudied how L2 speakers process referential ambiguity, particularly those whose L1s instantiate VB differently. For example, in Chinese, VB is more readily licensed with reflexives than with pronouns [5].

Adopting the same design as [4] (see Tables 1-2), we examined how L1-Chinese, L2-English advanced learners (IELTS: $M = 7.44$, $SD = 0.38$; TOEFL: $M = 104.53$, $SD = 6.67$) resolve referential ambiguity in eye-tracking while reading (**Exp1**, $N=60$) and offline antecedent choice rating (**Exp2**, $N=48$) experiments. If the Economy Principle extends to L2, a VB preference is predicted. Alternatively, (i) a strong recency bias may ensue given the limited cognitive resources in L2 processing, or (ii) discourse coreference may be preferred if non-syntactic cues dominate antecedent retrieval [6]. (Generalized) Linear mixed models were fitted.

Exp1: We found a main effect of proper name at the pronoun in second-pass reading ($\beta = 0.11$, $SE = 0.05$, $t = 2.40$), at Pro+1 region in total reading time ($\beta = 0.11$, $SE = 0.03$, $t = 3.42$), and at the pre-final region in first-pass regression out ($\beta = 0.60$, $SE = 0.23$, $z = 2.65$). This effect manifested as significantly longer reading times when the name mismatched the pronoun in gender relative to when it matched. There was also an interaction between name and QP match at the pronoun in second-pass reading ($\beta = 0.23$, $SE = 0.09$, $t = 2.51$), mainly driven by a QP mismatch effect when the name mismatched ($\beta = -0.15$, $SE = 0.07$, $t = -2.05$). These patterns contrast with L1 data [4] where consistent QP mismatch effects were found.

Exp2: The same participants showed native-like recency bias in offline antecedent-choice ratings ($\beta=1.52$, $SE=0.26$, $z=5.75$), indicating that the name mismatch effects in Exp1 are not due to a lack of knowledge of VB or stereotypical gender of job titles in L2 English.

Taken together, our findings show that L2 learners of English prefer linking the pronoun to a proper name that matches in conceptual number and definiteness with the pronoun, and consider the quantified antecedent only when the name mismatched the pronoun in gender. These results suggest that non-syntactic cues such as conceptual number and/or gender may carry greater weight than syntactic cues in L2 referential processing, potentially reflecting L1 transfer of a different bound variable hierarchy [5].

Table 1: Sample stimuli for Exp1, illustrating the 2×2 manipulation of gender congruence between the quantified phrase (QP) and pronoun and between the proper name and pronoun
Context: The troops marched through the town.

Condition	Sentence
(a) QP match, name match	It seemed to James that every soldier was completely convinced that he should wave as the parade passed.
(b) QP match, name mismatch	It seemed to Helen that every soldier was completely convinced that he should wave as the parade passed.
(c) QP mismatch, name match	It seemed to Helen that every soldier was completely convinced that she should wave as the parade passed.
(d) QP mismatch, name mismatch	It seemed to James that every soldier was completely convinced that she should wave as the parade passed.

Figures 1-3: Summary of eye-tracking measures for each condition in Exp1

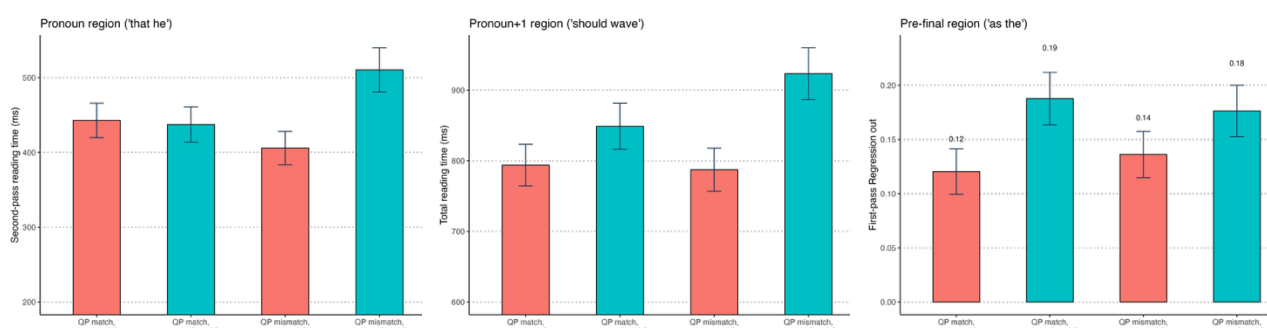
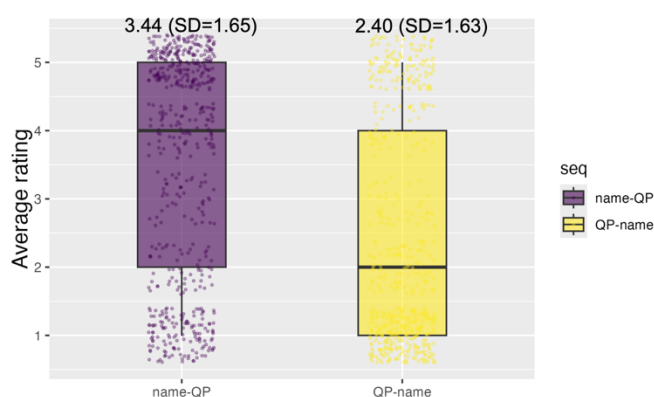


Table 2: Sample stimuli in each condition in Exp2

Condition	Sentence
(a) Name-QP sequence	The troops marched through the town. It seemed to James that every soldier was completely convinced that he should wave as the parade passed.
(b) QP-Name sequence	The troops marched through the town. Every soldier who knew that James was watching was convinced that he should wave as the parade passed.

Figure 4: Antecedent preference ratings in Exp2 (1 = strong preference for proper name, 5 = strong preference for quantified phrase).



References

- [1] Reuland. 2001. *Linguistic Inquiry*. [2] Reuland. 2011. MIT Press. [3] Koornneef. 2008. *LOT International Dissertation Series*. [4] Cunnings et al. 2014. *JML*. [5] Pan & Jiang. 2015. *International Journal of Chinese Linguistics*. [6] Cunnings. 2017. *BLC*.