CROSSOVER CONSTRAINTS IN NATIVE AND NON-NATIVE LANGUAGE COMPREHENSION

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While native (L1) speakers construct detailed syntactic structures and make detailed syntactic predictions about upcoming input during language comprehension [5], non-native (L2) speakers may have difficulty with them [2,4]. The present study reports two pre-registered experiments examining this issue by testing crossover constraints in L1ers and L2ers. Crossover constructions [6] provide an interesting test-case of the roles of prediction and structural constraints during pronoun resolution [3,5]. For example, in a crossover construction like (1a), the pronoun 'he' cannot co-refer with the prior antecedent ('the man'), while coreference is possible in (1c). Coreference in (1a/b) is ruled out by Binding Principle C [1]. However, Principle C is only operable here if the reader successfully predicts that 'the man' is to be interpreted as the direct object of the upcoming verb [5]. We hypothesised that if L2ers have difficulty making syntactic predictions, they may violate crossover constraints during processing.

In Experiment 1 (Ex1), 48 L1ers and 48 proficient L2ers read 24 sentences like (1) while their eye-movements were monitored. The pronoun 'he' either matched (1a/c) or mismatched (1b/d) in gender with the prior antecedent ('the man/the woman'). Coreference between the pronoun and this antecedent is not licensed in (1a/b) due to crossover but is possible in no-crossover conditions (1c/d). Longer reading times are thus expected at the pronoun in (1d) than (1c) due to gender mismatch effects, but if crossover constraints immediately restrict pronoun resolution, there should be no gender mismatch effects in (1a/b) [5]. However, if crossover is violated by either group, particularly L2ers, gender mismatch effects should be observed in (1a/b) as well.

Experiment 2 (Ex2), which was conducted after Ex1, tested offline knowledge of crossover. In Ex2, the same participants as Ex1 answered questions like (3) while reading sentences like (2). (2a) involves a crossover construction where the pronoun and sentence subject cannot co-refer, while (2b) is a non-crossover construction where coreference is possible. We predicted that L1ers should know the crossover constraint. However, if L2ers have difficulty with it, they should allow more subject antecedent responses than L1ers in (2a).

In Ex1, regression path duration showed a significant crossover by gender interaction for the spillover region ("phoned yesterday afternoon,"), which did not interact with group, due to gender mismatch effects in no-crossover conditions only. Total viewing times similarly showed a significant crossover by gender interaction at both critical ("who/that he") and spillover regions, which again did not interact with group. Here, gender mismatch effects were again observed in the no-crossover conditions. However, in the crossover conditions, gender match condition (1a) had longer reading times than gender mismatch condition (1b). Ex2 showed a significant main effect of crossover due to fewer subject antecedent responses in crossover sentences. There was also a significant crossover by group interaction, but this indicated more subject antecedent responses for L1ers than L2ers in no-crossover but not crossover sentences.

These results suggest crossover constraints guide online pronoun resolution. They partially replicated [5], who found gender mismatch effects in non-crossover but not crossover constructions. Although we did not find gender mismatch effects in crossover conditions, we did observe an opposite gender match effect in total reading times. Thus, while our results may not suggest that crossover is a 'hard' constraint that completely rules out ungrammatical antecedents, it nevertheless appears to strongly guide coreference resolution. We also did not find significant evidence that L2ers had any additional difficulty in applying crossover constraints in comparison to L1ers, which might have been expected if L2ers have difficulty predicting or utilising structural information during processing [2,4]. In sum, our results suggest L1ers and L2ers both utilise prediction and structural binding constraints to guide pronoun resolution during processing.

(1a) It was the man in the office who he phoned yesterday afternoon, but Tom didn't talk very much.
(1b) It was the woman in the office who he phoned yesterday afternoon, but Tom didn't talk very much.
(1c) It was the man in the office who said that he phoned yesterday afternoon, but Tom didn't talk very much.
(1d) It was the woman in the office who said that he phoned yesterday afternoon, but Tom didn't talk very much.

(2a) The boy who he helped yesterday afternoon was very busy.
(2b) The boy who claimed that he helped yesterday afternoon was very busy.
(3) Who does "HE" refer to? 1. The boy 2. Someone else

Figure 1. *Total viewing times in Ex1*.

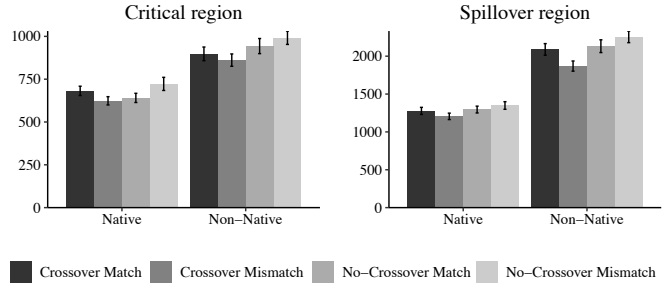

Figure 2. *Proportion of subject antecedent responses in Ex2*.

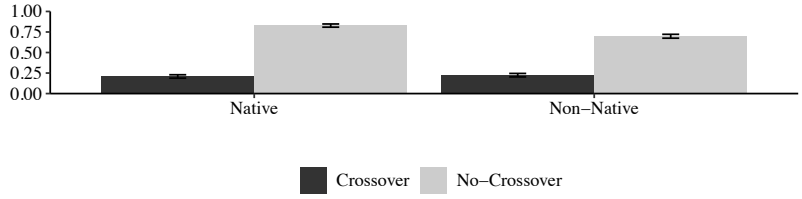

Table 1. *Statistical results of theoretical interest for total viewing times*.

	Estimate	*SE*	*t value*	*p value*
Group	0.196	0.04	5.054	<.001
Crossover	-0.027	0.01	2.185	.039
Gender	0.004	0.01	0.364	.719
Crossover:Gender	-0.037	0.01	3.528	.002
Group:Crossover:Gender	-0.007	0.01	-0.716	.474

Table 2. *Statistical results of theoretical interest for* subject antecedent responses.

	Estimate	*SE*	*z value*	*p value*
Group	-0.232	0.17	-1.398	.162
Crossover	-1.867	0.17	-11.249	<.001
Group:Crossover	0.311	0.12	2.488	.013

References

[1] Chomsky (1984), *Lectures on Government and Binding*; [2] Clahsen & Felser (2006), *AP*; [3] Felser & Drummer (2017), *JPR*; [4] Grüter et al. (2014), *BUCLD 38 Proceedings*.; [5] Kush et al. (2017), *Glossa*; [6] Wasow (1972), *doctoral dissertation*.