

The application of binding condition C in strong crossover configurations in German

Sentence-internal pronoun resolution is thought to be restricted by supposedly universal constraints known as binding conditions A-C [1]. Unlike binding conditions A and B, the real-time application of binding condition C, which prohibits coreference between a referential expression and a pronoun that c-commands it, has rarely been investigated. Evidence from reading-time studies on English, Russian and German suggests that condition C constrains native speakers' online resolution of cataphoric pronouns [2,3,4]. Condition C also appears to constrain coreference in so-called in strong crossover (SCO) configurations in English [5], where *wh*-movement has crossed a pronoun. As this movement needs to be mentally 'undone' prior to the application of condition C, crossover configurations allow us to test for its application not at surface structure but at the underlying sentence representation. In the present study, we investigated the application of condition C in two types of crossover configurations in German. To further test the hypothesis that the application of binding constraints is delayed in non-native (L2) relative to native language (L1) processing [6], participants included both native and proficient non-native speakers of German.

Experiment 1 was an offline pronoun–antecedent evaluation task. Materials included both SCO sentences, where coreference between the pronoun *er* 'he' and the fronted *wh*-expression *welchem Politiker* 'which politician' should normally be ruled out by condition C (as in 1a), and weak crossover (WCO) sentences, where condition C does not apply (as in 2a). Participants were asked to judge whether the (underlined) pronoun could possibly refer to the *wh*-NP. Thirty-three native speakers of German and 31 native speakers of Russian with good knowledge of German ("C1" level) took part in the experiment. Both L1 and L2 participants disallowed coreference in SCO configurations, in line with condition C. In contrast, both groups allowed coreference significantly more often in WCO configurations, where condition C is not involved.

Experiments 2 and 3 examined the online application of condition C using eye-tracking during reading, with a gender-mismatch paradigm. The materials for Experiment 2 included SCO sentences in which the gender of the pronoun *er* 'he' either matched (1a) or mismatched (1b) the gender of the *wh*-NP. Experiment 3 contained WCO sentences in which the pronoun did not c-command the *wh*-NP's canonical structural position (indicated by __), again with gender-match manipulated (2a/b). Participants were the same as in Experiment 1.

(1a) Constraint, gender match

Bei {welchem Politiker} in Rom er gute Chancen __ hatte, ...

(1b) Constraint, gender mismatch

Bei {welcher Politikerin} in Rom er gute Chancen __ hatte, ...

'Which politician (masc/fem) in Rome he had good chances with, ...'

(2a) No constraint, gender match

Bei {welchem Politiker} in Rom sein Praktikant gute Chancen __ hatte, ...

(2b) No constraint, gender mismatch

Bei {welcher Politikerin} in Rom sein Praktikant gute Chancen __ hatte, ...

'Which politician (masc/fem) in Rome his intern had good chances with, ...

Coreference between the pronoun and the wh-NP is possible in (2) but ruled out by condition C in (1). For the L1 group, we therefore expected to see gender effects in Experiment 3, reflecting the attempt to establish a coreference dependency between the pronoun and the fronted wh-NP, but no gender effects in Experiment 2. If L2 comprehenders try to link the pronoun to the wh-NP but are unable to apply condition C during online processing, they might show gender mismatch effects in both Experiments 2 and 3. If, on the other hand, coreference assignment is delayed in the L2 group (possibly due to the added difficulty of having to 'undo' the wh-movement on the fly), they might not show any online sensitivity to our gender manipulation at all.

Participants' reading times were analyzed using linear mixed-effects models. In Experiment 2, results from a preliminary analysis show no gender mismatch effects in either of the two participant groups. In Experiment 3, significant gender mismatch effects were found for the L1 group at both the pronoun (*first fixation duration*: $\beta=-.035$, $SE=.016$, $t=2.144$, and in *first pass reading time*: $\beta=-.034$, $SE=.015$, $t=-2.216$) and spillover region (*regression path time*: $\beta=-.047$, $SE=.020$, $t=2.332$), but not for the L2 group.

Our results indicate that condition C is applied offline in SCO configurations in both the L1 and the L2 group. Evidence of online sensitivity to condition C was only found in the L1 group, however. Thus, while native speakers of German apply condition C both offline and online independently of surface linear order [4], there appears to be a striking gap between the L2 group's offline and online behaviour. Further research will have to address the issue of when during L2 processing coreference is attempted and condition C is applied.

References

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