**Processing of logical form structure: Evidence from reconstruction for anaphoric binding**

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Results from two self-paced reading experiments demonstrate that the left-to-right incremental parser is sensitive to grammatical principles that hold of logical form (LF) structure. Specifically, we examined sentences which are argued to have distinct surface and LF structures; namely, sentences involving reconstruction. Results suggest that the parser searches for an antecedent as soon as it finds an anaphor (Principle A) but that no such search occurs for pronouns (Principle B). These studies provide evidence for the parser's sensitivity to structural constraints on the grammar.

**Background** Psycholinguistic work on filler-gap dependencies demonstrates that the parser is sensitive to the syntactic dependency holding between a wh-filler and its gap. Specifically, as soon as the parser finds a wh-filler, it postulates a gap later in the sentence to satisfy the dependency (Crain and Fodor, 1985; Stowe, 1986). However, psycholinguists have not yet investigated sentences in which a phrase must be interpreted in a distinct structural position from where it appears on the surface, as is the case for syntactic reconstruction (Chomsky, 1976; Fox, 2000; Pesetsky, 1987).

**Design** In both reconstruction and gap filling, an additional operation needs to occur later in the sentence. However, unlike gap filling, reconstruction is not always obligatory. One tool that can be used to control for whether reconstruction has occurred is Binding Theory, an LF requirement (Chomsky, 1981; Fox and Nissenbaum, 2004). According to Principle A, anaphors must be locally c-commanded by their antecedents. Thus, by manipulating the surface positions of the anaphor and its antecedent, we can test the parser's sensitivity to this principle: if an anaphor linearly precedes its antecedent, it must reconstruct below the antecedent at LF. In contrast, according to Binding Principle B, pronouns cannot be locally bound by their antecedents and thus do not reconstruct.

**Method** We used embedded *how many* questions in our experiments because they allowed us to present anaphors in structural positions that preceded their antecedents. In Exp. 1, we manipulated whether an anaphor, e.g., *herself*, or an R-expression, e.g., *Sean*, appeared in the *many-x* phrase, as in (1a). In its surface position, the anaphor cannot be bound by its antecedent and must reconstruct. Thus, we predicted longer reading times on words following *herself*, compared to *Sean*, which can be interpreted in its surface position. In Exp. 2, either a pronoun, *her*, or R-expression, *Alexa*, occurred in the *many-x* phrase or as the embedded subject, (1b). As pronouns cannot be bound by their antecedents, we did not predict increased reading times after the pronoun in Exp. 2.

(1) The reporters wondered how many lies...

a. about {herself$_i$/Sean} you are asking Alexa $t_i$ to invent (**Experiment 1**)

b. discrediting {her/Alexa} as a witness you are asking {Alexa/her} to invent (**Experiment 2**)

**Results and Discussion** In Exp. 1, we found longer reading times two and three words following the anaphor compared to the R-expression (both $p$'s $\leq 0.05$). Once the antecedent was reached, this effect disappeared. These results suggest that when an unlicensed anaphor is found, the parser actively searches for an antecedent that can bind it, i.e., Principle A. We argue that this processing cost for anaphors but not for R-expressions supports the view that reconstruction for anaphoric binding is obligatory. In Exp. 2, we observed longer reading times one word following the R-expression in the *many-x* phrase compared to the pronoun ($p < 0.001$). However, if the embedded subject was an R-expression, i.e., the condition containing a pronoun in the *many-x* phrase, it was read longer than if it was a pronoun ($p < 0.001$). These results provide no evidence for a search for an antecedent with pronouns and therefore, no evidence for reconstruction with pronouns. We attribute the increased reading times on the R-expression embedded subject to a cost of associating the antecedent with a previously introduced pronominal referent.

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