

An experimental investigation of reconstruction for Condition C in German A'-movement

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1. Abstract. We report on the first experimental investigation of Condition C reconstruction effects in German *wh*-questions and relative clauses (RC). The major contributions are the following: First, we propose an enhanced method to elicit coreference judgments. Second, we show that Condition C reconstruction is very robust in *wh*-movement (contrary to claims in the literature and recent experimental findings on English), while Condition C reconstruction in restrictive RCs is significantly weaker. Third, we have found no evidence supporting an argument-adjunct asymmetry. Our findings (i) argue against late merger of adjuncts and (ii) suggest that RCs and *wh*-movement differ in crucial respects: retention of a full LF-copy in *wh*-movement vs. vehicle-changed copies in RCs that result from ellipsis (as under the matching analysis).

2. Background. Reconstruction effects in A'-movement have played a prominent role in linguistic theory concerning argument-adjunct asymmetries (Lebeaux 1991) and as a diagnostic for movement (Fox 1999). While the robustness of Condition C effects has been controversial for some time, reconstruction effects have been subjected to empirical scrutiny only very recently, and only in English, cf. Adger et al. (2017), Bruening and Al Khalaf (2017). Their results suggest a reassessment of our views on reconstruction because Condition C effects were found to be systematic only with predicates (cf. Heycock 1995), while partially absent with (nominal) arguments. Furthermore, the argument-adjunct asymmetry was found to be rather weak.

3. Previous research. In Adger et al. (2017) subjects were asked whether a pronoun and a proper name could refer to the same individual (yes/no). Bruening & Al Khalaf (2017) tested reconstruction with embedded *wh*-questions where the matrix clause contained another R-expression:

(1) John told me which statue of Peter *he* likes.

Subjects were presented with a question asking for the referent of the subject pronoun (*Who likes the statue? John/Peter*). A low percentage of answers for the embedded R-expression was interpreted as a Condition C effect. Both methods have shortcomings: The task in Adger et al.'s experiment may be unnatural and lead to metalinguistic reasoning. Bruening and Al Khalaf's design is more natural, but since speakers can choose only one referent, coreference with the other referent cannot be ruled out with certainty.

4. A new method. We adopt Bruening and Al Khalaf's approach with embedded *wh*-questions so that there are two possible referents, but we explicitly test for both whether coreference is possible or not. In a sentence like (2), we would ask the questions in (3) (in randomized order):

(2) Hans erzählt, welche Statue von Peter er mag. *John tells (us) which statue of Peter he likes.'*

(3) Kann man den Satz so verstehen, dass... *'Can this sentence be interpreted such that...'*

a. ...Hans eine Statue mag? *John likes a statue?' yes/no*

b. ...Peter eine Statue mag? *Peter likes a statue?' yes/no*

This method not only involves a rather natural task for subjects, it also provides explicit information which referents are possible antecedents for the pronoun and which are not. The RC items were constructed as in (4). A universal quantifier was used to ensure a restrictive interpretation:

(4) Hans erwähnte jede Statue von Peter, die er mag. *John mentioned every statue of P. he likes.'*

(5) Kann man den Satz so verstehen, dass... *'Can this sentence be interpreted such that...'*

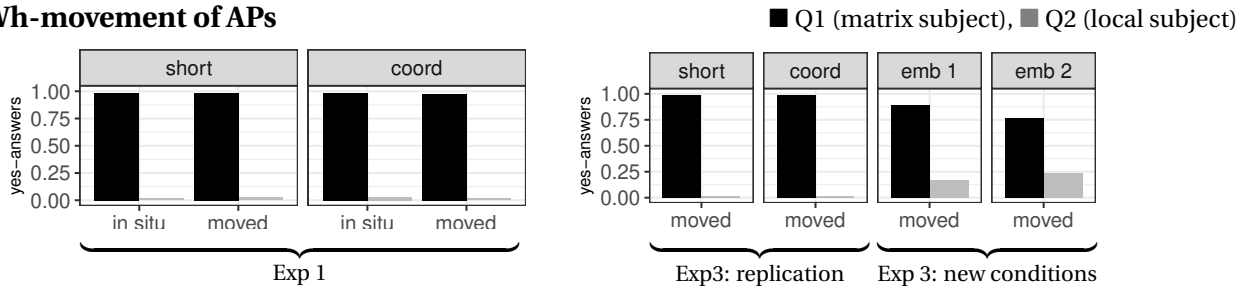
a. ...Hans die Statuen mag? *'...John likes the statues?' yes/no*

b. ...Peter die Statuen mag? *'...Peter likes the statues?' yes/no*

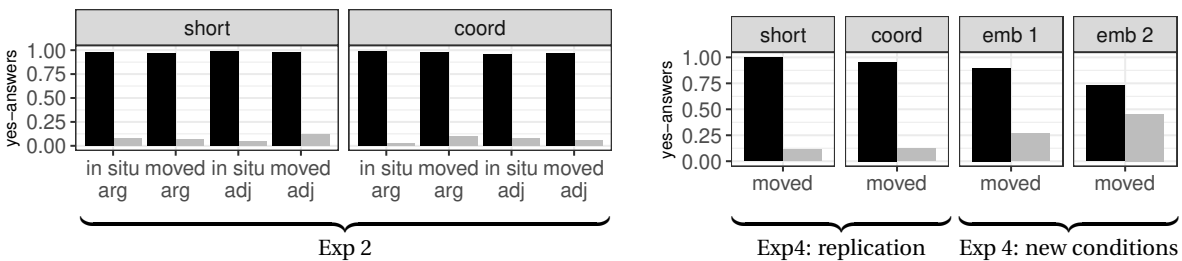
5. Experiments. We have investigated reconstruction for Condition C in five experiments. We manipulated the factors MOVEMENT (in situ/moved) and (linear and structural) DISTANCE. The latter was included because previous theoretical work (Huang 1993) and the experiment by Adger et al. had found that Condition C effects decreased with increasing distance between R-expression and pronoun. In exp 1 and 3, we tested *wh*-movement of APs (*John tells us how proud of Peter he is*). In exp 2 and 4, we tested *wh*-movement of DPs (as in (1)). In exps 1 and 2, the (linear) distance was manipulated using coordination (*John told us which statue of Peter and the team he likes*). In exps 3 and 4, we included an additional level of embedding (increasing

structural distance): emb1: *John told us which statue of Peter he said you like*; emb2: *John told us which statue of Peter you said he likes*. In exp 5, we compared *wh*-movement with relativization. In all experiments, the items were distributed using a Latin Square Design and intermixed with an equal amount of fillers. 32 native speakers of German took part in exp1, 48 in exp2, 36 in exp3, 36 in exp4, 32 in exp5. In the plots below, the black bar shows coreference with the matrix subject, the gray bar with the embedded R-expression. The replication of the basic conditions throughout all experiments supports the reliability of our method.

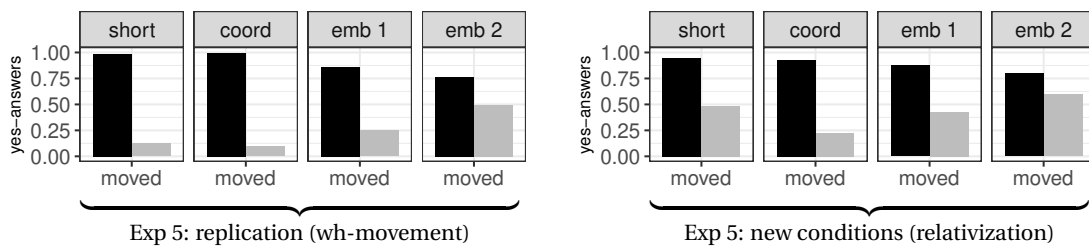
Wh-movement of APs



Wh-movement of DPs



Wh-movement vs. relativization



Results: *A. wh-movement:* 1. Reconstruction is very robust across conditions, with both APs and argument-DPs. 2. There is no support for an argument-adjunct asymmetry (cf. Exp2). 3. There is a significant effect of embedding (according to a GLM for Q2 compared to the short local mvt baseline; Exp 3: emb1: $z = 3.30$, $p < 0.001$; emb2: $z = 3.92$, $p < 0.001$ – Exp4: emb1: $z = 3.17$, $p = 0.002$; emb2: $z = 5.65$, $p < 0.001$), but not of linear distance (coordination has no significant effect: Exp3: $z = -0.01$, $p = 0.99$ – Exp4: $z = 0.23$, $p = 0.81$). Unlike in Adger et al., though, there remains a clear preference for non-coreference in all conditions. *B. Relativization:* There is less reconstruction compared to *wh*-movement (sign. effect of movement type at the short baseline level of distance: $z = 6.67$, $p < 0.001$, and sign. interaction between the factors at all other levels of distance: coord: $z = 2.07$, $p = 0.04$, emb1: $z = 2.92$, $p = 0.004$, emb2: $z = 4.12$, $p < 0.001$).

6. Theoretical implications. The Condition C pattern in *wh*-movement argues (i) against late merger of adjuncts, (ii) against an approach in terms of vehicle change (Safir 1999; the Condition C effect with APs is not alleviated if the coreferential pronoun is in the upper clause) but rather (iii) in favor of retention of full copies at LF. The RC-facts suggest that their derivation differs from *wh*-movement. One possibility to account for the asymmetry is the matching analysis (Sauerland 1998) where due to ellipsis between head-noun and operator phrase vehicle change (R-expression → pronoun) becomes possible, thereby voiding the Condition C effect (*he_i likes the statue of *John_i → ✓him_i*). The fact that coreference is not accepted by all in RCs could be linked to variation in the acceptability of coreferential pronouns within NPs: Some speakers only accept the reflexive *he_i likes the statue of himself_i*, while others also accept the pronoun.