Processing subject/object asymmetries in German: case-marking and intervention

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It is well-known that object-gap dependencies are more difficult to process than subject-gap dependencies (for German see [1][2][4]). This has been explained in terms of intervention: when processing an object dependency, the object crosses the subject, which potentially acts as an intervener. Intervention is dependent on the similarity between subject and object: the more similar they are, the stronger the intervention effect is. There is an ongoing discussion as to which features cause intervention [7]: do any cognitively or perceptually salient features cause intervention (**broad definition** [4]) or do only very specific, syntactic features count (**narrow definition**)? The latter position is taken by [7], who argues that only features that trigger movement cause intervention.

Previous studies investigating subject/object asymmetries focused on objects with structural, accusative case-marking. In this study, we contrast dative direct objects to accusative direct objects in German wh-questions and relatives. In German, a limited class of transitive verbs take dative objects. These objects behave differently in several respects, which is explained by assuming that they are lexically case-marked [5]. This makes an interesting prediction with respect to intervention: **under a broad definition of intervention, dative objects should be less sensitive to intervention than accusative objects,** since they decrease the similarity between subject and object: whereas the subject has a structural case feature, the object has a lexical case feature:

(1) [Welche-n Dieb] attackiert [der Detektiv] __
Which-ACC thief attacks the.NOM detective
[+struct] [+struct]
'Which thief did the detective attack?'

(2) [Welche-m Dieb] droht [der Detektiv] ___
Which-DAT thiefthreatens the.NOM detective
[+lex] [+struct]
'Which thief did the detective threaten?'

Under a narrow, syntactic definition of intervention, however, there should be no such processing advantage for dative objects, since case-marking features do not trigger movement and hence do not cause intervention [3]. We tested this hypothesis by comparing dative to accusative object extraction, using subject extraction as a baseline and looking for interactions between **case** (accusative vs. dative) and **type of argument** (subject vs. object) in both wh-questions and relatives. Examples of all conditions are in Table 1 below. Participants read the sentences word-by-word by pressing a button. Each sentence was followed by a true/false statement. The data of 39 native German participants who each saw 8 items per condition was analyzed using linear mixed effect models. We analyzed residual reading times (Fig. 1-2) at the embedded DP (*the thief/ detective*), where a gap can first be postulated, at the participle (*threatened/attacked*), where the filler is integrated, and at the sentence-final auxiliary (*has*). At the embedded DP, there were no significant effects for either sentence type. At the participle, there were no significant effects for relatives, but wh-questions showed a significant interaction between case and argument ($p < 0.05$), due to dative objects being read slower than all other conditions. At the auxiliary, there was a significant effect of case for relative clauses only ($p < 0.05$), due to dative conditions being read slower than accusative conditions. Thus, there is a relatively late effect for case, which is qualitatively different in relatives vs. wh-questions (main effect vs. interaction).

Concluding, the results do not provide any evidence for the broad definition of intervention, but instead suggest intervention is only caused by very specific, movement attracting features, in line with findings by [3]. If any, the results suggest that dative conditions are more difficult than accusative conditions. This shows that the parser is sensitive to fine-grained syntactic distinctions such as the difference between lexical and structural case, but that this does not play a role in intervention. We will argue that the higher processing difficulty for dative conditions is due to a higher integration cost at the verb, since dative case-marking can be argued to be more costly than accusative case-marking due to the specific mechanisms by which it is assigned.

Table 1: Experimental items

Condition	Example
1. Wh-question, accusative, object	Der Richter fragt, welche-n Dieb der Detektiv attackiert hat. The judge asks, which- ACC thief the.NOM detective attacked has
2. Wh-question, accusative, subject	Der Richter fragt, welche-r Detektiv den Dieb attackiert hat. The judge asks, which-NOM detective the.ACC thief attacked has.
3. Wh-question, dative, object	Der Richter fragt, welche-m Dieb der Detektiv gedroht hat. The judge asks, which-DAT thief the.NOM detective threatened has.
4. Wh-question, dative, subject	Der Richter fragt, welche-r Detektiv dem Dieb gedroht hat The judge asks,which-NOM detective the.DAT thief threatened has.
5. Relative, accusative, object	Das ist der Dieb, den der Detektiv attackiert hat. That is the thief, who.ACC the.NOM detective attacked has.
6. Relative, accusative, subject	Das ist der Detektiv, der den Dieb attackiert hat. That is the detective, who.NOM the.ACC thief attacked has.
7. Relative, dative, object	Das ist der Dieb, dem der Detektiv gedroht hat. That is the thief, who.DAT the.NOM detective threatened has.
8. Relative, dative, subject	Das ist der Detektiv, der dem Dieb gedroht hat. That is the detective, who.NOM the.DAT thief threatened has.

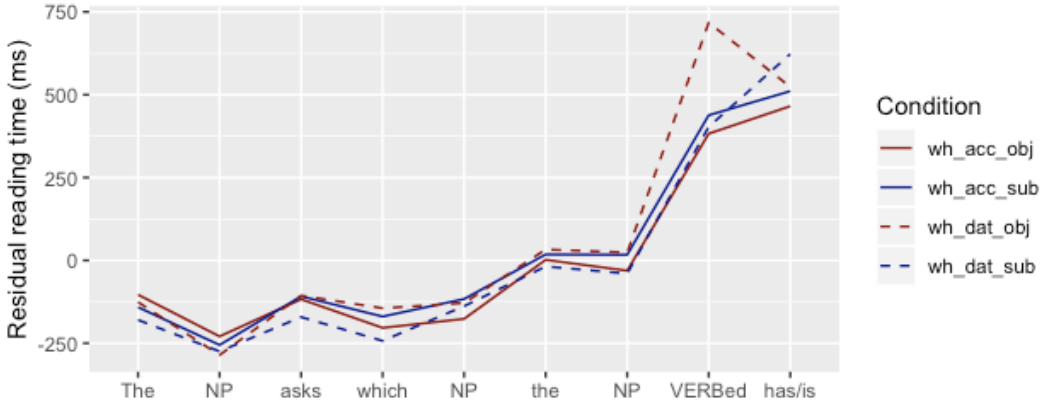

Figure 1: Residual reading times wh-questions

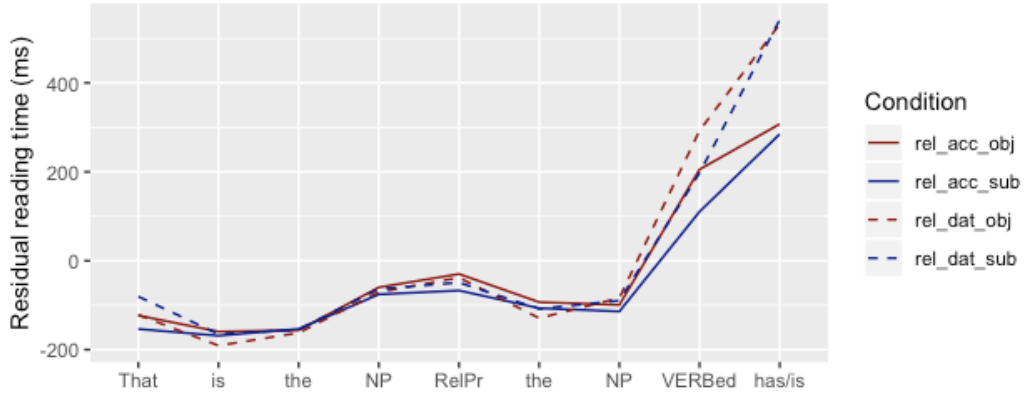

Figure 2: Residual reading times relatives

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