These Rumours About Psych Verbs Worry Us More Than Anything Else: On the (Im-)possibility of Reflexive Binding Into the Subject of German Experiencer-Object Verbs

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1 Introduction

There is a long-standing debate regarding so-called “backward binding” into the subject of experiencer-object verbs, i.e. psych-verbs whose experiencer is realised as an object, (see i.a. Belletti & Rizzi 1988, Pollard & Sag 1992, Pesetsky 1995, Landau 2010, Cheung & Larson 2015). In Belletti & Rizzi (1988)’s Italian examples in (1), only in the example containing an experiencer-object verb ((1a)) may the anaphor be bound although it is (superficially) not c-commanded by its antecedent.

(1) (Belletti & Rizzi 1988: p. 312)

a. *Questi pettegolezzi su di sé descrivono Gianni meglio di ogni biografia ufficiale.
   ‘These gossips about himself describe Gianni better than any official biography.’

While some authors take such examples to provide evidence for the unaccusativity of (certain classes of) experiencer-object verbs (e.g. Belletti & Rizzi 1988, Cheung & Larson 2015) – the subject is taken to originate in a position below the object, so that c-command does hold at some level of representation / during the derivation –, others claim that such cases represent instances of logophoric or point-of-view-based binding, a phenomenon that extends beyond the domain of psych verbs (e.g. Pollard & Sag 1992, Bouchard 1995).

In this paper, we will present experimental evidence from an offline acceptability study that binding into the subject of experiencer-object verbs in German is possible only if the objects precedes (and thus c-commands) the subject in surface order. In this regard, German is of special interest for multiple reasons.

First, the overall grammaticality of examples analogous to (1a) is disputed (cf. Kiss 2012, Platzack 2012, Fischer 2015, Temme & Verhoeven 2017), with Fischer (2015) claiming that there is an effect of linear order. Secondly, despite the standard assumption that scrambling disables binding possibilities in German (and enables new ones, see e.g. Haider 2017), Temme & Verhoeven (2017) claim to have found experimental evidence for backward binding with experiencer-object verbs in German using examples with variable binding. Thirdly, German does not license logophoric binding (Kiss 2012), so if backward binding were possible, a logophoric interpretation of the reflexive could not account for it. As we will discuss, the patterns observed can readily be explained using the usual c-command condition when taking the verbs’ linearisation preferences into account.

2 Theoretical Background

A study of possible backward binding with German experiencer-object verbs must take several factors into consideration. German is a verb-second language: While the finite verb is placed
after the first constituent in matrix clauses, the underlying verb-final order can be observed in embedded clauses. Since placing a constituent in the pre-field (the area in front of the verb in verb-second clauses) may have interpretational effects (Frey 2006), all constituents of relevance should be placed in the so-called middle-field, i.e. the area between C (the position of the finite verb in verb-second clauses) and the verbal complex at the end of the sentence.

While usually different linearisations of the constituents in the middle-field are considered grammatical, it is also to be considered that there is a normal (information-structure-wise most neutral (Höhle 2019/1982)) order that is at least partially dependent on the predicate. Deviations from the normal order may influence acceptability judgments independently of binding constraints, making it necessary to consider their effects here. The literature on normal word-order with experiencer-object verbs in German usually draws a distinction between those with an accusative object and those with a dative object (in the spirit of Belletti & Rizzi 1988), although its expenditure for German has been called into question by Masloch, Poppek & Kiss (2023) recently.

Experimental evidence points to a preference for object before subject with (almost all) dative-object experiencer-object verbs and a (slighter) preference for subject before object with (almost all) accusative-object experiencer-object verbs with inanimate subjects if all other factors potentially influencing linear order (such as definiteness, weight etc.) are equalled out (Temme & Verhoeven 2016, Masloch, Poppek & Kiss 2023). Following Kiss, Pieper & Börner (2023), we assume base generation (arguments may be merged in any order in principle) and violable linear precedence constraints. We furthermore agree with Haider (2010) in assuming a binary-branching structure and the absence of functional projections between V and C.

Another relevant factor is the subject itself: Since German lacks a genitive reflexive, a reflexive can only be embedded in the subject within a PP. However, the usage of such a PP can be functionally overshadowed by a considerably more frequent construction involving a possessive, as in (2). Stimuli where this might be the case are to be avoided in the experimental context.

(2) Er betrachtete seine Möbel / ??die Möbel von sich.
    he beheld his furniture the furniture of REFL
    ‘He looked at his furniture.’

3 Experimental Study

We aimed to answer the question if reflexive binding into the subject of experiencer-object verbs is possible in German by conducting an acceptability study in a Likert-Scale design with 5 levels ranging from vollkommen unnatürlich ‘completely unnatural’ to vollkommen natürlich ‘completely natural’. This experiment has been pre-registered with OSF (https://osf.io/ev7ma/?view_only=0ca53dc84f944f55a8ea7131981896ce). All scripts and materials are available via https://osf.io/vnwfq/?view_only=aed558f22daa4062a916946950796cf.

The design reflects the two factors ORDER (subject before object (SO) or object before subject (OS)) and CASE (of the object, accusative or dative). While CASE is tested between items (since there is no synchronic object-case alternation with experiencer-object verbs having a subject in German), each item is presented in both ordering conditions. Participants only see each item in one ordering condition, but each of them rates the same number of SO and OS sentences.
3.1 Hypotheses

We follow Masloch, Poppek & Kiss (2023)’s account of argument linearisation in the middle-field for German experiencer-object verbs, which takes surface-order at face value: A constituent in the middle-field is taken to c-command another if and only if it precedes it in linear order. Combined with the usual assumption that the reflexive must be c-commanded by its antecedent, it follows that sentences in which the subject precedes the object are ungrammatical (because the reflexive cannot be c-commanded by its antecedent). Sentences where the object precedes the subject are strictly speaking grammatical but may violate linear precedence constraints, possibly leading to different degrees of unacceptability. Based on these prerequisites, we expect dative-object verbs to receive high ratings in OS linearisation while the same order is marked with accusative-object verbs, which should result in lower ratings. In SO order, the reflexive is not c-commanded by its antecedent and the order is marked for dative-object verbs. However, if we assume that the normal order is accessible to the participants (or may be reconstructed by them), examples may be rated lower but not as completely unnatural. In contrast, since SO already is the normal order with accusative-object verbs, the above effect is not possible. Consequently, sentences in this condition should be rated as unnatural.

We will use Bayesian generalised linear mixed models (Bürkner 2017) to analyse the data. In a cumulative link generalised mixed model with dative and OS as reference levels, the expectations will lead to a small negative effect of CASE, a medium negative effect of ORDER and a marginal, if any, interaction effect.

3.2 Materials

Test items were constructed according to example (3) (in the SO condition and without any acceptability judgment):

\[(3) \quad \text{Es ist offensichtlich, dass das Gerücht über sich den Professor genervt hat.} \]

\[\text{‘It is obvious that the rumour about himself annoyed the professor.’} \]

Test items contained the clause of interest embedded in a matrix clause to ensure a verb-final sentence. In total, we used 8 test items containing an accusative-object experiencer-object verb and 8 test items containing a dative-object experiencer-object verb.\(^1\) Verbs were chosen based on their syntactic behavior in corpus data, taking into account a preference for inanimate subjects, the frequency of non-psych readings and other potentially confounding factors. In all test items, the subject was an NP containing an embedded PP whose internal argument was the third person reflexive \(\text{sich}\) with the verbs’ object as the only possible antecedent within the clause. The noun-preposition sequences are frequent collocates and we ensured that the use of the PP is not overshadowed by a construction with a possessive (as in (2)).

3.3 Methods and Procedure

Since CASE was manipulated between items and ORDER within items, there were 16 test items in two linearisation conditions (SO and OS). We created two lists, so that each participant rated

\(^1\) dative object: \(\text{auflösen ‘to strike’, behagen ‘to please’, einleuchten ‘to be evident’, gefallen ‘to like’, imponieren ‘to impress’, missfallen ‘to displease’, nahegehen ‘to afflict’, widerstreben ‘to have an aversion’;\)

only one ordering condition per item. The surveys further contained 64 related and unrelated filler items (6 calibration items shown in the beginning to familiarise the participants with the rating scale, 16 control- and 10 attention items used to exclude uncooperative or inattentive participants). Participants (monolingual native speakers of German, DACH-residents) were recruited via Prolific (prolific.co). The experiment was conducted in a web-based infrastructure where the participants’ individual reaction times were automatically measured. Taking control- and attention checks as well as possible topic-awareness (checked with an open question at the end of the survey) into account, data of 48 participants has been included in the analysis. Participants received a compensation of £ 3.50 (£ 15.11 / hour on average).

3.4 Results

Figure 1 displays the empirical distribution of ratings in all four conditions, “5” standing for “completely natural”, “1” for “completely unnatural”.

We see that sentences in which the subject containing the reflexive precedes the object (condition SO, “subject < object” in figure 1) received very low ratings, although ratings improve slightly with accusative-object verbs. In the OS condition, in which the reflexive is preceded by its antecedent, sentences receive overall better judgments, although there is still a large number of lower ratings. In addition, ratings are higher with accusative-object verbs. To model the data, we fitted a Bayesian cumulative generalised linear mixed model with logit link and flexible thresholds using the brms package (Bürkner 2017) in R (R Core Team 2020). Both factors were dummy-coded with dative and OS as the reference levels. The model includes fixed effects for CASE, ORDER, and their interaction, random intercepts for participants and items, a random slope for ORDER for items and random slopes for CASE, ORDER, and their interaction for participants.

Given the lack of previous comparable studies and quantitative predictions for the effect size, we used only mildly informative, regularising priors. The effects of ORDER ($\hat{\beta} = -2.02$, 95% credible interval (CrI) = [−2.80, −1.25])$^2$, CASE ($\hat{\beta} = -0.76$, 95% CrI = [−1.79, 0.29]),
and their interaction ($\hat{\beta} = 0.88, 95\% \text{ CrI} = [-0.14, 1.91]$) generally match the expectations: Changing from dative OS to dative SO leads to lower ratings, changing to accusative OS to slightly lower ratings. The effect of changing to accusative SO is not as strong as the simple addition of both effects would imply. However, the 95% credible intervals of the effect of CASE and the interaction effect include estimates of the opposite polarity, which indicates that we should be less confident about them. An effect size of 2 roughly corresponds to the distance of thresholds 1 and 2, and 3 and 4 on the scale of the latent variable (the difference between 2 and 3 being smaller).

It is noteworthy that the standard deviation of the participants’ random intercepts, which is on the same scale as the fixed effects, is rather high ($\hat{\sigma} = 1.61, 95\% \text{ CrI} = [1.21, 2.10]$), which means that participants differ quite strongly in their reactions towards the dative OS items, while the random intercepts for items ($\hat{\sigma} = 0.98, 95\% \text{ CrI} = [0.62, 1.51]$) and the participants’ random slope for ORDER ($\hat{\sigma} = 0.89, 95\% \text{ CrI} = [0.25, 1.43]$) are also non-negligible. The latter implies that participants differ in how strongly they are affected by a change from OS to SO order (in the dative condition). In a model without random intercepts, the standard deviations of random slopes for both CASE conditions are similar and there is a strong positive correlation between them ($\hat{\sigma}_{\text{dat}} = 1.62, 95\% \text{ CrI} = [1.17, 2.13]; \hat{\sigma}_{\text{acc}} = 1.52, 95\% \text{ CrI} = [1.11, 2.02]; \hat{r} = 0.88, 95\% \text{ CrI} = [0.69, 0.98]$).

## 4 Discussion

The results generally confirm our predictions: Binding into the subject of German of EO verbs is licit only if it is not backward, while deviating from the normal order leads to a reduced level of acceptability (in the absence of a context licensing it). This can readily be explained if one assumes the usual c-command constraint on reflexive binding once linearisation preferences are taken into account – given the binary branching verb-final German syntax, one argument c-commands the other in the middle field if it precedes it in linear order.\(^3\) However, given the case of EO verbs, we do not find any necessity to postulate a peculiar syntactic structure for these verbs to account for their binding behaviour in German.

Given our predictions, the comparatively high acceptability of SO sentences with accusative-object verbs appears slightly unexpected, but one may note that SO is the normal order in this condition and some participants may rate a sentence as “rather natural” despite a violation of binding constraints because they might be able to resolve the linearisation issue pragmatically. Two other remarkable aspects are the overall low level of acceptability and the strong individual variation. Regarding both, one has to consider that the test items were complex sentences that had to fulfill highly specific criteria and contained a relatively infrequent phenomenon (PP with reflexive). Thus, some test items still may appear artificial to some participants, resulting in differing ratings of their “naturalness”.

## 5 Conclusion

German – a language whose reflexive does not have a logophoric interpretation – licenses binding into the subject of experiencer-object verbs in the (right) middle-field only if the subject is c-commanded by the antecedent in surface structure. Our findings show that if linearisation preferences are taken into account, there is no need to postulate peculiar syntactic structures for experiencer-object verbs to account for their binding patterns in German.

\(^3\)Weak fronted pronouns may be considered an exception to this assumption, (cf. Haider 2010).
References


