Filling the prefield: Findings and challenges

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Abstract

The clause-initial position in German declarative main clauses – the so-called prefield – can be rather flexibly filled with almost any kind of constituent. In the first part of this paper, we give an overview of recent experiments that we ran to investigate the factors governing whether the subject or the object of a transitive verb is put into the prefield. The factors that we tested include the semantic roles assigned by the verb, the animacy of the arguments and the discourse status of the arguments. In agreement with findings from the prior literature, participants put the object argument into the prefield when this was favored by the manipulated factors, but they did not use object fronting for this purpose but passivization instead.

Corpus counts nevertheless show that object-initial sentences occur with some regularity, even if their frequency is low in comparison to subject-initial sentences. In the second part of this paper, we therefore make use of corpus evidence in order to explore the conditions under which object-initial sentences are produced. A conclusion emerging from our discussion is that the referential form of an object is an additional factor governing whether it is put into the prefield or not. This conclusion is supported by additional evidence from experiments obtaining acceptability judgments.

Keywords: word order, German, language production, conceptual accessibility, discourse structure, referential form

1 Introduction

A defining property of declarative main clauses in German is the so-called verb-second (V2) property. Each declarative main clause starts with a phrase that can be of (almost) any syntactic category. This phrase is immediately followed by the finite verb, which thus occupies the second position of the clause. Within generative grammar, the standard derivation of a V2 clause proceeds as follows. First, all structure below the CP level is generated. Second, the finite verb is moved to C^0. Finally, a single constituent is moved to SpecCP (the so-called *prefield*). This results in a clausal structure as shown in (1), where the dots stand for possible additional nodes (e.g., functional projections like IP or TopP).

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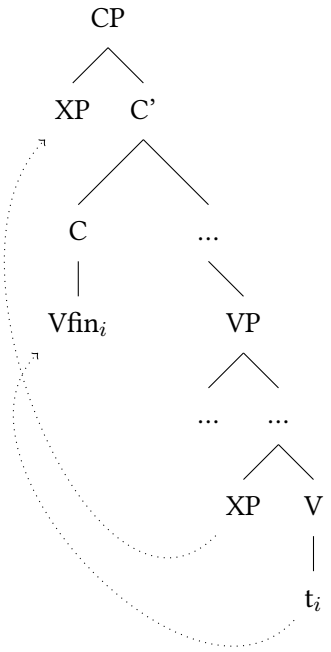
 http://nbn-resolving.de/urn:nbn:de:bsz:352-0-390234

(1)



In this paper, we pursue the question of filling the prefield from a psycholinguistic point of view. In most general terms, the question is how speakers or writers decide which phrase to move to the prefield. This question is of particular interest in the context of models of language production because in many cases, the grammar allows several options from which to choose, with often competing constraints favoring different options. Finding out how language producers select one of these options offers a welcome opportunity to study the complex decision processes involved in language production.

Pursuing the question of how the prefield is filled in its most general form is beyond the scope of this paper. We therefore confine ourselves to the more specific question of how language producers decide whether to put the subject or the object of a transitive verb into the prefield. To take a concrete example, consider someone who wants to express the message that Peter fed the dog. The grammatical encoding of this message involves the following two decisions, among others. First, how are the two arguments realized – the agent as subject and the patient as direct object in an active clause, or the patient as subject and the agent as a by-phrase in a passive clause? Second, which of the two arguments – the agent or the patient – is put into the prefield? Since the answers to these questions can be freely combined, the language producer can choose between four different sentences as shown in (2) and (3).[1]

(2) a. Peter hat den Hund gefüttert.
Peter has the.ACC dog fed

[1]In addition, the verb alone or the verb together with its object can be put into the prefield. For reasons of space, we do not consider these further word order options.

b. Den Hund hat Peter gefüttert.
the.ACC dog has Peter fed
'Peter fed the dog.'

(3) a. Der Hund wurde von Peter gefüttert.
the.NOM dog was by Peter fed
b. Von Peter wurde der Hund gefüttert.
by Peter was the.NOM dog fed
'The dog was fed by Peter.'

In actual language use, all four variants are produced, although not with equal frequency. Table 1 shows the frequency of the sentence types illustrated in (2) and (3) in the TIGER 2.1 treebank created by the Universities of Stuttgart, Saarbrücken and Potsdam (*http://www.ims.uni-stuttgart.de/projekte/TIGER*). Not surprisingly, by far the largest proportion is taken up by subject-initial active sentences. Object-initial active sentences (OS sentences) are the second most frequent sentence type. Passive sentences with a by-phrase occur rarely, especially with the by-phrase in the prefield.

Table 1: Distribution of active clauses with a subject and an accusative object and corresponding passive clauses with a subject and a by-phrase in the TIGER 2.1 treebank (50000 sentences).

	$NP_{Nom} > NP_{Acc}$/PP-by	NP_{Acc}/PP-by $> NP_{Nom}$
Active (NP_{Nom} and NP_{Acc})	4462	652
Passive (NP_{Nom} and PP-by)	223	19

This paper has two parts addressing the question of how language producers choose between the four sentence types discussed so far. In the first part, we review a series of experiments that we have run in order to investigate how animacy, verb semantics and information structure affect the order of arguments in German V2-clauses. Two main conclusions emerge from this review. First, these factors have a strong effect on the decisions of which argument is put into the prefield. Second, passivization is the preferred means to bring the underlying object of a verb into the prefield. In the second part of this paper, we concentrate on active sentences and use corpus evidence as well as experimental acceptability judgments in order to reveal the conditions under which sentences with OS order are produced. A particular focus of this part will lie on the question of how the choice of a referential expression – e.g. a pronoun versus a full NP – affects movement to the prefield.

2 Word order and conceptual accessibility

From a language production perspective, filling the prefield is an instance of the more general task of bringing the words of a sentence in a particular order before the sentence is uttered. Within models of language production, this task belongs to the process of grammatical encoding, which takes a linguistically encoded message as input and produces a syntactic surface

representation as output. During the mapping from a message to a surface structure, the language production system must assign syntactic functions to the participants involved in the event described by the message, and it must order the phrases and words contained in a sentence. In the classical two-stage architecture of grammatical encoding going back to Merill Garret's work on speech errors (e.g., Garrett 1976; see Ferreira & Engelhardt 2006, for current incarnations of this two-stage architecture), syntactic function assignment is achieved at the *functional level* of grammatical encoding whereas linearization occurs at the *positional level*.

As an overarching principle guiding the process of grammatical encoding, Ferreira & Dell (2000) proposed the Principle of Immediate Mention given in (4).

(4) **The Principle of Immediate Mention**
Production proceeds more efficiently if syntactic structures are used that permit quickly selected lemmas to be mentioned as soon as possible.
(Ferreira & Dell 2000: p. 299)

If the Principle of Immediate Mention is on the right track, the question arises what determines how quickly lemmas are selected. Following a suggestion by Bock & Warren (1985), the term *conceptual accessibility* has been used as an umbrella term for all factors that contribute to the speed of lemma selection. We give a brief introduction to research on conceptual accessibility in the next subsection. Afterward, we review old and new experimental evidence concerning the effect of conceptual accessibility on choosing a phrase to put into the prefield.

2.1 Conceptual accessibility in models of language production

In the experiment of Bock & Warren (1985), participants had to recall sets of sentences with only a short delay between sentence memorization and sentence recall. Among the sentences to memorize were simple active and passive sentences in which either the first NP was of high imageability and the second NP of low imageability or the other way around. On recall, sentences were produced with inverted argument order (that is, active as passive or passive as active) more than twice as often when the second NP was of higher imageability than the first NP than when the first NP was of higher imageability. Bock & Warren (1985) introduced the notion of conceptual accessibility to account for this finding, where "conceptual accessibility is the ease with which the mental representation of some potential referent can be activated in or retrieved from memory" (Bock & Warren 1985: p. 50).

A further finding of Bock & Warren (1985) was that imageability had no effect on the order in which the two nouns of a coordination were recalled. This pattern – an effect of conceptual accessibility on order mediated by different syntactic function assignments (active versus passive) but no effect on order when words had the same syntactic function (coordination) – was replicated in later research (e.g., McDonald et al. 1993). It is usually interpreted in terms of the two-stage architecture of grammatical encoding discussed above. Conceptual accessibility is assumed to take its effect on the functional level, where the most accessible argument wins the race for the highest syntactic function on the syntactic function hierarchy. The positional level, in contrast, is assumed to be unaffected by conceptual accessibility. The fact that phrases with high conceptual accessibility are often produced in sentence-initial position is then a side-effect of the rather rigid association of syntactic functions with serial positions in English.

A property of nouns that has played an important role in research on conceptual accessibility is their animacy (see Branigan et al. 2008, for a review of this line of research). Of particular interest in this regard is the influential study by Ferreira (1994) who tested the combined effect of animacy and thematic roles on the order of arguments. Animacy and thematic roles are correlated to a certain extent, as witnessed, for example, by the strong preference of agents and experiencers to be realized by animate entities. This raises the question of whether animacy and thematic roles both make a contribution to word order, or whether the effect of one can be reduced to the effect of the other. To investigate this question, participants in Ferreira's (1994) Experiment 3 had to produce sentences containing either an action verb or an object-experiencer verb using an experimental task known as constrained production (a term coined by Stallings et al. 1998). Participants saw the verb and two nouns on a computer screen and had to form a sentence out of these three components. As soon as they had formed the sentence, they had to speak it out aloud.

Table 2 shows the type of nouns used with each type of verb. The agent of an action verb was always animate whereas the patient could be either animate or inanimate. As also indicated in Table 2, in this case the order "underlying subject before underlying object" is favored in terms of thematic roles because an agent is higher on the thematic role hierarchy than the patient. This order is also favored in terms of animacy when the patient is inanimate whereas animacy favors no particular order when both arguments are animate. For object-experiencer verbs, the experiencer was always animate whereas the animacy of the stimulus varied. For these verbs, the thematic roles prefer the underlying object to precede the underlying subject. The same is true when the stimulus is inanimate. When both arguments are animate, again no order is preferred.

Table 2: Verbs and their arguments used in the experiment of Ferreira (1994)

Action verb:			Object-experiencer verb:		
avoid			*challenge*		
subject	>	object	subject	>	object
agent	>	patient	stimulus	<	experiencer
animate	≥	animate/inanimate	animate/inanimate	≤	animate
cowboy		*sheriff*/*frontier*	*sheriff*/*frontier*		*cowboy*

This experiment had two main results. First, the passivization rate – that is, the construction in which the underlying object precedes the underlying subject – was higher for object-experiencer verbs than for action verbs, independent of the animacy of the patient or stimulus. Second, the passivization rate increased even further when the stimulus argument of an object-experiencer verb was inanimate. For action verbs, the animacy of the patient had no effect, but, as explained above, such an effect was not expected given that the animacy of the underlying object was manipulated. In sum, the results of Ferreira (1994) allow the conclusion that argument order is influenced by both animacy and thematic roles, and neither can be reduced to the other.

Prat-Sala & Branigan (2000) introduced the distinction between *inherent* and *derived* accessibility. Inherent accessibility refers to permanent properties of a word, like concreteness, imageability or animacy. Derived accessibility, in contrast, refers to properties that depend on the prior linguistic and non-linguistic context. Derived accessibility can be increased by priming, making the referent of a word visually salient, or making it salient in terms of discourse structure, for example by making it the topic of the current discourse. A comprehensive list of properties that have been investigated under the label of conceptual accessibility can be found in Jaeger & Norcliffe (2009: 869). What is missing from their list is accessibility related to thematic roles, as investigated by Ferreira (1994). Since being an agent or a patient is not a permanent property of a concept but a property that a concept has by virtue of being part of the message that is the input to grammatical encoding process, this property can be counted among the properties determining a noun's derived accessibility.

Prat-Sala & Branigan (2000) present two cross-linguistic experiments that investigated the contribution of derived accessibility on the order of arguments. In both experiments, participants – who were either native speakers of English or of Spanish – had to describe pictures which showed an agent and a patient engaged in some action. Each picture was accompanied by a verbal context that increased the salience of either the agent or the patient. In the first experiment, both agent and patient were animate. Overall, most sentences produced by the participants started with the agent in first position. However, when the patient was made salient by the preceding verbal context, a substantial number of sentences were patient-initial sentences. In the second experiment, the agent could be either animate or inanimate. Inanimate agents were placed more often in non-initial position, and thus led to more patient-initial sentences. The results of Prat-Sala & Branigan (2000) thus show that both inherent accessibility (animacy) and derived accessibility (discourse salience) affect the order of arguments.

2.2 The basic word-order of German

As pointed out at the beginning of this paper, generative accounts of German V2 clauses standardly assume that the derivation of a V2 clause starts with the generation of all structure below the CP level, that is, the middlefield and the right clausal bracket in traditional terminology. When this part of the tree is completed, C° is filled by movement of the finite verb and SpecCP alias the prefield is filled by movement of one phrase selected from the syntactic tree generated before. According to Frey (2004), the middlefield-initial XP is moved to the prefield unless pragmatic reasons indicate otherwise. This type of movement is called *formal movement* by Frey (2004). V2 clauses that are derived by formal movement are expected to have the same pragmatic properties as clauses in which all arguments appear in the same order within the middlefield. In particular, the order of arguments in V2 clauses with sentence wide-focus, that is, out-of-the-blue utterances, should mirror the order of arguments within the middlefield.

The next question then is how the arguments of a verb are ordered within the middlefield. There is a rich body of literature on this topic within theoretical linguistics (e.g., Lenerz 1977; Grewendorf 1989; Haider 1993; Müller 1999), as well as some studies within psycholinguistics (e.g., Pechmann et al. 1996) and corpus linguistics (e.g. Hoberg 1981; Bader & Häussler 2010). As far as NP arguments are concerned that are neither pronouns nor part of an idiomatic expression, there is a broad consensus that the order of arguments in the middlefield is to a large

degree determined by two properties that fall under the notion of conceptual accessibility as discussed above: the animacy of the arguments and the thematic roles assigned to them by the verb. The exact contribution of these two properties is a controversial issue, but recent evidence converges on the conclusion that animacy and thematic roles are both necessary in order to account for the full range of word order phenomena found within the German middlefield (Verhoeven 2015; Bader submitted).

In conjunction, Frey's (2004) claim that formal movement puts the XP that comes first in the middlefield into the prefield and the observation that the order of arguments in the middlefield is governed to a large extent by conceptual accessibility make the prediction that the prefield should preferentially be occupied by the most accessible argument. We next review experimental evidence that has tested this prediction.

2.3 Prior experimental studies of filling the prefield

In contrast to the vast linguistic literature on word order in German, language production studies on this topic are rare. In this section, we summarize the few studies that provide experimental evidence on the question of how the prefield is filled during language production. Van Nice & Dietrich (2003) used a picture-description task in order to investigate the effect of animacy on the production of sentences with action verbs. Their experiments are special in that they varied the animacy of both the agent (as in Prat-Sala & Branigan 2000) and the patient (as in Ferreira 1994). In all three experiments – which differed with respect to the procedural details – the patient argument was put into the prefield most often when the agent was inanimate and the patient animate. The remaining conditions showed some variability depending on the procedural details, but in most cases the rate patient-initial sentences increased when the agent was made inanimate or the patient was made animate. Only passivization seems to have been used for bringing the patient to the prefield, as the authors only report passivization rates and do not consider the alternative means of producing an OS sentence.

Verhoeven (2014) presents an experiment on filling the prefield in German main clauses as part of a cross-linguistic investigation of the effects of thematic roles and animacy on the production of sentences with either a subject-experiencer or an object-experiencer verb. The experimental design of Verhoeven's experiments is similar to the design used by Ferreira (1994), the main difference being that Verhoeven investigated subject-experiencer verbs instead of action verbs. As shown in Table 3, the stimulus can vary with regard to animacy whereas the experiencer must be animate. As a consequence of this, in the case of subject-experiencer verbs all properties favor the production of active SO sentences or are neutral in this regard. For object-experiencer verbs, in contrast, the thematic roles lead to a preference for having the underlying object in front of the underlying subject. When the stimulus is inanimate, animacy also leads to a preference for having the experiencer in first position, whereas no order is preferred by animacy when the stimulus is animate.

Verhoeven (2014) used the same procedure of constrained production as Ferreira (1994). Participants saw the verb and two nouns and had to produce a complete sentence. The experiment for German yielded the following important findings. First, sentences with subject-experiencer verbs were almost always produced with SO order and the verb in the active voice, whether the stimulus was animate or inanimate. This is not unexpected given that such sentences have

Table 3: Verbs and their arguments used in the experiment of Verhoeven (2014)

Subject-experiencer verb:			Object-experiencer verb:		
bewundern 'admire'			*interessieren* 'interest'		
subject	>	object	subject	>	object
experiencer	>	stimulus	stimulus	<	experiencer
animate	≥	animate/inanimate	animate/inanimate	≤	animate
Kunde 'client'		*Friseur*/*Frisur* 'hairstylist'/'haircut'	*Clown*/*Aufführung* 'clown'/'performance'		*Zuschauer* 'spectator'

no property that would favor bringing the underlying object (= the stimulus) into sentence initial position. Second, sentences with an object-experiencer verb were often produced with the underlying object (= the experiencer) in first position. The rate of sentences with the underlying object in initial position was above 50% when the stimulus was animate and it increased even further when the stimulus was inanimate. Third, the preferred means for bringing the underlying object into the prefield was to use a non-canonical verb form – verbal or adjectival passive or the anti-causative construction. Active OS sentences were also produced, but almost exclusively when both thematic roles and animacy together pulled the underlying object toward the prefield. However, even then only about 10% of the produced sentences occurred with OS order. In summary, the results of Verhoeven (2014) extend the findings of Ferreira (1994) to German: the order of arguments is affected by conceptual accessibility both in terms of thematic roles and in terms of animacy.

In contrast to van Nice & Dietrich (2003) and Verhoeven (2014), who looked at the effect of lexical-semantic factors on word order, Skopeteas & Fanselow (2009) looked at the effect of the discourse-status of the arguments. As part of a larger cross-linguistic study, Skopeteas & Fanselow (2009) investigated the effect of givenness on the filling of the prefield in German. Skopeteas & Fanselow used a picture description task for eliciting sentences in which agent and patient were both animate. Participants always saw two pictures. The first picture showed either the agent alone or the patient alone. The second picture showed an action involving two participants, the one already seen in the first picture and a second one that was not seen before. Thus, either the agent was given and the patient was new, or the other way around. The sentences that were produced by the participants to describe the second picture showed a clear effect of givenness. When the agent was given, it appeared without exception in the prefield as the subject of a verb in the active voice. When the patient was given, the agent occurred in the prefield in only 77% of the cases. In the remaining 23%, the patient occurred in the prefield. In 10 out of 11 cases, the patient was brought into the prefield by using the verb in the passive voice. In only one case did a participant produce an OS sentence. The reasons that Skopeteas & Fanselow (2009) propose for the strong preference for passivization as the means to front a patient will be discussed in section 3.

2.4 New experimental evidence

Based on the insights gained by the research reported above, we ran a series of three experiments that made use of a common set of sentence materials in order to address how the three different types of conceptual accessibility discussed above – animacy, thematic roles, and discourse status – affect the order of arguments in simple German declarative main clauses. In addition, we tested the same materials with two experimental tasks – constrained production and picture description – in order to reveal possible differences between the tasks.

Like the experiments by Ferreira (1994) and Verhoeven (2014), we contrasted canonical verbs for which the thematic role of the subject is more prominent than the thematic role of the object (action verbs) with non-canonical verbs for which it is the other way around (object-experiencer verbs). In addition, we tested the effect of animacy. As discussed above, Ferreira (1994) and Verhoeven (2014) varied animacy in such a way that animacy could have an effect on sentences with non-canonical verbs but not on sentences with canonical verbs. As shown in Table 4, we again used object-experiencer verbs as non-canonical verbs and thus tested sentences with an animate experiencer and a stimulus that could be either animate or inanimate. If animacy affects linearization, we expect that the experiencer is more often brought to the prefield when the stimulus is inanimate than when it is animate. In order to make a parallel prediction for canonical verbs, we followed Prat-Sala & Branigan (2000) and van Nice & Dietrich (2003) and used action verbs with an agent/causer that could be either animate or inanimate. The patient was always animate in order to make the experimental design not too complicated, and because the experiencer of the non-canonical verbs also was animate. For action verbs, an effect of animacy would result in a higher rate of putting the patient into the prefield when the agent/causer is inanimate. An additional prediction concerns the different thematic roles assigned in the two verb classes. Based on existing evidence, we expect that experiencers will more often occur in the prefield than patients.

Table 4: Verbs and their arguments used in our experiments

Action verb:			Object-experiencer verb:		
erschlagen 'strike-dead'			*interessieren* 'interest'		
subject	>	object	subject	>	object
agent	>	patient	stimulus	<	experiencer
animate/inanimate	≤	animate	animate/inanimate	≤	animate
Räuber/*Fels* 'burglar'/'rock'		*Bergsteiger* 'alpinist'	*Veteran*/*Buch* 'veteran'/'book'		*Regisseur* 'director'

Experiment 1 and Experiment 2 both test the production of sentences in a neutral discourse context but use different experimental procedures – Experiment 1 the constrained production task and Experiment 2 a picture description task. Experiment 3 uses the same picture description task as Experiment 2, but with a context that establishes the underlying object as topic.

Experiment 1: Constrained production

Our first experiment used the same method of constrained production as the experiments by Ferreira (1994) and Verhoeven (2014). We constructed 48 word triples consisting of two nouns and a verb as shown in Table 4. 24 triples contained an action verb, an animate noun intended as patient, and a noun intended as agent, which could be either animate or inanimate. 24 further triples contained an object-experiencer verb, an animate noun intended as experiencer, and a noun intended as stimulus, which could be either animate or inanimate.

24 students from the Goethe University Frankfurt produced sentences using the following procedure. The three sentence fragments appeared on a computer screen in front of the participant, one below the other. The verb always appeared in the lowest position. The positions of the two nouns were systematically varied in order to determine whether presentation order had an effect on the order of arguments within the sentences produced by the participants. For reasons of space, we present results collapsed across this factor. Participants were asked to mentally form a sentence using all words seen on the screen. They were told that function words could be added in order to arrive at a complete sentence, but that no additional content words should be used. As soon as they had formed a complete sentence, they pressed a key on the computer keyboard and uttered the sentence they had formulated.

All sentences produced by the participants were digitally recorded and later scored for order (subject initial/subject non-initial) and voice (active, verbal passive, adjectival passive, anti-causative). The different voice categories are illustrated in (5).

(5) a. **SO active**
Das Buch interessiert den Regisseur
the book.NOM interests the director.ACC

b. **OS active**
Den Regisseur interessiert das Buch
the director.ACC interests the book.NOM

c. **verbal passive**
Der Bergsteiger wurde vom Fels erschlagen
the alpinist.NOM was by the rock striken dead

d. **adjectival passive**
Der Regisseur ist an dem Buch interessiert
the director.NOM is at the book interested

e. **anti-causative**
Der Regisseur interessiert sich für das Buch
the director.NOM interests himself for the book

The results for this experiment are shown in Figure 1. The category 'passive' includes both adjectival and verbal passive. Sentences with an action verb and two animate NPs were almost always realized as active SO sentences, resulting in a very low rate of non-canonical order (that is, an order in which the underlying object was put into the prefield). This rate increased both when the animate subject was replaced by an inanimate subject, or when the action verb was replaced by an object-experiencer verb, or when both changes were made. We thus see independent and nearly additive effects of animacy and thematic roles. In absolute terms,

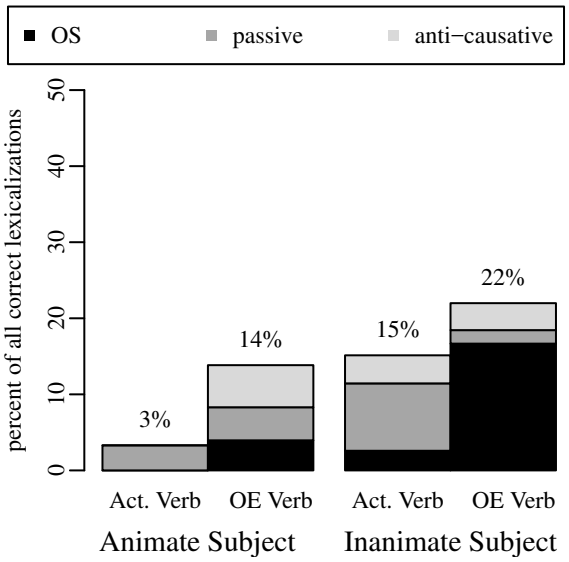


Figure 1: Results for Experiment 1 (Act. Verb = Action Verb, OE Verb = Object-Experiencer Verb)

these factors did not have strong effects, resulting in about 22% sentences with non-canonical order when this order was favored by both factors. An additional finding concerns how non-canonical order was realized. When non-canonical order was favored by animacy or thematic roles alone, active OS sentences were produced in a minority of cases, but when non-canonical order was favored by both animacy and thematic roles, the majority of the sentences with non-canonical order were active OS sentences. Thus, as far as the use of OS order is concerned, the two factors do not seem to work additively.

Experiment 2: Picture description and wide focus

Overall, the rate of sentences starting with the underlying object was low in Experiment 1. Even when both animacy and thematic roles pulled the underlying object toward the prefield, this happened in only 22% of all sentences produced by our participants. Since the procedure of constrained production is somewhat artificial, we decided to rerun Experiment 1 with a different experimental task. In Experiment 2, participants had to describe pictures in a single sentence. The material for this experiment was based on the 48 triples that were constructed for Experiment 1, with occasional replacements of nouns that could not easily be depicted. For each of the 48 verb-noun triples, two pictures were drawn by our colleague Heike Doussier. Figure 2 shows the pictures corresponding to the sentence materials in Table 4. Especially for verbs denoting psychological states or events, it is almost impossible to come up with pictures that unambiguously trigger the use of the verb that we intended participants to use. The verb was therefore always displayed above the picture on the computer screen. Furthermore, participants heard a sentence introducing the arguments seen on each picture in order to prevent

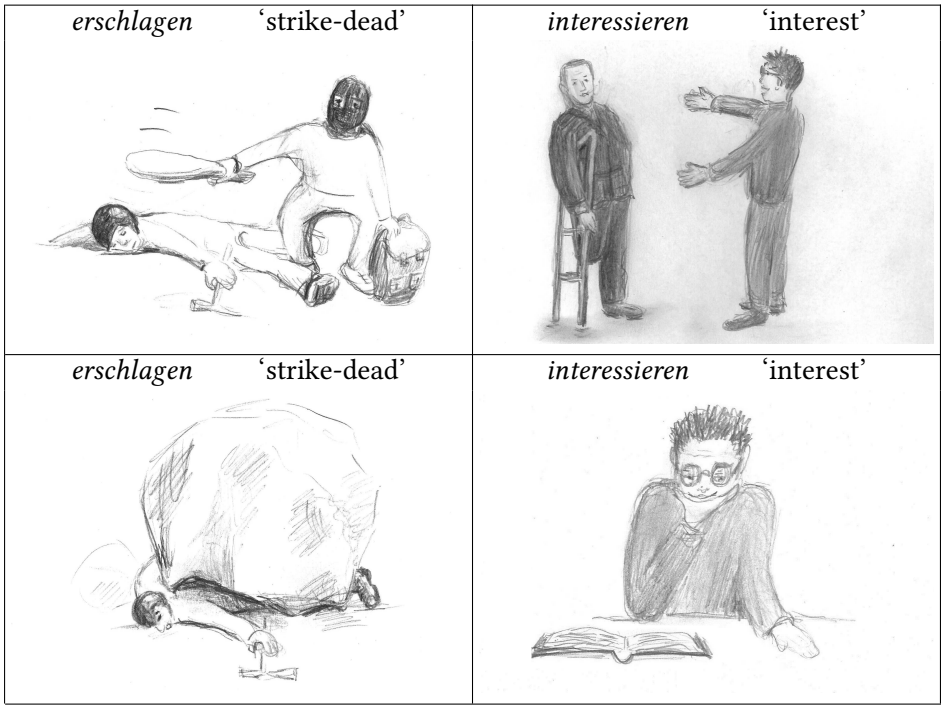


Figure 2: Example pictures used in Experiment 2 and Experiment 3.

the frequent use of general nouns like "man" or "boy". The clause introducing the arguments was always followed by a wide-focus question. The order of the arguments in the introductory clause was systematically varied, and the left-right order of the depicted participants in the pictures was aligned with their order in the preceding clause. An example is provided in (6).

(6) Hier geht es um einen Räuber/Fels und einen Bergsteiger. Was ist zu sehen?
'In this picture a burglar/rock and an alpinist are involved. What can you see?'

24 students of the University of Frankfurt produced picture descriptions in the following way. After pressing a key on the keyboard, participants saw a picture with the target verb printed above it. Simultaneously with the onset of the picture presentation, the introductory sentence and the wide focus question were started to play. After participants had heard the question, they produced a sentence describing the picture and then pressed a key to receive the next item.

Sentences were scored for order and voice using the same categories as in Experiment 1. The results for this experiment are shown in the graphic on the left side of Figure 3. Overall, the rate of sentences produced with non-canonical order was substantially higher in Experiment 2 than in Experiment 1. As before, animacy and thematic role had approximately additive effects. With regard to the means used for bringing the underlying object to the prefield, Experiment 2 differs markedly from Experiment 1. In contrast to the first experiment, hardly any OS sentences were produced in the current experiment. Instead, in the majority of cases, passivization was used for this purpose, and the anti-causative construction also occurred regularly.

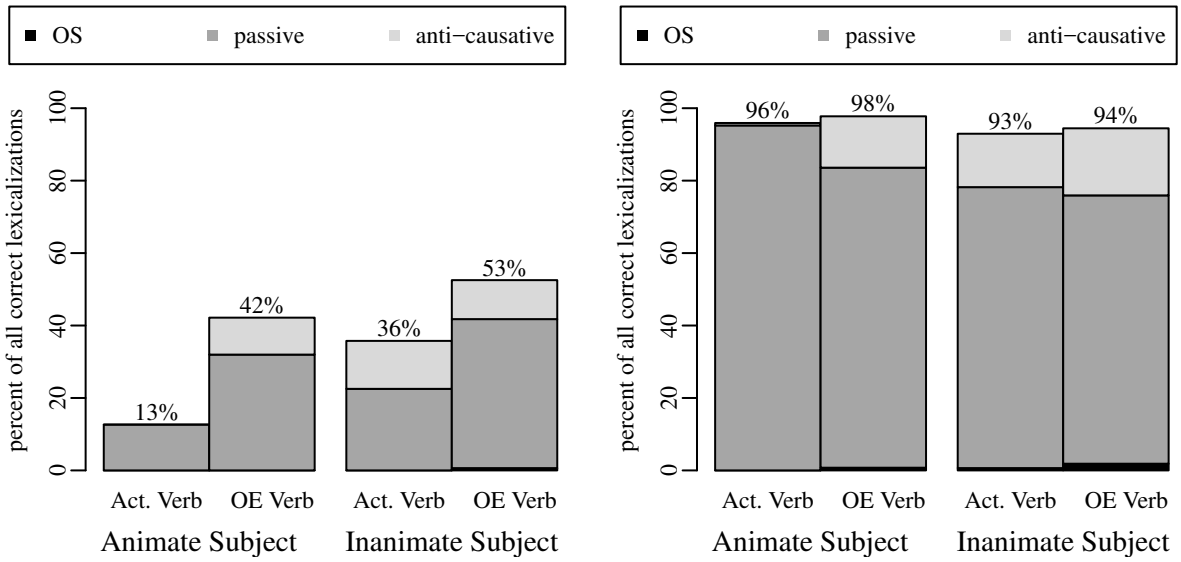


Figure 3: Results for Experiment 2 (left side) and Experiment 3 (right side) (Act. Verb = Action Verb, OE Verb = Object-Experiencer Verb)

Experiment 3: Picture description and narrow focus

The first two experiments have shown clear effects of conceptual accessibility derived from lexical-semantic properties of the verb and its arguments. In order to explore the effect of conceptual accessibility based on discourse properties, Experiment 3 replicates Experiment 2 with only one change. The wide focus question introducing each picture was replaced with a narrow focus question, as shown in (7). The question requested information about the underlying object, thereby establishing it as the sentence topic.

(7) Hier geht es um einen Räuber/Fels und einen Bergsteiger. Was lässt sich über den Bergsteiger sagen?
'In this picture a burglar/rock and an alpinist are involved. What can one say about the alpinist?'

The experimental material, the experimental procedure and the scoring of the digitally recorded sentences produced by 16 students of the Goethe University Frankfurt was identical to Experiment 2. The results, which are shown on the right-hand side of Figure 3, show that the change of the introductory question had a tremendous effect on participants choice of a phrase for the prefield. In over 90% of all sentences, the underlying object, which was made the topic by the preceding question, was put into the prefield, independent of animacy and thematic role. As in the preceding experiment using picture description, the rate of OS sentences was exceedingly low.

2.5 Conceptual accessibility and the prefield: Summary

The three experiments that we have run in order to investigate the effect of conceptual accessibility on filling the prefield show that the rate of fronting the underlying object – which was always animate and either a patient or an experiencer – increases if the subject is inanimate, or the object is an experiencer, or the object is made the topic. Our experiments thus confirm earlier findings that inherent and derived conceptual accessibility have a strong effect on filling the prefield.

Our results go beyond the existing evidence in several respects. First, animacy and thematic roles had approximately additive effects on fronting the underlying object. This conclusion could not be reached in any of the prior experiments because none varied animacy on the higher argument of different verb types. Van Nice & Dietrich (2003) included only action verbs in their experiments. Verhoeven (2014) included both subject- and experiencer-object verbs and varied the animacy of the stimulus argument, which is the underlying object for subject-experiencer verbs but the underlying subject for object-experiencer verbs. An effect of animacy could therefore only be obtained for the latter verb type. Because we used action verbs instead of subject-experiencer verbs, we could vary the animacy of the underlying subject for both canonical and non-canonical verbs, and could thus reveal that animacy and thematic roles affect the decision about which argument to put into the prefield in an additive way. Since additivity is a strong indicator of independence (Sternberg 1998), our experiments strengthen the assumption that animacy and thematic roles independently contribute to the order of arguments.

Second, making the underlying object the sentence topic had a much stronger effect than varying the lexical-semantic properties of the verb and its arguments, as shown by the striking difference between Experiment 2 and Experiment 3. As even a cursory look at Figure 3 shows, the effect of manipulating the discourse status of the underlying object was not additive. Making the underlying object the sentence topic by a preceding question resulted in more than 90% sentences with the topic – that is, the underlying object – in the prefield. Note that this high rate of non-canonical order is much higher than what has been found by Prat-Sala & Branigan (2000) and Skopeteas & Fanselow (2009). We attribute this finding to the fact that in our experiment the underlying object was explicitly turned into a sentence topic by a preceding question, whereas in the prior experiments the underlying object was made salient, but not a sentence topic. For example, the participants of Skopeteas & Fanselow's experiment simply saw the patient depicted on a picture preceding the picture to be described, without any additional verbal context. This shows that the specific discourse status of an underlying object – just given or given and a topic – has a strong effect on word order. With regard to the means used to bring the underlying object into the prefield there was no corresponding difference – passivization was strongly preferred in all cases. We come back to this finding in the next section.

A final finding is revealed by comparing Experiment 1 and Experiment 2 – these two experiments differed only with regard to the experimental procedure, constrained production in the former and picture description in the latter. This difference with regard to the elicitation method revealed a difference with regard to the means used to bring the patient/experiencer to the prefield. When using constrained production, most sentences with the underlying object in the prefield were active sentences with OS order when animacy and thematic prominence

jointly pulled the underlying object toward the sentence initial position. When participants had to describe pictures, they almost always used a non-canonical verb form in order to bring the underlying object into the prefield – the anti-causative construction and the adjectival passive for object-experiencer verbs and the anti-causative construction and the verbal passive for action verbs. OS sentences, in contrast, were rarely produced when describing pictures.

The question thus is why the procedure of constrained production elicited more OS sentences than the picture description procedure, whereas the picture description task elicited more sentences with non-canonical verb forms. We suspect that this difference comes about because constrained production is less spontaneous than picture description. In an experiment using constrained production, participants can engage in a process of deliberate reasoning as to what sentence to produce given the words seen on the screen. Only when this process is finished and a complete sentence has been formed do participants start uttering the sentence. When describing simple pictures of the sort used in our experiments, in contrast, participants typically start uttering the sentence immediately after they have heard the introductory context, without spending much time on pre-planning the sentence.

In the literature on grammatical encoding, there is some consensus that language production proceeds incrementally, although probably not radically so (see Christianson & Ferreira 2005, and Ferreira & Engelhardt 2006, and references cited there). That is, language production usually involves some form of pre-planning spanning several words. Furthermore, the amount of pre-planning seems to be under the strategic control of the speaker, at least to a certain degree. OS sentences arguably require more planning-ahead than SO sentences. A sentence with the most accessible argument realized as subject in clause-initial position can be started to be produced without much pre-planning, given that most NP arguments of the verb can be realized as subject by adjusting the voice of the verb accordingly.[2] To produce a sentence with OS order, in contrast, the argument structure of the verb has to be inspected first in order to determine the syntactic role of the most accessible argument. Only after it has been determined that the most accessible argument is an object argument can the production mechanism start with planning the sentence initial NP. The faster sentences are produced, and the less time therefore remains for planning-ahead, the more sentences with a subject in initial position will be produced.

Independent evidence for an account along these lines comes from an experimental investigation of the placement of object pronouns within the middlefield of German clauses. In an unpublished production experiment, participant read a main clause and had to transform it into an embedded clause, starting with a main clause that was given as a prompt. The main clause and the embedded clause had to be spoken out aloud. For example, the main clause in (8a) would have to be transformed into the embedded clause in (8b) (with the pronoun *ihn* included at only one of the two positions), where the prompt is *Peter sagte* 'Peter said'.

(8) a. Der Opa wird Peter besuchen.
the grandpa will Peter visit
'The grandpa will visit Peter'

[2]Even dative objects, which surface as dative objects in the regular passive voice, can be realized as subjects, namely by reverting to the *bekommen* passive (*get* passive, sometimes also called recipient passive). The semantic and syntactic constraints on the *bekommen* passive are more restricting than the constraints on the regular passive, but language producers are quite creative in stretching these constraints to their limits.

b. Peter sagte, dass (ihn) der Opa (ihn) besuchen wird.
Peter said that him the grandpa him visit will
'Peter said that the grandpa will visit him.'

In this experiment, the rate of sentences with initial object pronoun correlated with processing speed, as measured by the time taken to transform the sentences and to utter them: More SO sentences were produced when processing speed was high whereas more OS sentences were produced when processing speed was low.

3 Objects in the prefield

The experiments that we summarized in the preceding section revealed strong effects of conceptual accessibility, but were not particularly successful in eliciting object-initial sentences. Speakers of German mainly produced sentences in the passive voice in order to bring the underlying object of a verb into the prefield. Our experiments are not alone in this respect, as similar results have been obtained by van Nice & Dietrich (2003), Skopeteas & Fanselow (2009) and Verhoeven (2014). Skopeteas & Fanselow (2009) point out in the discussion of their experimental results that the strong preference for using passivization to bring a given object into the prefield is surprising for two reasons. First, under a typological perspective, German is a free word-order language, offering the possibility to front an underlying object directly, that is, without taking the detour of passivization. Second, corpus results by Weber & Müller (2004) found an OS preference when the patient was given and the agent was new. That their participants nevertheless reverted to passivization in order to bring the patient into the prefield leads Skopeteas & Fanselow (2009) to the conclusion that "the givenness of an object is not a sufficient reason for movement across the subject."

In this second part of our paper, we will take a critical look at this conclusion. We first give a short overview of some recent accounts of the role played by information structure on filling the prefield. After that, we present a mixture of observations – based on corpus counts and acceptability experiments – that suggest that, under the right circumstances, givenness alone can be sufficient to bring an object into the prefield.

3.1 How to fill the prefield: Linguistic accounts

In contrast to older work, which saw the prefield as the default position for the sentence topic, recent corpus-based research (Rambow 1993; Filippova & Strube 2007; Speyer 2007) and research in theoretical linguistics (Frey 2004) converge on the conclusion that the default position of the topic is at the left edge of the middlefield.[3] Speyer (2007) proposes that a topic NP is put into the prefield only when there is no other phrase that is higher-ranked in a hierarchy that ranks phrases according to their propensity to claim the prefield. Among the phrases that are higher ranked than the topic NP are phrases which denote a referent that is related to a referent introduced in the prior discourse by a *poset* relation (Ward & Prince 1991; Birner & Ward 1998). A *poset* relation is a relation that imposes a partial ordering on a given set of elements.

[3] This position is also called the Wackernagel position when it is occupied by a weak pronoun or a clitic. Since we are interested in topics of various forms, we will not use this term here.

A proto-typical poset relation is the part-of relation. An example of an NP denoting a referent that is a part of a referent introduced in the preceding discourse is given in (9).

(9) [S1] Loos starb im Sanatorium Kalksburg bei Wien, wo er mit einer Krankenschwester befreundet war, die **er** dem Vernehmen nach heiraten wollte.
'Loos died in the sanitarium Kalksburg near Vienna, where he was friends with a nurse, who he wanted to marry according to accounts received.'
[S2] Er ruht in **einem Grab** auf dem Wiener Zentralfriedhof (Gruppe 0, Reihe 1, Nummer 105).
'He is buried in a grave at Vienna Central Cemetery.'
[S3] **Den Grabstein** hatte er selbst entworfen.
'The gravestone he had designed himself.'

The gravestone mentioned in [S3] has not been mentioned before, but it is a part of the grave mentioned in the preceding sentence [S2]. The gravestone thus stands in a poset relation to the previously introduced grave. As predicted by Speyer's theory, the object NP *den Grabstein* occupies the prefield, and the subject NP *er*, which is the sentence topic, occupies the initial position of the middlefield.

Experimental evidence for the strong preference of putting poset elements into the prefield has been provided by Weskott et al. (2011), who investigated two-sentence discourses as shown in (10).

(10) Peter hat den Wagen gewaschen.
Peter has the.ACC car washed.
'Peter has washed the car.'

a. **SO follow-up sentence**
Er hat den Außenspiegel ausgelassen.
he.NOM has the.ACC side mirror left-out
'He left the side mirror out.'

b. **OS follow-up sentence**
Den Außenspiegel hat er ausgelassen.
the.ACC side mirror has he.NOM left-out.
'The side mirror, he left out.'

The context sentence introduces two referents. The referent of the subject NP, which can be considered as the sentence topic, is taken up in the next sentence by a subject pronoun. The referent of the object NP of the second sentence is a part of the referent of the object NP in the first sentence. The two referents are thus connected by a poset relation. Since poset elements are higher ranked than topics in the prefield hierarchy of Speyer (2007), OS order as in (10b) should be preferred to SO order as in (10a). This is exactly what Weskott et al. (2011) found in an acceptability judgment experiment and a self-paced reading experiment. In the acceptability experiment, OS sentences like (10b) received a rating of 6.33 whereas SO sentences like (10a) received a rating of 5.93 on a scale from 1 'totally unacceptable' to 7 'perfectly acceptable'. In the self-paced reading experiment, OS sentences were read faster than SO sentences. In the terminology of Weskott et al. (2011), this is a case of *strong licensing* of the OS order. Strong

licensing contrasts with cases of *weak licensing*, which refers to cases where OS sentences are judged as equally acceptable as corresponding SO sentences.

As intriguing as the results of Weskott et al. (2011) are, they leave unanswered several questions. First, can strong licensing of an OS order also be obtained with relations other than a poset relation? Second, what role did it play that the subject was a personal pronoun in the sentences of Weskott et al. (2011)? We next present evidence aimed at answering these questions.

3.2 Givenness, referential choice and OS order

The first question raised by the findings of Weskott et al. (2011) is whether strong licensing the OS order can also be found when the object does not stand in a poset relation to some preceding referent. In particular, can strong licensing also be found when the referent of an object NP stands in a simple identity relation to a given discourse referent? There are several referential expressions for this case: full DPs, in particular definite and demonstrative DPs, as well as pronominal DPs, including personal pronouns, demonstrative pronouns, and so-called d-pronouns, which are form-identical to the definite article with few exceptions. D-pronouns have referential properties that put them somewhere between personal pronouns and demonstrative pronouns (Zifonun et al. 1997; Bosch et al. 2007).

As far as personal pronouns are concerned, it has often been observed that they avoid the prefield when realizing the object, except for special cases (see Lenerz 1992). D-pronouns, in contrast, occur quite freely in the prefield. Evidence for this difference from an ongoing corpus study is provided in Table 5. Whereas the vast majority of subject pronouns in the prefield are p-pronouns, the majority of object pronouns in the prefield are d-pronouns.

Table 5: Percentages of different types of pronouns in the prefield depending on case. The data are from a search of about 20% of the deWac Corpus (Baroni et al. 2009).

	Type of pronoun	
Case	Personal pronoun	D-pronoun
Nominative pronoun in the prefield	95.8 (149183)	4.2 (6518)
Accusative pronoun in the prefield	38.2 (582)	61.8 (943)

Objects that are realized as demonstrative NPs also show a preference for the prefield. In an analysis of a subset of the German Wikipedia, sentences in which the subject was the personal pronoun *er* 'he' occurred with SO order in more than 85% of the cases when the object was a definite or an indefinite NP. When the object was a demonstrative NP, in contrast, about 75% of the sentences had the object in the prefield. In sum, objects show a high inclination to appear in the prefield when they are demonstrative NPs and d-pronouns.

In two acceptability experiments, we tested whether the strong licensing of the OS order can also be observed for objects realized either as d-pronouns or as demonstrative NPs. For reasons of comparisons, we also included a condition in which the object was a personal pronoun. 16 sentence quartets were constructed adhering to the scheme in (11).

(11) Heute morgen habe ich einen wichtigen Kunden angerufen.
today morning have I a important client called
'This morning, I had to call an important client.'

a. **SO follow-up sentence**
Ich musste ihn/den/diesen Kunden von unserem neuen Produkt überzeugen.
I must him/the/this client of our new product convince
'I had to convince him/this client of our new product.'

b. **OS follow-up sentence**
Ihn/Den/Diesen Kunden musste ich von unserem neuen Produkt überzeugen.
him/the/this client must I of our new product convince
'I had to convince him/this client of our new product.'

In one experiment, personal pronouns were compared with d-pronouns (*ihn* versus *den*). In another experiment, d-pronouns were compared with demonstrative NPs (*den* versus *diesen Kunden*). As in the study of Weskott et al. (2011), participants had to give acceptability judgments on a scale from 1 (completely unacceptable) to 7 (completely acceptable). For personal pronouns, the first experiment revealed the expected disadvantage of OS sentences in comparison to SO sentences (SO: 6.52 versus OS: 5.86). For the d-pronoun, in contrast, OS sentences showed an advantage in contrast to SO sentences (SO: 5.79 versus OS: 6.51). In the second experiment, the pattern for d-pronouns was replicated (SO: 4.73 versus OS: 5.82) whereas no difference showed up in the case of demonstrative DPs (SO: 6.1 versus OS: 6.0).

In sum, each of the three object expressions showed a different pattern: The usual default disadvantage for OS sentences was found when the object was a personal pronoun, weak licensing was found in the case of demonstrative DP objects, and strong licensing was observed in the case of d-pronouns. With regard to the question asked at the beginning of this section, we can conclude that the strong licensing of the OS order can be observed in cases where the object argument is related to a referent given in the prior discourse by the identity relation. A poset relation is thus not necessary for strong licensing. The results also show that the referential form used to realize the object matters. Before discussing these findings in more detail, we first turn to the second question raised by the findings of Weskott et al. (2011).

3.3 The status of the subject in OS sentences

In the sentences investigated by Weskott et al. (2011) as well as in our sentences the subject was the topic realized by a personal pronoun. The research on the syntax-pragmatic interface discussed above (Rambow 1993; Filippova & Strube 2007; Frey 2004; Speyer 2007) converges on the conclusion that the preferred position of sentence topics is the left edge of the middlefield, and that the topic is moved to the prefield just in case there is no other element claiming this position.

If the left edge of the middlefield is the preferred position for sentence topics, this could have contributed to the observation of strong licensing effects for certain sentences with OS order. Experimental evidence on this issue does not seem to be available. Preliminary corpus evidence comes again from the deWac corpus. Table 6 shows the percentage of pronouns directly following the verb in C^0, that is, at the left edge of the middlefield, depending on

whether the prefield was filled by a personal pronoun or a d-pronoun functioning as either subject or direct object.

Table 6: Percentages of non-pronominal and pronominal elements immediately following C^0 depending on the pronominal element in the prefield. The data are from a search of about 20% of the deWac Corpus (Baroni et al. 2009).

			Element after C^0	
Syntactic function	*Pronoun*	*Word*	Non-pronominal	Pronominal
Subject	P-pronoun	Er	94.2	5.7
	D-pronoun	Der	91.9	8.1
Direct object	P-pronoun	Ihn	77.8	22.3
	D-pronoun	Den	40.1	59.9

When the prefield hosts a subject pronoun, only a small percentage of the sentences has a pronoun at the beginning of the middlefield. When the prefield hosts an object pronoun, in contrast, the number of pronouns at the left edge of the prefield increases substantially. By far the strongest increase can be seen for the direct object d-pronoun *den*, for which a pronoun immediately follows C^0 in more than half of the cases. Since this pronoun is almost always a subject and the topic of the sentence, we conclude that fronting the object is indeed made easier when the subject is a topic and thus prefers to occupy the left-peripheral middlefield internal topic position.

3.4 Summary: Givenness and OS order

The experiments reviewed in the preceding section showed a strong preference for using passivization in order to bring an underlying object into the prefield, despite the fact that German is a free word order language. However, finding OS sentences in corpora is not difficult after all. As shown by Table 1 in the introduction, about 10% of all main clauses with a verb subcategorizing for a direct object occur with OS order. This section therefore explored some of the conditions that favor the production of OS sentences. Taking results obtained in prior research and our new data together, the following conclusion emerges. The use of sentences with OS order is particularly favored when both subject and object are given in the prior discourse and the subject is the sentence topic. The referent of the object NP can be given directly by being identical to a referent already mentioned in the prior discourse or indirectly by standing in a poset relation to an already established referent. In the former case, the use of OS order also depends on the referential form of the object. Whereas objects in the prefield are seldom realized as personal pronouns, they show a special inclination to be realized as d-pronouns or demonstrative NPs.

4 Conclusion

In the introduction, we considered someone who wants to verbalize the message that Peter fed the dog. With regard to grammatical encoding, this speaker has several options. First, the verb can be realized in the active voice or the passive voice. Second, either the agent or the

patient can be put into the prefield. In the first part of this paper we reviewed experimental evidence that has addressed the role played by conceptual accessibility for filling the prefield. This research has shown that the decision of which argument to bring to the prefield is heavily influenced by conceptual accessibility – both inherent accessibility in the form of animacy as well as accessibility derived from the clausal context (thematic roles) and the discourse context (topichood). An additional finding has been that when participants decide to put the underlying object into the prefield, they usually do so by producing a passive clause where the underlying object is realized as subject. Thus, participants show a strong preference to start their sentences with a subject.

It follows that a typical participant would verbalize the message that Peter fed the dog as in (12) when the dog was made highly accessible by the preceding context, for example by asking a question about it.

(12) Der Hund wurde von Peter gefüttert.
the.NOM dog was by Peter fed
'The dog was fed by Peter.'

In the second part of this paper, we took a closer look at the circumstances under which OS sentences are produced. The participants in the production experiments that we have reviewed were rather reluctant to produce OS sentences, but corpus data show that such sentences are not exceedingly rare. Taking prior proposals concerning the preferred position of a sentence topic as our starting point, we discussed a range of findings from corpus studies and from experiments measuring sentence acceptability. Taken together, these findings suggest that the production of OS sentences depends both on properties of the object and on properties of the subject. The chance that an OS sentence is produced is particularly high when the object is given and realized by a d-pronoun or a demonstrative NP and the subject is a topic realized by a personal pronoun. A typical use of an OS sentence is thus as in (13).

(13) A: Was macht Peter? Hat er sich um den Hund gekümmert?
what makes Peter has he himself about the dog cared
'What about Peter? Did he take care of the dog?'
B: Ja, den hat er pünktlich gefüttert.
yes him has he on-time fed
'Yes, he fed him on time.'

When the object itself is the topic, the use of OS sentences is also possible, as shown in (14).

(14) A: Was macht der Hund? Geht es ihm gut?
what makes the dog goes it him well
'What about the dog? Is he fine?'
B: Ja, den hat Peter pünktlich gefüttert.
yes him has Peter on-time fed
'Yes, he fed him on time.'

Even in these cases, SO sentences are not excluded, especially when a personal pronoun is used to refer to the dog. Further experiments are therefore necessary in order to reveal the exact circumstances under which participants produce OS sentences.

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