(Non)Attitude verbs and control shift: Evidence from German[1]

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Abstract. Recent work on obligatory control (OC) phenomena (following, in particular, Landau 2015) holds that certain non-canonical OC construals such as partial control, implicit control or control shift are generally possible with matrix attitude verbs but not with nonattitude verbs. The crosslinguistic validity of this empirical generalization, however, is subject to ongoing research. With regard to German, it has been disputed for the case of implicit control (Pitteroff and Schäfer, 2019), but supported for partial control (Pitteroff et al., 2017). The study reported in this paper contributes experimental evidence for an attitude/nonattitude contrast in the availability of control shift in German. The results also indicate that the relevant difference concerns the interpretation rather than the acceptability of the triggering construction, thus adding some nuance to the empirical picture on control shift.

Keywords: obligatory control, control shift, attitude contexts, German

1. Introduction

For a long time, syntactic and semantic approaches to obligatory control (OC) phenomena advanced in a largely unconnected fashion. Landau (2015, 2018) proposes a theory of OC that reconciles these two perspectives and takes into account that certain non-canonical readings in OC constructions arise only in the complement of attitude verbs (see e.g. Pearson 2013, 2016, White and Grano 2014 on partial control). The canonical case of OC involves exhaustive identification of the covert embedded subject of an infinitival complement with the overt nominal subject of the matrix predicate in the case of subject control verbs (1a,b) or with an overt object in the case of object control verbs (1c). (Following convention in the theoretical literature on control phenomena, we represent the covert embedded subject as PRO.) As a concise characterization of obligatory control, we reproduce Landau's (2013) 'OC signature' in (2).

(1) a. John$_i$ tried [PRO$_i$ to bake a cake].
b. Mary$_i$ promised John$_j$ [PRO$_{i/*j}$ to bake a cake].
c. Mary$_i$ persuaded John$_j$ [PRO$_{*i/j}$ to bake a cake].
(exs. adapted from Stiebels 2007: 1)

(2) **The OC signature** (Landau, 2013: 29)
In a control construction [... X$_i$ ... [$_S$ PRO$_i$ ...] ...], where X controls the PRO subject of the clause S:
a. The controller(s) X must be (a) co-dependent(s) of S.
b. PRO (or part of it) must be interpreted as a bound variable.

Let us now illustrate some non-canonical cases of obligatory control. PARTIAL CONTROL (PC), shown in the examples in (3), constitutes the case where only 'part of' PRO is interpreted as

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a bound variable (cf. (2b)). In PC construals, the reference of the embedded subject properly includes the reference of the controller (i.e. they are not identical).

(3) a. The chair$_i$ preferred [PRO$_{i+}$ to gather at 6].
b. Bill$_i$ regretted [PRO$_{i+}$ meeting without a concrete agenda].
c. John advised Mary to work on the project as a team.
(exs. from Landau 2013: 157; Pearson 2016: 725)

The examples in (4) illustrate the closely related phenomenon of SPLIT CONTROL, which refers to cases in which two nominal arguments of the matrix predicate together control the embedded subject.

(4) a. John$_i$ proposed to Mary$_j$ [PRO$_{i+j}$ to meet each other at 6].
b. John$_i$ asked Mary$_j$ [PRO$_{i+j}$ whether to get a new car]. (Landau, 2013: 172)

As a third example of a non-canonical OC construction, (5) illustrates IMPLICIT CONTROL (with impersonal passives). In these cases, the embedded subject is controlled by the implicit argument (IA) of the matrix predicate in an impersonal passive construction.

(5) a. It was IA$_i$ decided [PRO$_i$ to move forward].
b. It was IA$_i$ hoped [PRO$_i$ to provide an accessible and more effective service].
c. It was IA$_i$ planned [PRO$_i$ to focus on certain sectors such as tourism].
(exs. adapted from Landau 2013: 181)

Finally, (6) illustrates CONTROL SHIFT, which is the focus of this paper. (6a) is an example of 'subject-to-object' control shift, i.e. an OC construction that involves a ditransitive subject control verb (*promise*) but allows for an object control reading. 'Object-to-subject' control shift, where the obligatory object control verbs *ask, persuade, beg* allow for subject control, is shown in (6b-d). Notably, control shift usually occurs with 'de-agentivized' complement clauses (term adopted from Landau 2015, for discussion see Růžička 1983; Farkas 1988, among many others), for instance when the complement is passivized or when it contains a modal.

(6) a. Grandpa promised the children$_i$ [PRO$_i$ to be able to stay up for the late show].
b. Jim$_i$ asked Mary [PRO$_i$ to be allowed to get himself a new dog].
c. Susie$_i$ persuaded the teacher [PRO$_i$ to be allowed to leave early].
d. John$_i$ begged Mary [PRO$_i$ to be allowed to consult a doctor].
(Landau, 2013: 136)

The remainder of the paper is structured as follows. In the next section, we briefly introduce the empirical and theoretical background of our study (mainly referring to Landau 2015) and we review some previous experimental work on non-canonical OC in German. In Section 3, we present our experimental study on control shift. Section 4 provides some conclusions as well as further discussion of our results.

2. Background

2.1. Non-canonical OC and the attitude/nonattitude split

Control predicates vary in their tolerance for non-canonical OC. In (7)–(10), we provide some examples from the literature showing that verbs such as *try, manage, begin* or *force* are incompatible with the control readings illustrated above.

(7) No partial control (exs. adapted from Pearson 2016: 692)
a. *John$_i$ tried [PRO$_{i+}$ to assemble in the hall].
b. *John$_i$ managed [PRO$_{i+}$ to go on vacation together].
c. *John$_i$ dared [PRO$_{i+}$ to work on the problem as a team].

(8) No split control (ex. from Landau 2015: 78)
*Bill$_i$ forced / compelled George$_j$ [PRO$_{i+j}$ to deal with themselves first].

(9) No implicit control (exs. adapted from Pitteroff and Schäfer 2019: 144)
a. *It was tried to understand the analysis.
b. *It was begun to clean up the living room.
c. *It was managed to find a solution to this problem.

(10) No control shift (exs. from Landau 2013: 137)
a. *Bill$_i$ forced the judge [PRO$_i$ to be allowed to live].
b. *John$_i$ encouraged Bill [PRO$_i$ to be allowed to leave].

A central proposal in Landau (2015) is that such non-canonical control readings are restricted to OC constructions that involve matrix ATTITUDE predicates, and related observations can be found in Pearson (2013, 2016) with regard to partial control in particular. Pearson observes that all control predicates that allow for PC readings belong to the attitude class. Note that this class includes not only predicates of mental attitude such as *want, hope, regret*, but also communication verbs, e.g. *claim, promise, advise* (see also Pearson 2020 for explicit discussion of this definition of attitude predicates).[2]

Landau's (2015) 'Two-tiered Theory of Control' (TTC) provides an analysis of obligatory control that takes these generalizations into account. The TTC integrates insights on control from earlier syntactic analyses (in particular the Agree model, see Landau 2000 et seq.) and formal semantic accounts of control such as Chierchia (1989); Pearson (2013, 2016) with the goal of providing a comprehensive theory of OC that captures (among other things) obligatory *de se/ de te* readings, agreement facts and various non-canonical control phenomena. According to the TTC, attitude predicates and nonattitude predicates give rise to two different control mechanisms: OC constructions involving nonattitude predicates are associated with PREDICATIVE CONTROL, whereas OC constructions with matrix attitude predicates involve LOGOPHORIC

[2]Note also that, according to Pearson's (2013) classification of PC predicates, not all attitude predicates are compatible with partial control. For instance, verbs such as *try* or *dare*, which are restricted to exhaustive control, are referred to as 'non-canonical attitude verbs' in Pearson (2013). Verbs in this class intuitively have attitude ascription as part of their lexical meaning, but they do not display the opacity effects that are characteristic of canonical attitude predicates. For discussion and empirical support for Pearson's classification see also White and Grano (2014).

CONTROL.[3] These different types of control account for the empirical differences summarized in Table 1 (adapted from Landau 2015: 66). Inspired by Pitteroff and Schäfer (2019), we refer to the contrasts stated in Table 1 as LANDAU'S GENERALIZATION(S).

	Predicative control (nonattitude contexts)	Logophoric control (attitude contexts)
Inflected complement	✓	*
[-human] PRO	✓	*
Implicit control	*	✓
Control shift	*	✓
Partial control	*	✓
Split control	*	✓

Table 1: Empirical differences between logophoric and predicative control (Landau 2015)

For reasons of space, we do not discuss the technical details of the TTC in this paper. Nonetheless, let us briefly summarize the features of predicative and logophoric control that are relevant for deriving the proposed contrast in the availability of control shift. In **predicative control** constructions, the control complement denotes a property (type $\langle e,\langle s,t\rangle\rangle$)[4], created by movement of PRO to the left edge of the embedded clause, where PRO λ-binds its own trace. The denotation of the complement is directly applied to the matrix subject in the case of subject control or to the object (in a small clause configuration) in the case of object control. In consequence, the 'control' relation is confined to strict identity and all non-canonical readings, including control shift readings, are impossible.[5] **Logophoric control** is more complex in that it involves an additional syntactic tier, in the CP domain above the predicative structure, which is headed by a special complementizer C^{OC}. This complementizer projects one of the individual coordinates of the embedded context (AUTHOR or ADDRESSEE) as a covert pronoun (pro_x or pro_y) in its specifier. The property created by PRO movement is predicated over this covert pronoun, which in turn is bound by one of the matrix arguments (pro_x by the matrix AUTHOR, pro_y by the matrix ADDRESSEE). Importantly, the grammar only specifies that some individual coordinate of the embedded context (pro_x or pro_y) be projected, not which. For this reason, control shift is not excluded in logophoric control configurations.

2.2. Non-canonical OC in German

Before turning to our own study, we briefly review some previous empirical works pertaining to non-canonical OC construals in German. Partial control in German has been investigated in a study reported in Pitteroff et al. (2017). This study provides experimental evidence for a

[3]Landau's analysis builds on previous accounts of control as predication (e.g. Williams 1980; Chierchia 1984, 1989; Clark 1990) and logophoricity (e.g. Williams 1992, for discussion and further references see Landau 2013, 2015). A major novelty of Landau (2015) lies in applying these mechanisms to two subtypes of OC.

[4]The class of nonattitudinal control predicates includes aspectual verbs such as *begin*, in which case the complement is assumed to be of type $\langle d,\langle e,\langle s,t\rangle\rangle\rangle$, see Landau (2015: 24 f.) for a sample derivation.

[5]See however Pearson (2016) for an analysis of partial control that treats OC complements as properties, and derives partial control readings directly from the semantic properties of attitude verbs.

contrast between attitude and nonattitude verbs[6] in the licensing of PC, showing that, unless the complement clause contains a predicate that potentially licenses 'fake' partial control by means of an implicit comitative (see e.g. Hornstein 2003; Boeckx et al. 2010), partial control is acceptable only if the matrix predicate belongs to the attitude class. Thus, one of the conclusions that can be drawn from Pitteroff et al. (2017) is that German appears to comply with Landau's generalization as far as partial control is concerned, i.e. attitude verbs license (real) PC, nonattitude verbs do not.

Pitteroff and Schäfer (2019) investigate Landau's generalization with a focus on implicit control, based on crosslinguistic data from questionnaire studies in eight languages. Their results support Landau's generalization for English as well as French, Russian and Hebrew. In these languages, implicit control as illustrated in (5) seems to be restricted to OC constructions involving attitude verbs. However, Pitteroff and Schäfer (2019) also show that in four Germanic languages in their sample, namely in German, Dutch, Norwegian and Icelandic, implicit control is possible with nonattitude verbs as well, contrary to Landau's generalization.

Thus with respect to German, previous empirical works provide diverging evidence pertaining to Landau's generalizations as summarized in Table 1: embedding under an attitude predicate seems to be a necessary condition for licensing partial control, but not implicit control. Our experimental study, reported in the next section, aims to complement this empirical picture by investigating whether evidence can be found for a difference between attitude and nonattitude contexts in the availability of control shift in German.

A relevant study on control shift from a different theoretical angle is reported in Panther and Köpcke (1993) (see also Panther 1994). Panther and Köpcke (1993) investigate 10 ditransitive German control verbs and their English equivalents, which they group into 5 classes: i) commissives: *versprechen, zusagen / promise, give one's word*, ii) consultatives: *empfehlen, raten / recommend*, iii) directives: *bitten, beschwören / request, implore*, iv) perlocutives: *überzeugen, überreden / convince, persuade*, v) implicatives: *veranlassen, zwingen / induce, force*. A crucial empirical result of their investigation is that ditransitive control verbs in German are more likely to license control shift than their English equivalents. We will come back to this in Subsection 3.3, when we discuss our predictions.

To summarize, previous empirical works suggest the following generalizations on non-canonical OC in German as a background of our own study:

1. Landau's generalization seems to apply to German in the case of partial control (Pitteroff et al., 2017).
2. There is crosslinguistic variation with respect to Landau's generalization in the case of implicit control. In particular, the generalization seems to apply to English, but *not* to German in the case of implicit control (Pitteroff and Schäfer, 2019).
3. German is more prone to control shift than English (Panther and Köpcke 1993).

[6]Pitteroff et al. (2017) stick with the terminological distinction between P(artial) C(ontrol) predicates and E(xhaustive) C(ontrol) predicates that originates in Landau's earlier work, but acknowledge that this corresponds to the attitude vs. nonattitude distinction.

3. Experiment

In view of these findings, we tested whether Landau's generalization applies to German in the case of control shift. A relevant formulation from Landau (2015) is reproduced in (11).

(11) **Landau's generalization** (control shift): "all the verbs that display control shift [...] induce logophoric control, not predicative control" (Landau, 2015: 76)

Given that only attitude predicates display logophoric control, (11) implies that all control predicates that are compatible with control shift are attitude predicates. Hence, control shift is predicted to be licensed in (some) attitude complements, but not in nonattitude complements. The relevant contrast is illustrated for English in (12). According to Landau (2015), a subject control reading is licensed in an OC construction containing the object control verb *ask* and a 'de-agentivized' *be-allowed-to* complement (which is a typical control shift trigger in English), as in (12a). Crucially, *ask* is a communication verb and thus belongs to the attitude class. The same control shift trigger does not license subject control readings with the implicative object control verbs *force* and *compel*, which belong to the nonattitude class, (12b).

(12) a. Jim$_i$ asked Mary [PRO$_i$ to be allowed to get himself a new dog].
b. ?*She$_i$ forced/compelled her parents [PRO$_i$ to be allowed to quit school].
(Landau, 2015: 75/76)

3.1. Design and materials

In our experiment, we manipulated the factors VERB TYPE (levels: *attitude* verb vs. *nonattitude* verb) and VOICE (levels: *active* infinitival complement clause vs. *passive* infinitival complement clause) in a 2×2 design. We constructed 12 items in which we crossed these factors to obtain 4 conditions: 1. attitude verb / active complement, 2. nonattitude verb / active complement, 3. attitude verb / passive complement, 4. nonattitude verb / passive complement.

The verbs we tested (based on a selection from the ZAS database on clause-embedding predicates, Stiebels et al. 2018) are listed in (13) and (14). We only used object control verbs so as to exclude any potential bias introduced by subject control predicates.[7] Notably, most attitude object control verbs are communication verbs.

(13) Attitude verbs
bitten (ask/request), *auffordern* (ask), *befehlen* (command), *raten* (advise), *empfehlen* (recommend), *beschuldigen* (accuse), *überzeugen* (convince), *überreden* (persuade), *verpflichten* (obligate), *anflehen* (beg), *instruieren* (instruct), *unterstellen* (allege/accuse)

(14) Nonattitude verbs
(dazu) bringen (get sb. to do sth.), *zwingen* (force), *veranlassen* (cause/induce), *helfen* (help), *hindern* (hinder/prevent), *abhalten* (prevent), *ermöglichen* (enable), *lehren* (teach), *nötigen* (compel/coerce), *(dazu) treiben* (drive sb. to do sth.), *ersparen* (spare), *(dazu) bewegen* (move sb. to do sth.)

[7] In our assessment, ditransitive subject control verbs generally belong to the attitude class. This would also seem to follow from Landau's (2015) analysis, since controller choice is flexible only in logophoric control constructions.

We classified the verbs as attitude or nonattitude predicates based on standard opacity tests (e.g. failure of substitution with co-referring terms, contingency with empty predicates, see e.g. Pearson 2020).[8] Let us briefly illustrate opacity by example of contingency with empty predicates. The sentence in (15a) with the embedding communication verb *befehlen* ('command/order') is contingent, i.e. it can be true or false depending on Laura's orders in the actual world, regardless of the fact that there are no actual unicorns. The same sentence with the implicative verb *zwingen* ('force') in (15b) gives rise to a different intuition. In the actual world, which does not contain unicorns, (15b) is necessarily false. This is because (15b) is transparent in the sense that the truth of the sentence depends on the truth of the complement, and since non-existent unicorns cannot be caught, (15b) cannot be true in the actual world.

(15) Contingency with empty predicates
   a. Laura befahl Leo, für sie ein Einhorn zu fangen. (contingent)
      'Laura ordered Leo to catch a unicorn for her.'
   b. Laura zwang Leo, für sie ein Einhorn zu fangen. (false)
      'Laura forced Leo to catch a unicorn for her.'

An additional criterion we used to distinguish attitude from nonattitude verbs concerns restrictions on subject selection. Attitude verbs only select subjects that are potential attitude holders (or at least sources of information in the case of communication verbs, for discussion see e.g. Anand and Hacquard 2014). Nonattitude verbs show no such restriction, they are compatible with a wide variety of inanimate, non-sentient subjects. This contrast is illustrated for *befehlen* and *zwingen* in (16).

(16) a. #Die Hitze befahl mir, die Klimaanlage anzuschalten.
      # 'The heat ordered me to turn on the AC.'
   b. Die Hitze zwang mich, die Klimaanlage anzuschalten.
      'The heat forced me to turn on the AC.'

Object control predicates that behave like *befehlen* with respect to opacity and subject selection were classified as attitude verbs, those that behave like *zwingen* were allocated to the nonattitude class.

3.2. Participants and presentation

Our 12 target items were distributed across 4 lists in a Latin square design; each participant saw every item in one condition. The items were intermixed with 40 fillers and presented in pseudorandomized order. Each list thus contained 52 sentences plus two practice sentences; the study took about 25 minutes to complete. 80 German native speakers, who were recruited and compensated via the online platform Prolific, took part in the study. The experiment was created using the free experimental software OnExp (https://onexp.textstrukturen.uni-goettingen.de/) and made available online.

Participants were presented with one test sentence per page and were asked for two judgments per sentence. They should i) rate the acceptability of the sentence on a scale from 1 (unac-

[8]The distinction between attitude verbs and nonattitude verbs is mostly discussed with reference to transitive verbs, which made it difficult to find a list of ditransitive predicates in the literature that considers this distinction.

ceptable) to 7 (completely acceptable) and then ii) answer a question on its interpretation in a multiple choice task. The questions in the multiple choice task were constructed to elicit the possible control interpretations of the target sentence. The response options corresponded to (i) canonical (object) control, (ii) control shift, (iii) split control and (iv) no control (NC). The order of responses (i)–(iii) was varied across items. Participants could choose one or more responses and were instructed to select all response options they considered plausible. A complete item set is given in (17)–(20), an illustration of the visual presentation in Figure 1.

(17) **Condition 1: attitude verb, active complement**

a. *Test sentence:* Der Diktator befiehlt dem Minister, den General nach Frankreich zu bringen.
'The dictator commands the secretary to bring the general to France.'

b. *Question:* Wer soll den General nach Frankreich bringen?
'Who is supposed to bring the general to France?'

c. *Response options:*
(i) der Minister (the secretary) [CANONICAL (OBJECT) CONTROL]
(ii) der Diktator (the dictator) [SHIFTED (SUBJECT) CONTROL]
(iii) der Diktator und der Minister zusammen (the dictator and the secretary together) [SPLIT CONTROL]
(iv) jemand anderes (sb. else) [NO CONTROL]

(18) **Condition 2: nonattitude verb, active complement**

a. *Test sentence:* Der Diktator zwingt den Minister, den General nach Frankreich zu bringen.
'The dictator forces the secretary to bring the general to France.'

b. *Question:* Wer soll den General nach Frankreich bringen?
'Who is supposed to bring the general to France?'

c. *Response options:* (as above)
(i) der Minister (the secretary) [CANONICAL (OBJECT) CONTROL]
(ii) der Diktator (the dictator) [SHIFTED (SUBJECT) CONTROL]
(iii) der Diktator und der Minister zusammen (the dictator and the secretary together) [SPLIT CONTROL]
(iv) jemand anderes (sb. else) [NO CONTROL]

(19) **Condition 3: attitude verb, passive complement**

a. *Test sentence:* Der Diktator befiehlt dem Minister, nach Frankreich gebracht zu werden.
'The dictator commands the secretary to be brought to France.'

b. *Question:* Wer soll nach Frankreich gebracht werden?
'Who is supposed to be brought to France?'

c. *Response options:* (as above)
(i) der Minister (the secretary) [CANONICAL (OBJECT) CONTROL]
(ii) der Diktator (the dictator) [SHIFTED (SUBJECT) CONTROL]
(iii) der Diktator und der Minister zusammen (the dictator and the secretary together) [SPLIT CONTROL]
(iv) jemand anderes (sb. else) [NO CONTROL]

(20) **Condition 4: nonattitude verb, passive complement**

a. *Test sentence:* Der Diktator zwingt den Minister, nach Frankreich gebracht zu werden.
'The dictator forces the secretary to be brought to France.'

b. *Question:* Wer soll nach Frankreich gebracht werden?
'Who is supposed to be brought to France?'

c. (as above)

d. *Response options:* (as above)

(i) der Minister (the secretary) [CANONICAL (OBJECT) CONTROL]

(ii) der Diktator (the dictator) [SHIFTED (SUBJECT) CONTROL]

(iii) der Diktator und der Minister zusammen (the dictator and the secretary together) [SPLIT CONTROL]

(iv) jemand anderes (sb. else) [NO CONTROL]

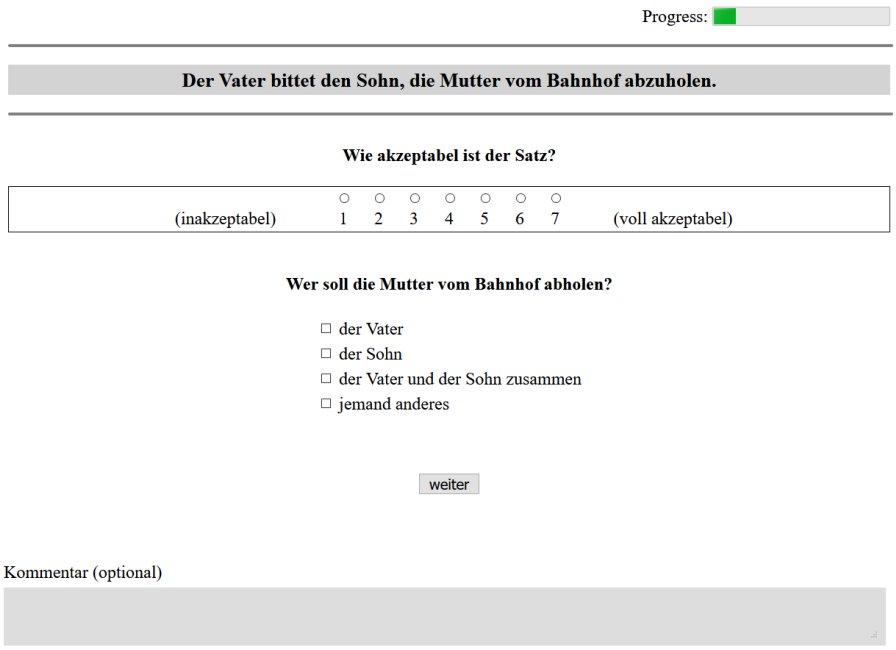

Figure 1: Example of a target item as seen by the participants

3.3. Predictions

The two-step task described above was intended to examine whether any possible effect of the verb class is due to a contrast in acceptability or interpretation. In other words, we aimed to investigate whether a potential ban of control shift with nonattitude verbs arises because the shifted interpretation is unavailable or because the control shift trigger (passivization) leads to ungrammaticality in nonattitude contexts (or both).

If Landau's generalization applies to German (and if the German verbs in (14) exhibit predicative control), this predicts that nonattitude verbs do not license control shift, but attitude

verbs license control shift to some extent. Moreover, the presence of a control shift trigger is a factor in the experiment; control shift is predicted only with passivized complements. Hence, based on Landau's generalization, we predict control shift only in the attitude/passive condition (condition 3, see ex. (19)).

	att/active	nonatt/active	att/passive	nonatt/passive
control shift	×	×	✓	×

Table 2: Predictions on the availability of control shift based on Landau (2015)

More precisely, if Landau's generalization holds, we predict an interaction between the factors VERB TYPE and VOICE. Depending on whether this is an effect of interpretation or acceptability (or both), this interaction will surface in the frequency of control shift responses in the multiple choice task or in the ratings in the acceptability judgment task (or both).

Let us briefly relate this prediction to the previous studies on non-canonical control in German (see Subsection 2.2). Panther and Köpcke (1993) do not consider a classification into (non)attitude verbs in their study. However, their sample includes 5 object control verbs from our attitude class (*raten, empfehlen* / recommend, *bitten* / request, *überreden* / persuade, *überzeugen* / convince) and 2 object control verbs from our nonattitude class (*zwingen* / force, *veranlassen* / induce). In their study design, Panther and Köpcke (1993) also consider the possibility that the constructions triggering control shift are unacceptable. They gave participants the option to select "reject" as an alternative to subject or object control. In their data on German, *zwingen* ('force') and *veranlassen* ('induce') receive more (shifted) subject than (canonical) object control responses. The rejection rates are relatively high (23% and 31%, respectively), but similar to those obtained for the attitude verbs *empfehlen* ('recommend', 29%), *raten* ('advise', 37%) and *überreden* ('persuade', 20%). Based on this, we might hypothesize that independent factors facilitate control shift interpretations for both attitude and nonattitude verbs in German (similar to what has been argued for implicit control by Pitteroff and Schäfer 2019), i.e. that Landau's generalization does not apply to German. In terms of our predictions, this amounts to the null hypothesis that the attitude/nonattitude distinction is not decisive for the availability of control shift. In this case, we predict only a main effect of VOICE in our data:

	att/active	nonatt/active	att/passive	nonatt/passive
control shift	×	×	✓	✓

Table 3: Predictions on the availability of control shift based on the null hypothesis

3.4. Results

The results of the multiple choice task are depicted in Figure 2 and summarized in Table 4 below.

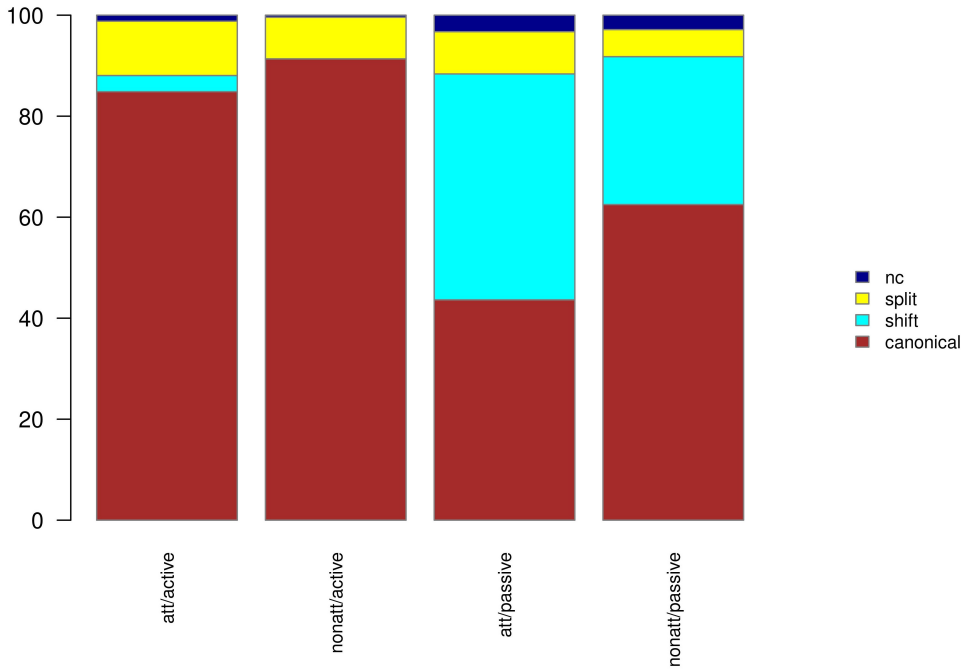

Figure 2: Proportions of responses across conditions

	canonical (object)	shift (subject)	split	no control
attitude/active	213	8	27	3
nonattitude/active	222	0	20	1
attitude/passive	120	123	23	9
nonattitude/passive	175	82	15	8

Table 4: Absolute frequencies of selected responses by condition

The plot shows considerable proportions of control shift responses (depicted in light blue) in both passive conditions, especially in the attitude/passive condition, where they are predicted to occur under Landau's generalization,[9] while in the active conditions participants predominantly selected for the response option corresponding to canonical (object) control.

We used binomial logistic regression to analyze the data statistically and to test for the predicted interaction between the factors. Fitting complex logistic regression models was complicated by the zero count of control shift responses in the nonattitude/active condition (see Table 4). On account of this separation in the data, we opted for a logistic regression model using Firth's

[9]Based on Landau's generalizations in Table 1, we might expect a contrast between attitude and nonattitude contexts also with respect to split control responses. These were selected overall very rarely by the participants, and they were not in the focus of our study, so we do not discuss them in any detail. We note however that split control responses were indeed selected more frequently with attitude than with nonattitude matrix verbs in our study. A generalized mixed effects model with VERB TYPE as fixed effect (and by-item and by-participant random intercepts) fitted to the split control responses suggests that this might be a true effect (β = -0.5, 95% CI [-1, -0.003], p = .048). We leave a more detailed investigation of split control for future research.

bias reduction method (Firth, 1993; Heinze and Schemper, 2002). The model was fitted to the control shift responses (using the logistf package in R, Heinze et al. 2022), with VOICE, VERB TYPE and their interaction as predictors. The results provide some (albeit not very strong) evidence for an interaction between the factors VERB TYPE and VOICE (β = 2.16, 95% CI [0.03, 7.04], p = .046). Assuming that there is indeed an interaction effect, the descriptive statistics suggest that it is driven by the difference between the verb types in the two passive conditions. We investigated this in more detail by fitting a generalized linear mixed effects model (using the glmer function from the lme4 package in R, Bates et al. 2015) to the control shift responses obtained in conditions 3 and 4. The model was specified with VERB TYPE as fixed effect and by-item as well as by-participant random intercepts. In addition, we included by-item random slopes for the predictor in the model, to account for variation between individual attitude and nonattitude verbs that were paired in the items (see Section 4 for some discussion of the differences in observed control shift responses within verb classes). Even with this variation taken into account, the constructed model revealed a significant effect of VERB TYPE (β = -1.19, 95% CI [-2.23, -0.14], p = .026), providing additional evidence for a difference between the two verb classes in the availability of control shift readings triggered by embedded passive.[10]

The results of the *acceptability judgment task* are plotted in Figure 3 and summarized in Table 5.

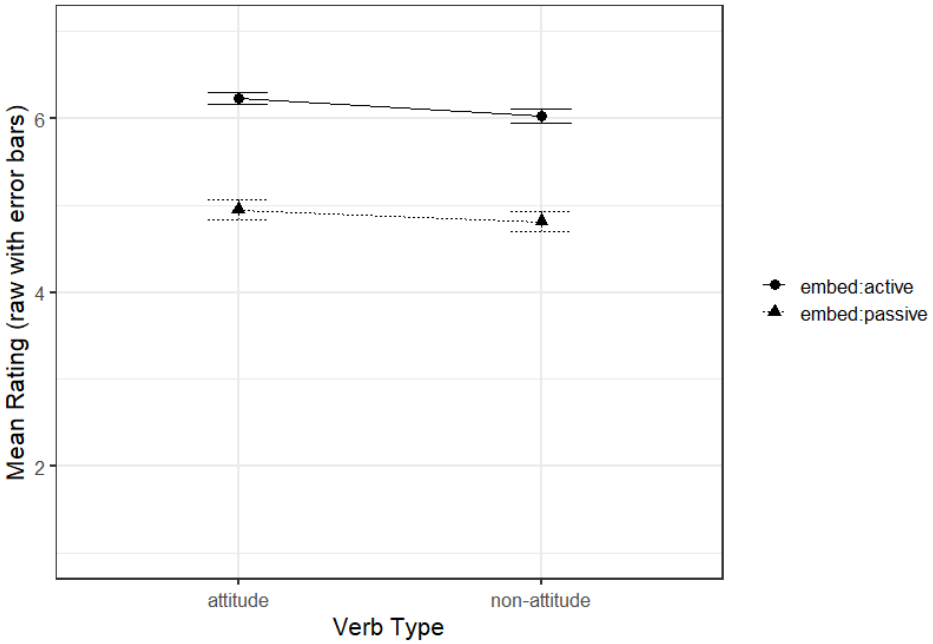

Figure 3: Acceptability ratings across conditions

	active complement	passive complement
attitude verb	6.23 (1.07)	4.95 (1.76)
nonattitude verb	6.03 (1.25)	4.81 (1.73)

Table 5: Mean acceptability ratings by VERB TYPE and VOICE, standard deviation in parentheses

[10] According to a simpler model without varying slopes, the effect of VERB TYPE is highly significant (β= -1.09, 95% CI [-1.57, -0.62], p $<$ .001). A likelihood ratio test however indicated significantly better model fit with by-item random slopes.

Visual inspection suggests that i) there is no interaction between the factors in this case, ii) passivization in the complement clause decreases acceptability across verb type conditions, and iii) sentences with attitude verbs receive slightly higher ratings than sentences with nonattitude verbs. For the statistical analysis, we fitted a linear mixed effects model (using the lmer function from the lme4 package in R) with VERB TYPE, VOICE and their interaction as fixed effects and by-participant and by-item random intercepts as well as by-participant and by-item random slopes for VERB TYPE and VOICE. The model indicated no interaction between the factors (β = 0.07, 95% CI [-0.21, 0.34], t = 0.48), but a significant effect of VOICE (β = -1.28, 95% CI [-1.67, -0.89], t = -6.79). The difference between verb types does not reach significance according to this model (β = -0.2, 95% CI [-0.56, 0.15], t = -1.2). Same as in the analysis of the multiple choice data, we also compared the two passive conditions in order to examine the difference between verb types. The linear mixed model with VERB TYPE as fixed effect and random by-item and by-participant intercepts as well as by-item random slopes fitted to the acceptability ratings in conditions 3 and 4 revealed no significant effect (β = -0.14, 95% CI [-0.71, 0.43], t = -0.53).

4. Conclusions and further discussion

Summing up the results of our study, sentences with passivized complement infinitives were more likely to give rise to control shift responses and received lower acceptability ratings than sentences with active infinitival complements. The former confirms that passivization acts as a control shift trigger in German, the latter may reflect greater complexity of the construction as well as the fact that passivization may not be equally natural with all embedding verbs (see the Appendix for the full list of items). Crucially, passivization seems to affect the acceptability of the overall construction to a similar extent in attitude and nonattitude contexts. The proportion of control shift responses in the multiple choice task however differed depending on the verb type: sentences with matrix attitude verbs were more likely to give rise to control shift readings when embedding a passivized complement than sentences with nonattitude verbs. Our results thus provide some quantitative evidence for Landau's generalization with respect to control shift in German. Beyond that, the data obtained in our study suggest that the relevant difference between the verb classes lies in their possible interpretations rather than in the acceptability of the triggering construction, a differentiation that is rarely made explicit in the literature. On the other hand, the results also suggest that control shift is in fact possible with nonattitude predicates in German, contrary to Landau's generalization.

The plots below show the proportions of canonical, shifted and split readings broken down by items for attitude verbs (Figure 4) and nonattitude verbs (Figure 5) with passivized complements. This might give a hint as to which verbs are most likely to license control shift within the attitude and nonattitude class, respectively. (Note however that each verb was tested in only one lexical context, limiting any conclusions to be drawn about individual verbs.)

Within our attitude class, we seem to replicate Panther and Köpcke (1993)'s finding that directive verbs (e.g. *bitten* (ask/request), *anflehen* (beg), *befehlen* (command)) are more likely to give rise to control shift interpretations than 'consultative' verbs (*raten* (advise), *empfehlen* (recommend)).

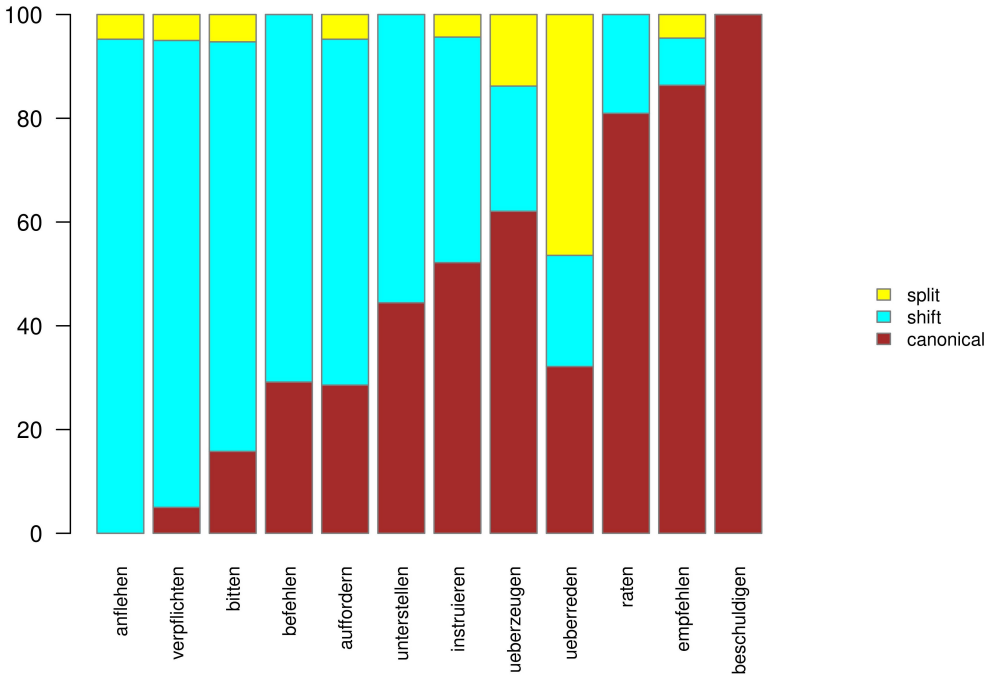

Figure 4: Proportions of responses in condition 3 (attitude/passive), by item

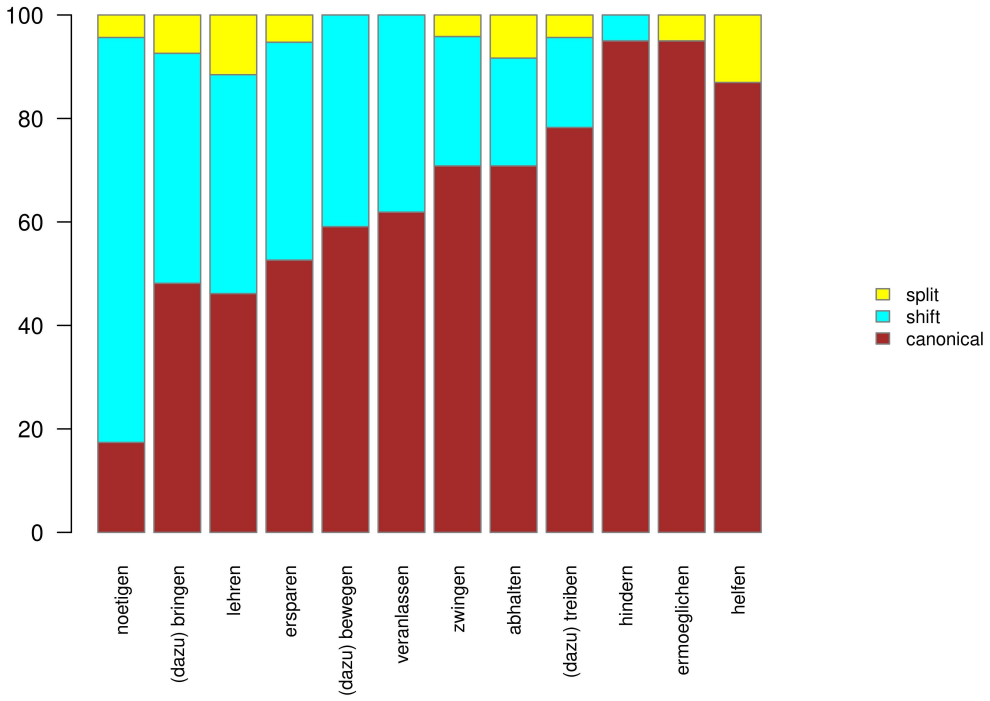

Figure 5: Proportions of responses in condition 4 (nonattitude/passive), by item

Figure 5 shows that several of the verbs in our nonattitude class seem to license control shift (including the implicative verbs *zwingen* (force) and *veranlassen* (cause/induce) that were also tested by Panther and Köpcke 1993). The verb *nötigen* (compel/coerce) sticks out in that the item with this verb predominantly elicited control shift readings in the passive condition. Recall that Landau (2015)'s analysis however excludes control shift in nonattitude contexts.

A possible explanation for the relatively high proportions of control shift we find with some verbs from our nonattitude class is that they can quite easily be reinterpreted as attitude verbs. That is, verbs like *nötigen* and *dazu bringen* allow for an (implicative) nonattitude as well as an attitude (≈ 'persuade'/'command') interpretation, and speakers who access the latter can get control shift readings. This would predict that control shift with nonattitude verbs is more sharply infelicitous with subjects that cannot be attitude holders, cf. (21b) in contrast to our original test sentence in (21a).[11] Recall that all the verbs from our nonattitude class are in principle compatible with such subjects, as illustrated by the naturally occurring example in (22) (retrieved from the internet).

(21) a. Die Unternehmerin$_i$ nötigt den Geschäftspartner$_j$, [PRO$_{i/j}$ über jede Entscheidung informiert zu werden].
b. Die Auftragslage$_i$ nötigt den Geschäftspartner$_j$, [PRO$_{*i/j}$ über jede Entscheidung informiert zu werden].
'The entrepreneur / the order situation compels the business partner to be informed of every decision.'

(22) Der Betrag ist unangemessen und beleidigt die Opfer, deren soziale Lage sie zur Annahme nötigt.
'The amount is inappropriate and offends the victims, whose social situation compels them to accept it.'

We have to leave it for future research to investigate exactly what role the polysemy of embedding verbs plays in the licensing of control shift, and whether the availability of control shift readings with nonattitude verbs that surfaced in our study can be explained simply in terms of reinterpretation. In the future, it would also be interesting to conduct similar studies in other languages, in order to examine how Landau's generalization interacts with a language's general propensity to control shift. In any case, experimental studies help us refine our empirical and theoretical accounts of control phenomena across languages.

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[11] We thank Hagen Augustin for helpful discussion of this point. We also note that Landau (2015: 68) makes a similar observation with respect to the English verb *convince*, which might thus also belong to the class that have an attitude-like as well as a nonattitude reading.

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Appendix: Test Items

(23) a. Der Vater bittet den Sohn, die Mutter vom Bahnhof abzuholen.
b. Der Vater bringt den Sohn dazu, die Mutter vom Bahnhof abzuholen.
Frage: Wer soll die Mutter vom Bahnhof abholen?
c. Der Vater bittet den Sohn, vom Bahnhof abgeholt zu werden.
d. Der Vater bringt den Sohn dazu, vom Bahnhof abgeholt zu werden.
Frage: Wer soll vom Bahnhof abgeholt werden?

(24) a. Der Diktator befiehlt dem Minister, den General nach Frankreich zu bringen.
b. Der Diktator zwingt den Minister, den General nach Frankreich zu bringen.
Frage: Wer soll den General nach Frankreich bringen?
c. Der Diktator befiehlt dem Minister, nach Frankreich gebracht zu werden.
d. Der Diktator zwingt den Minister, nach Frankreich gebracht zu werden.
Frage: Wer soll nach Frankreich gebracht werden?

(25) a. Die Direktorin rät dem Schüler, den Lehrer in der Pause anzusprechen.
b. Die Direktorin veranlasst den Schüler, den Lehrer in der Pause anzusprechen.
Frage: Wer soll den Lehrer in der Pause ansprechen?
c. Die Direktorin rät dem Schüler, in der Pause angesprochen zu werden.
d. Die Direktorin veranlasst den Schüler, in der Pause angesprochen zu werden.
Frage: Wer soll in der Pause angesprochen werden?

(26) a. Die Professorin empfiehlt dem Kollegen, die bekannte Autorin zu einem Vortrag einzuladen.
b. Die Professorin hilft dem Kollegen, die bekannte Autorin zu einem Vortrag einzuladen.
Frage: Wer soll die bekannte Autorin zu einem Vortrag einladen?
c. Die Professorin empfiehlt dem Kollegen, zu einem Vortrag eingeladen zu werden.
d. Die Professorin hilft dem Kollegen, zu einem Vortrag eingeladen zu werden.
Frage: Wer soll zu einem Vortrag eingeladen werden?

(27) a. Der Sachbearbeiter beschuldigt den Chef, die Abgeordneten zu bestechen.
Frage: Wer besticht angeblich die Abgeordneten?
b. Der Sachbearbeiter hindert den Chef daran, die Abgeordneten zu bestechen.
Frage: Wer hätte die Abgeordneten bestochen?

c. Der Sachbearbeiter beschuldigt den Chef, bestochen zu werden.
Frage: Wer wird angeblich bestochen?
d. Der Sachbearbeiter hindert den Chef daran, bestochen zu werden.
Frage: Wer wäre bestochen worden?

(28) a. Die Schwester überzeugt den Bruder, den Onkel im Gästezimmer unterzubringen.
Frage: Wer soll den Onkel im Gästezimmer unterbringen?
b. Die Schwester hält den Bruder davon ab, den Onkel im Gästezimmer unterzubringen.
Frage: Wer hätte den Onkel im Gästezimmer untergebracht?
c. Die Schwester überzeugt den Bruder, im Gästezimmer untergebracht zu werden.
Frage: Wer soll im Gästezimmer untergebracht werden?
d. Die Schwester hält den Bruder davon ab, im Gästezimmer untergebracht zu werden.
Frage: Wer wäre im Gästezimmer untergebracht worden?

(29) a. Der Opa überredet die Oma, am Wochenende das Enkelkind zu besuchen.
b. Der Opa ermöglicht es der Oma, am Wochenende das Enkelkind zu besuchen.
Frage: Wer besucht am Wochenende das Enkelkind?
c. Der Opa überredet die Oma, am Wochenende besucht zu werden.
d. Der Opa ermöglicht es der Oma, am Wochenende besucht zu werden.
Frage: Wer wird am Wochenende besucht?

(30) a. Der Trainer fordert den Ringer auf, den Gegner mit Handschlag zu begrüßen.
b. Der Trainer lehrt den Ringer, den Gegner mit Handschlag zu begrüßen.
Frage: Wer soll den Gegner mit Handschlag begrüßen?
c. Der Trainer fordert den Ringer auf, mit Handschlag begrüßt zu werden.
d. Der Trainer lehrt den Ringer, mit Handschlag begrüßt zu werden.
Frage: Wer soll mit Handschlag begrüßt werden?

(31) a. Die Unternehmerin verpflichtet den Geschäftspartner, den Personalchef über jede Entscheidung zu informieren.
b. Die Unternehmerin nötigt den Geschäftspartner, den Personalchef über jede Entscheidung zu informieren.
Frage: Wer soll den Personalchef über jede Entscheidung informieren?
c. Die Unternehmerin verpflichtet den Geschäftspartner, über jede Entscheidung informiert zu werden.
d. Die Unternehmerin nötigt den Geschäftspartner, über jede Entscheidung informiert zu werden.
Frage: Wer soll über jede Entscheidung informiert werden?

(32) a. Die Rebellin fleht den Mitstreiter an, den Gefangenen kurz und schmerzlos zu töten.

b. Die Rebellin treibt den Mitstreiter dazu, den Gefangenen kurz und schmerzlos zu töten.
Frage: Wer soll den Gefangenen kurz und schmerzlos töten?
c. Die Rebellin fleht den Mitstreiter an, kurz und schmerzlos getötet zu werden.
d. Die Rebellin treibt den Mitstreiter dazu, kurz und schmerzlos getötet zu werden.
Frage: Wer soll kurz und schmerzlos getötet werden?

(33) a. Die Ärztin instruiert die Arzthelferin, den Patienten bei der Terminfindung zu unterstützen.
Frage: Wer soll den Patienten bei der Terminfindung unterstützen?
b. Die Ärztin erspart der Arzthelferin, den Patienten bei der Terminfindung zu unterstützen.
Frage: Wer hätte den Patienten bei der Terminfindung unterstützt?
c. Die Ärztin instruiert die Arzthelferin, bei der Terminfindung unterstützt zu werden.
Frage: Wer soll bei der Terminfindung unterstützt werden?
d. Die Ärztin erspart der Arzthelferin, bei der Terminfindung unterstützt zu werden.
Frage: Wer wäre bei der Terminfindung unterstützt worden?

(34) a. Der Anwalt unterstellt dem Kommissar, den Zeugen stundenlang zu befragen.
Frage: Wer befragt angeblich stundenlang den Zeugen?
b. Der Anwalt bewegt den Kommissar dazu, den Zeugen stundenlang zu befragen.
Frage: Wer soll den Zeugen stundenlang befragen?
c. Der Anwalt unterstellt dem Kommissar, stundenlang befragt zu werden.
Frage: Wer wird angeblich stundenlang befragt?
d. Der Anwalt bewegt den Kommissar dazu, stundenlang befragt zu werden.
Frage: Wer soll stundenlang befragt werden?