Incomplete Category Fronting in German without Remnant Movement

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Incomplete category fronting in German has been argued to involve movement of a constituent containing a trace (Thiersch 1985; Webelhuth and den Besten 1987; G. Müller 1996). In this paper, we show that the two kinds of examples used as key evidence for such remnant movement, partial-VP and "partial-NP" topicalization, do not motivate an unbounded dependency theory complex enough to license fronted constituents containing a gap. Formulating an HPSG theory based on lexical principles, we show that these phenomena and their interaction are more appropriately handled by generalizing the argument raising approach to partial VPs of Pollard (1996).

1 The issue

It is traditionally assumed that German declarative verb-second sentences are derived from verb-first structures by fronting a single constituent. A much-discussed aspect of this extraction is that it can involve what looks like a partial constituent.

(1) [[$\_{i}$ Verkaufen] wollen] wird er [das Pferd]$_i$.
sell want-to will he the horse

In (1) the transitive verb *verkaufen* has been fronted together with the modal verb *wollen*, leaving the complement of *verkaufen*, the NP *das Pferd*, behind. The relevant question in our context is whether the fronted partial verb-phrase constituent *verkaufen wollen* does itself contain a gap (or bear a nonempty SLASH value).

In the HPSG framework, Pollard (1996) proposed to license partial VP constituents for topicalization using argument raising, a special lexical specification introduced by Hinrichs and Nakazawa (1989) which allows a verbal complement taking verb to realize the unsaturated subcategorization requirements of its verbal complement. In constructions in which that verbal complement has been fronted, it thus does not need to include a trace for a missing argument since the unrealized valence requirements are mediated via argument raising.

However, G. Müller (1996, pp. 10f.) points out that not only direct arguments of the verb, but also more deeply embedded constituents can be missing from the fronted constituent as shown in (2).

(2) [[$_{NP}$ Ein Buch $_{-i}$] schreiben]$_j$ will niemand [$_{PP}$ darüber]$_i$ $_{-j}$.
a book write want-to no-one about-that

In such examples, the fronted verbal head has realized its nominal complement yielding a saturated VP constituent; but the nominal complement of the verb is lacking its PP argument. The theory of Pollard (1996) cannot account for such data, since raising the arguments of the fronted VP's verbal head as such is insufficient.

In this paper, we show that the phenomenon of partial-NP fronting and its interaction with VP topicalization as shown in (2) does not motivate a theory of unbounded dependencies licensing fronted constituents containing a gap. Zooming in on the properties of NPs missing a PP argument, we show that the arguments fielded in favor of an extraction analysis are not convincing. Instead, we argue that an analysis allowing argument raising of PP complements from nominal heads is more appropriate in that it makes additional correct predictions regarding possible word orders and correctly predicts the interaction with VP fronting.

2 NPs missing PP arguments

In this section, we are concerned with the status of NPs occurring separate from their PP arguments. Example (3) shows a sentence in which the PP argument of a noun has been topicalized.

(3) *Über Syntax* hat Hans sich [ein Buch] ausgeliehen.
About Syntax has Hans himself a book borrowed

Webelhuth (1992), G. Müller (1996), and others have argued that in such sentences the PP has been extracted from the NP. But as pointed out by Fanselow (1987), sentences like (4) are problematic for this assumption, since the extraction source *ein Buch* and not the extracted element *über Syntax* has been fronted.

(4) [Ein Buch] hat Hans sich *über Syntax* ausgeliehen.
A book has Hans himself about Syntax borrowed

For such examples, G. Müller (1996) argues that the fronted element contains a trace of the PP argument, i.e., the fronted NP is a so-called remnant category. The remnant category approach in a principles and parameters framework requires a complex explanation of how the trace in the fronted element can be bound by a filler that configurationally occurs lower in the tree. Similarly, for their remnant movement account of partial-VP topicalization Hinrichs and Nakazawa (1994) must extend the unbounded dependency mechanism of HPSG in order to mediate the nonlocal information about the gap inside the extracted category.

Alternatively, an analysis for the two kinds of examples in (3) and (4) could be provided along the lines of Fanselow (1987), who proposed to employ a reanalysis rule that splits up the complex NP into a partial NP and a PP which are sisters in the VP. G. Müller (1996) rejects such an approach for a number of empirical reasons and also since "such reanalysis rules cannot be expressed in the GB framework" (Müller 1991, p. 175, our translation). In the following, we show that the arguments he presents in favor of an extraction analysis are not convincing (sec. 2.1) and discuss evidence supporting a reanalysis-like approach (sec. 2.2). In section 4, such a reanalysis-like approach is then formalized in HPSG.

2.1 Arguments against extraction

G. Müller (1996) argues for a remnant-movement analysis by showing that the NP remaining in the Mittelfeld in (3) and the fronted NP in (4) obey the restrictions to be expected from a constituent containing a trace.

Firstly, he claims that fronting a PP argument of a subject NP and the reverse case of fronting an incomplete subject NP result in ungrammaticality, as is shown in (5). Since it is usually assumed that subjects in German may not contain a gap, this behavior would be predicted under a remnant-movement account.

(5) a. * *Worüber* hat [ein Buch] Karl beeindruckt?
About what has a book(nom.) Karl(acc.) impressed

b. * [Ein Buch] hat Karl *über Syntax* beeindruckt.

Haider (1993), however, presents examples like the ones shown in (6) which show that subject NPs can occur separate from their PP arguments.

(6) a. *Über Strauß* hat [ein Witz] die Runde gemacht.
About Strauß has a joke the round made

b. [Ein Witz] hat *über Strauß* die Runde gemacht.

Secondly, G. Müller (1996) uses examples like (7) to show that both fronting out of an NP and the reverse case exhibit the "Specificity Effect", a classical restriction on extraction.

(7) a. * *Über Syntax* hat Karl [**das** Buch] gelesen.
About syntax has Karl the book read

b. ?? [**Das** Buch] hat Karl *über Syntax gelesen.*

Again, it was already shown by Pafel (1993) that the specificity of an NP in German does not disallow fronting of its argument PP in general (8). As shown in (9), this is not even the case for the prime example of specificity, prenominal genitives.

(8) a. *Über Syntax* hat Karl nur **dieses**, aber nicht **jenes** Buch gelesen.
About Syntax has Karl only this but not that book read

b. [Nur dieses Buch] hat Karl *über Syntax* gelesen.

(9) a. *Über Syntax* hat Karl [nur **Margas** Buch] gelesen.
About syntax has Karl only Marga's book read

b. [Nur Margas Buch] hat Karl *über Syntax* gelesen.

Finally, G. Müller (1996) argues that a freezing effect can be observed: constituents appearing at the beginning of the Mittelfeld become opaque for extraction. He provides example (10) to show that this generalization carries over to the fronting of PP arguments of NPs – a claim which is falsified by examples like the one in (11) taken from Fanselow (1991).

(10) * *Worüber* hat [ein Buch] keiner gelesen?
About what has a book no-one read

(11) *Worüber* kann [einen Südkurier-Artikel] selbst Peter nicht am Strand verfassen?
About what can a *Südkurier* article even Peter not at the beach write

Summing up, none of the above arguments convincingly motivate the remnant-movement assumption that argument PPs are extracted out of NP.

2.2 Predictions of a reanalysis-like theory

We now turn to the alternative hypothesis, the assumption that the complex NP is "reanalyzed" as two sister categories, a partial NP and a PP. Such a theory would predict that the partial NP and the PP should appear separate from each other as other sister constituents do. The following examples show that this is in fact the case.

Regarding the word order possibilities in the Mittelfeld, example (12) illustrates that both the partial NP and the PP can appear independently at the beginning of the Mittelfeld and (13) that other material can appear in between the two constituents.

(12) a. Hans hat *über Syntax* schließlich [drei Bücher] gekauft.
Hans has about syntax finally three books bought

b. Hans hat [drei Bücher] schließlich *über Syntax* gekauft.

(13) a. Hans hat schließlich [drei Bücher] bei Osiander *über Syntax* gekauft.
Hans has finally three books at Osiander on syntax bought
b. Hans hat schließlich *über Syntax* bei Osiander [drei Bücher] gekauft.

Further support comes from an observation made by Grewendorf (1989, p. 46), who notes that independently of the PP, the NP can be included in the verbal complex in the so-called Oberfeld construction (cf., Bech (1955)):

(14) Niemand hätte gedacht,
a. daß Hans *über Becker* würde [einen Sieg] erringen können.
that Hans against Becker would a victory win be able to
b. daß er über Syntax würde [ein Buch] ausleihen müssen.
that he on syntax would a book to borrow have to

A reanalysis-like theory that analyzes these constructions as involving a PP and a partial NP as two separate sister categories thus makes the correct predictions.[1]

3 The interaction between VP fronting and partial NPs

As mentioned in the introduction, interesting empirical evidence arises from the fact that the topicalization of (partial) VPs can interact with the occurrence of partial NPs.[2] While one could argue that the sentence we showed in (2) is only grammatical since verbs like *schreiben* (to write) can also construct with a PP argument and an optional NP, the example (15) for a fronted VP including a partial NP shows that this construction is also possible for verbs like *ausleihen* which require an obligatory NP and no PP complement.

(15) [Ein dickes Buch ausleihen] will er *über Syntax*.
a thick book borrow wants-to he about syntax

The example in (16) illustrates that such interaction is also possible with a partially fronted VP including a partial-NP complement.

(16) [Ein dickes Buch ausleihen] will er *ihr hierzu* aber nicht.
a thick book lend wants-to he her on-this but not

But even though our discussion in section 2.2 showed that the partial NP and the PP with respect to their word order properties in the Mittelfeld behave

[1] Additional properties of such partial NP constructions, in particular the lexical restrictions involved, are discussed in De Kuthy (1998).

[2] Cf., also Grewendorf (1989).

like sister categories, fronting of the complement of an NP together with the embedding verb is ungrammatical, as shown in (17).

(17) * [Über Syntax ausleihen] will er *ein Buch*.
about syntax lend wants-to he a book

The complement of an NP in this respect thus behaves parallel to the complement of a verbal head in example (18) which illustrates that the raised complement of a verb cannot be fronted without that verbal head.

(18) * [Das Pferd müssen] wird er *verkaufen*.
the horse have-to will he sell

4 An HPSG analysis

In section 2 we showed that the empirical facts support a reanalysis-like approach over remnant movement. We now turn to the question of formalizing such a reanalysis-like theory in an HPSG architecture. We base this section on the theory for partial constituent fronting which we defined in De Kuthy and Meurers (1998) and add schemata for nominal structures in order to explicitly show how the grammaticality of the interaction of VP fronting with partial NPs discussed in section 3 is predicted. Following Meurers (1997), we introduce lexical principles to introduce argument raising as a generalizations over the mapping between argument structure and the valence specifications of verbs. In the lexicon, the argument structure is specified under the ARG-ST attribute, as shown in the lexical entries below.[3]

(19) a. $\begin{bmatrix} \text{PHON} & \langle \text{wollen} \rangle \\ \text{ARG-ST} & \left\langle NP, \begin{bmatrix} \text{L}|\text{C}|\text{HEAD} & \textit{verb} \\ \text{LEX} & + \end{bmatrix} \right\rangle \end{bmatrix}$ b. $\begin{bmatrix} \text{PHON} & \langle \text{empfehlen} \rangle \\ \text{ARG-ST} & \left\langle NP, \begin{bmatrix} \text{L}|\text{C}|\text{HEAD} & \textit{verb} \\ \text{LEX} & - \end{bmatrix} \right\rangle \end{bmatrix}$

c. $\begin{bmatrix} \text{PHON} & \langle \text{hoffen} \rangle \\ \text{ARG-ST} & \left\langle NP, \begin{bmatrix} \text{L}|\text{C}|\text{HEAD} & \textit{verb} \end{bmatrix} \right\rangle \end{bmatrix}$

In addition to the specification of the argument structure, the lexical entries also show that obligatorily coherent verbs verbs like *wollen* (want-to) in (19 a) mark their verbal complement as [LEX +], whereas obligatorily incoherent verbs like *empfehlen* (recommend) in (19 b) require it to be [LEX –]. The lexical entry

[3] The ARG-ST attribute is specified explicitly or derived by some kind of a linking theory. We assume argument raising to take place only with respect to the valence attributes, not on ARG-ST. The intuition behind this is that the argument structure should be a direct syntactic reflection of the semantic roles of a predicate.

of an optionally coherent verb like *hoffen* (hope) in (19 c) is underspecified and enforces no LEX restrictions on its complement.[4] Basically, marking a complement as [LEX −] corresponds to the X-bar schema condition that non-heads have to be completed projections. But while the X-bar schema is a condition on structures, the LEX attribute lexicalizes this restriction, which makes it possible to relax the [LEX −]-complement requirement for heads of a specific lexical class to account for cluster formation in coherent constructions.

The lexical principle shown in figure 1 expresses how the argument structure specified in the ARG-ST list of the lexical entries of base form verbs[5] determines the values of the valence attributes (SUBJ and COMPS). The first element ($\boxed{1}$) of

$$\begin{bmatrix} \textit{word} \\ \text{S}|\text{L}|\text{C}|\text{HEAD} \begin{bmatrix} \textit{verb} \\ \text{VFORM} \;\; \textit{bse} \end{bmatrix} \end{bmatrix} \rightarrow \begin{bmatrix} \text{S}|\text{L}|\text{C}|\text{V} \begin{bmatrix} \text{SUBJ} & \langle \boxed{1} \rangle \\ \text{COMPS} & \boxed{2} \oplus \Big(\textit{raised}(\boxed{3}) \wedge \textit{indep} \Big) \end{bmatrix} \\ \text{ARG-ST} \; \langle \boxed{1} \mid \boxed{2} \rangle \;\; \wedge \;\; (\boxed{3} \bigcirc \textit{indep}) \end{bmatrix}$$

Figure 1: The lexical argument-raising principle

the argument structure is assigned to be the subject and the rest of the arguments ($\boxed{2}$) are specified to surface on the COMPS list.[6] Appended ($\oplus$) to that COMPS list are the arguments raised from $\boxed{3}$. These raised arguments are required to be *indep(endent)*[7], i.e., saturated with respect to their complements and [LEX −]. This is also required of all arguments on ARG-ST except for the argument raising source $\boxed{3}$, which is shuffled ($\bigcirc$) into this list.

The relation *raised* defined in figure 2 specifies that the argument raising source is either empty, in which case no arguments are raised. Or it is a verb

[4] Kathol (1995) and S. Müller (1997) employ a special selection attribute (GOV or VCOMP) for complements of coherent verbs. This, however, results in two lexical entries for each optionally coherent verb instead of the underspecified single entry we propose here. Apart from this, regarding partial VP topicalization their analyses make the same predictions as the one we propose here.

[5] Finite verbs are assumed to be derived from their base forms by a lexical rule which among other things removes the subject from SUBJ and encodes it together with the complements on COMPS in the tradition of Pollard (1996).

[6] To concentrate on the relevant issues, we here ignore subjectless and subject raising verbs, the integration of which is possible but requires a principle with a more complex mapping for subjects.

[7] Relations are written in the functional notation traditionally used in HPSG. Definition of *indep*: $\textit{indep} := \langle \rangle.$

$$\textit{indep} := \left\langle \begin{bmatrix} \text{L}|\text{C}|\text{V}|\text{COMPS} & \langle \rangle \\ \text{LEX} & - \end{bmatrix} \middle| \; \textit{indep} \right\rangle.$$

$$
\begin{array}{l}
\mathit{raised}(\langle\rangle) := \langle\rangle. \\
\mathit{raised}\left(\left\langle \begin{bmatrix} \text{LEX} & + \\ \text{L}|\text{C} & \begin{bmatrix} \text{HEAD} & \mathit{verb} \\ \text{V}|\text{COMPS} & \boxed{1} \end{bmatrix} \end{bmatrix} \right\rangle\right) := \boxed{1}. \\
\mathit{raised}\left(\left\langle \begin{bmatrix} \text{L}|\text{C} & \begin{bmatrix} \text{HEAD} & \mathit{noun} \\ \text{V}|\text{COMPS} & \boxed{1} \end{bmatrix} \end{bmatrix} \right\rangle\right) := \boxed{1}.
\end{array}
$$

Figure 2: The argument raising sources

required to be [LEX +] from which the complements are returned to be raised. Finally, nouns can also return their complements, but different from verbs the nouns are not required to be [LEX +].

Turning to the ID Principle in figure 3, the Cluster-Formation Schema (CF)

$$
\begin{array}{lll}
\begin{bmatrix} \mathit{phrase} \\ \text{DTRS} \;\; \mathit{headed\text{-}struc} \end{bmatrix} \rightarrow & \begin{bmatrix} \text{S}|\text{LEX} & + \\ \text{DTRS} & \begin{bmatrix} \mathit{head\text{-}comps\text{-}struc} \\ \text{HEAD-DTR} & \mathit{word} \\ \text{COMP-DTRS} & \left\langle \begin{bmatrix} \text{S}|\text{LEX} & + \end{bmatrix} \right\rangle \end{bmatrix} \end{bmatrix} & \text{(CF)} \\
\vee & \begin{bmatrix} \text{S}|\text{LEX} & - \\ \text{DTRS} & \begin{bmatrix} \mathit{head\text{-}comps\text{-}struc} \\ \text{HEAD-DTR} \;\; \mathit{word} \end{bmatrix} \end{bmatrix} & \text{(HC)} \\
\vee & \begin{bmatrix} \text{S}|\text{LEX} & - \\ \text{DTRS} & \mathit{head\text{-}spr\text{-}struc} \end{bmatrix} & \text{(HSPR)} \\
\vee & \begin{bmatrix} \text{S} & \begin{bmatrix} \text{LEX} & - \\ \text{L}|\text{C}|\text{H}|\text{MOD} & \boxed{1} \end{bmatrix} \\ \text{DTRS} & \begin{bmatrix} \mathit{head\text{-}adj\text{-}struc} \\ \text{HEAD-DTR}|\text{SYNSEM} & \boxed{1} \end{bmatrix} \end{bmatrix} & \text{(HA)}
\end{array}
$$

Figure 3: The ID Principle

licenses head-complement structures marked [LEX +] which consist of a *word* and a single [LEX +] complement. The Head-Complement Schema (HC), on the other hand, allows head-complement structures in which a *word* combines with any number of complements to form a [LEX –] constituent, just like the constituents licensed by the rest of the ID schemata. To license nominal structures, we adopt the Head-Specifier Schema (HSPR) and the Head-Adjunct Schema (HA) of Pollard and Sag (1994).[8]

Regarding the other principles, we assume the traditional HPSG architecture of Pollard and Sag (1994, ch. 9). In particular, in head-complement and head-

[8] While these two schemata are sufficient for our purpose of analyzing the interaction of partial NPs with VP topicalization, obviously a full theory of German nominal constituents is more complicated. However, Netter (1996, sec. 4.9.2) discusses how the Pollard and Sag (1994) theory we rely on here can be modified to properly account for the German NP data.

specifier structures the respective valencies are realized according to the Valence Principle. And the SPEC-Principle applies to head-specifier structures to ensure identity of the SPEC value of the non-head with the head.

Two examples: Now that the relevant machinery has been introduced, let us look at the two examples for interaction of partial NPs with VP topicalization which we showed in section 3. The observation was that topicalization including a partial NP is possible (15) whereas topicalization of the VP including only the PP argument of an NP is ungrammatical (17). The structure for the grammatical example as licensed by our theory is shown in Figure 4. The important

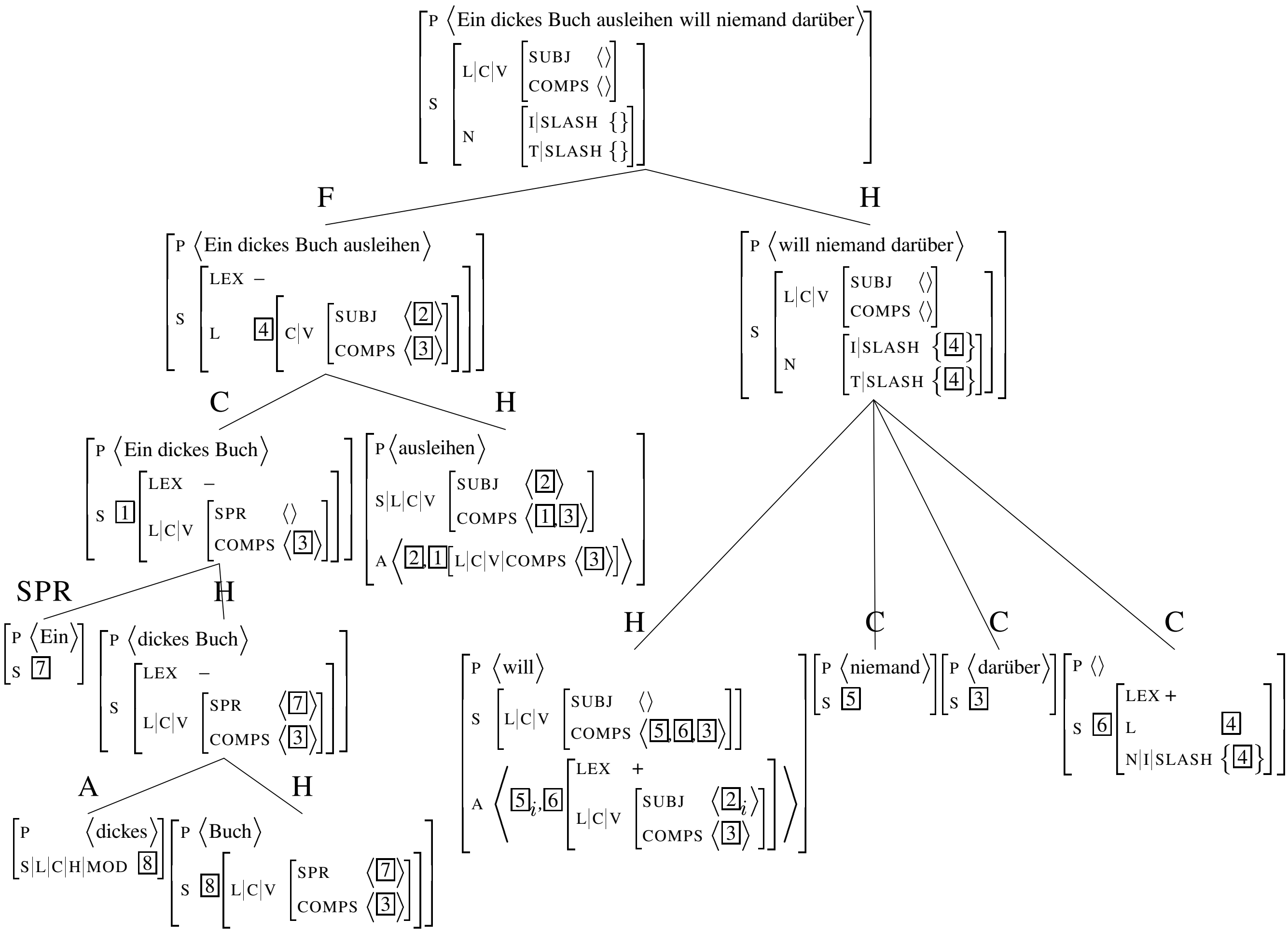

Figure 4: Topicalization of a VP including a partial NP

detail here is how the partial topicalized constituent *ein dickes Buch ausleihen* is licensed. The structure of the NP *ein dickes Buch* is licensed by the Head-Specifier and the Head-Adjunct Schema. Relevant for the following is that the PP complement (3) of the noun *Buch* is never saturated and thus appears on the

COMPS list of the NP ($\boxed{1}$). As the lexical entry of the verb *ausleihen* shown in Figure 5 interacts with the argument raising principle of Figure 1, the occur-

$$\begin{bmatrix} \text{PHON} & \langle \text{ausleihen} \rangle \\ \text{S}|\text{L}|\text{C}|\text{HEAD} & \textit{verb} \\ \text{ARG-ST} & \langle \text{NP, NP} \rangle \end{bmatrix}$$

Figure 5: Lexical entry for *ausleihen* (to borrow)

rence of *ausleihen* in the tree in Figure 4 raises the PP argument *darüber* ($\boxed{3}$) from its nominal complement ($\boxed{1}$). The remaining partial-NP complement *ein dickes Buch* ($\boxed{1}$) is then realized in a head-complement structure. The resulting VP *ein dickes Buch ausleihen* is [LEX –] and has one element left on its COMPS list, the raised PP *darüber* ($\boxed{3}$).

The verb *will* belongs to the obligatorily coherent verbs and requires its verbal complement to be [LEX +], as was shown in its lexical entry (19 a). The argument raising principle ensures that the occurrence of *will* in the tree in figure 4 raises the PP *darüber* ($\boxed{3}$) from (the trace of) its verbal complement *ein dickes Buch ausleihen* ($\boxed{6}$). Note that for this to be possible, the trace must be [LEX +]. This does not conflict with the [LEX –] specification on the topicalized VP since, as usual, only the local information ($\boxed{4}$) is shared between the filler and the trace of the unbounded dependency construction, in which the LEX specification is not included (cf. Meurers 1998, S. Müller 1997). The subject NP *niemand*, the raised PP *darüber*, and the trace of the partial-VP complement are then all realized in a flat head-complement structure. The PP ($\boxed{3}$) has thus been raised twice and is realized separate from its original head *Buch*, as a complement of the verb *will*.

The ungrammatical example (17) involves a PP argument that has been topicalized with the VP, leaving the NP behind. The most promising structure for this example is shown in Figure 6. The example is interesting since in the Mittelfeld both the NP and the PP can appear separately, which is reflected in our theory by allowing the PP to raise and become a sister of the NP. So why is this example ungrammatical?

The verb *ausleihen* in the example in Figure 6 can raise the PP argument *darüber* ($\boxed{3}$) of the NP *ein dickes Buch* ($\boxed{1}$) and realize it as its own complement in the fronted position. The conflict in this example arises in the Mittelfeld: as already shown in the previous example tree, the verb *will* obligatorily raises all complements from its verbal argument ($\boxed{6}$). Thus it has to raise the remaining NP ($\boxed{1'}$) from this verbal argument. But according to the argument-raising principle, the raised complement ($\boxed{1'}$) has to be saturated in order to satisfy the relation *indep*. This conflicts via the Valence Principle with the nonempty COMPS list of *ein dickes Buch* ($\boxed{1}$).

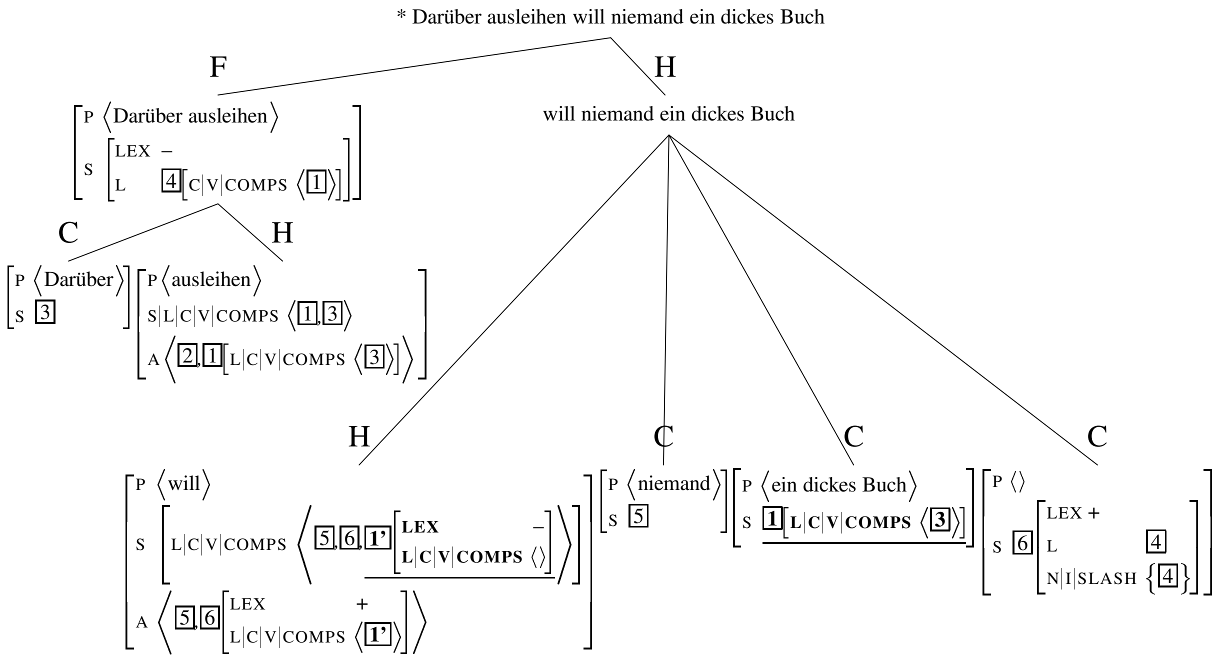

Figure 6: Topicalization of a VP including a raised PP

5 Conclusion

Investigating the nature of partial NPs and their interaction with VP fronting in German, we showed that there are no convincing arguments for assuming that fronted constituents contain a gap. Instead, we formalized a reanalysis-like account in terms of a lexical principle which introduces argument raising from nominal complements in addition to the traditional argument raising from verbal complements. This correctly predicts the interaction between the occurrence of partial NPs and VP topicalization.

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