

# Phrasal typology and the interaction of topicalization, wh-movement, and extraposition

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## 0. Introduction

An extraposed relative clause must not take an antecedent contained in a VP if the VP is topicalized but the relative clause is not (cf. Culicover/Rochemont (1990:28)).<sup>1</sup>

- (1) The governor said he would meet a man at the party who was from Philadelphia, and meet **a man** at the party **who was from Philadelphia** he did.
- (2) \*The governor said he would meet a man at the party who was from Philadelphia, and meet **a man** at the party he did **who was from Philadelphia**.

As is illustrated in (3), (4), and (5), the grammaticality distribution is the same if the topicalized phrase itself is the antecedent.<sup>2</sup>

- (3) I like micro brews that are located around the Bay Area.
- (4) **Micro brews that are located around the Bay Area**, I like.
- (5) \***Micro brews**, I like **that are located around the Bay Area**.

Topicalization does not seem to pattern with wh-question formation in this respect. As the following examples show, an extraposed relative clause may take an antecedent that has been wh-moved. This observation is somewhat surprising if topicalization and wh-question formation are analyzed as instances of the Head-Filler Schema.<sup>3</sup>

- (6) Who<sub>i</sub> do you know [that<sub>i</sub> you can really trust]?
- (7) Which argument<sub>i</sub> do you know [that<sub>i</sub> Sandy thought was unconvincing]?

One could assume that the contrast illustrated in (1) to (5) can be accounted for by considering the grammaticalized discourse functions of the dislocated phrases. In the ungrammatical cases in (2) and (5), the dislocated phrase can be considered a grammaticalized topic – hence the term *topicalization*. In the grammatical cases in (6) and (7), the dislocated phrases can be analyzed as the focus of the sentence. In section 1 below, however, we will show that such an approach is seriously flawed. Instead, we will suggest that the contrast between (6) and (7) on the one hand, and (2) as well as (5) on the other hand, can be derived from the interaction of two assumptions.

The **first assumption** concerns the typology of phrases in HPSG. Pollard/Sag (1994:391) assume that subjects are realized as subject daughters, and that topicalized phrases, wh-subjects, as well as wh-objects are realized as filler daughters. Contrary to this assumption, we assume that wh-moved object daughters and ‘ordinary’ subject daughters in English are specifier daughters, and not filler daughters, or subject daughters, respectively. Topicalized phrases, however, are analyzed as filler daughters. An important consequence of this move is that subjects and wh-moved objects are locally related to a lexical head, viz. to the head whose specifier they are. Topicalized phrases are not locally related to a

<sup>1</sup> Example (2) could be grammatical if the relative clause would take the subject as its antecedent. This is problematic, however, since the antecedent is a pronoun. In the examples given, we assume an association between the relative clause and the object, unless otherwise indicated.

<sup>2</sup> If the antecedent of the relative clause is the subject, and not the object, the construction is grammatical, as is witnessed in (i):

(i) Micro brews the men<sub>i</sub> mentioned yesterday [who<sub>i</sub> came from New York].

(ii) The men who came from New York mentioned micro brews yesterday.

<sup>3</sup> Following Sag (1997:462f.), we assume that *that* can be analyzed as a pronoun.

lexical head.<sup>4</sup> It is thus not the discourse function of the dislocated phrase but the syntactic realization of the phrase that introduces a crucial distinction here.

The **second assumption** concerns the association between an extraposed relative clause and its antecedent. Following Kiss (2002), we will assume that extraposed relative clauses are neither moved nor associated with their antecedents through a ‘movement simulation’ feature, like EXTRA (cf. Keller 1995). Kiss (2002) assumes that extraposed relative clauses can be adjoined to a given phrase if the phrase contains a suitable antecedent. Such an antecedent can be deeply embedded in the phrase, but the agreement features of the phrase must be compliant with the agreement features of the relative pronoun. Since the association of the relative clause and with its NP antecedent must apply to a local tree structure, so-called anchors mediate it. Anchors are introduced into the syntactic structure by nominal projections. They are projected through the set-valued non-local feature ANCHORS. The relative clause requires that the ANCHORS attribute of its syntactic sister contains at least one anchor that can be used for identification. In its relevant parts, the anchor is identical to the index of the nominal projection. It hence follows that the head of the nominal projection and the relative pronoun agree.

The projection of anchors is subject to a condition requiring that all anchors become bound if the resulting phrase is an instance of the Head-Filler or Head-Specifier Schema. Hence, Kiss (2002) can account for the fact that relative clause extraposition is not constrained by the *Complex Noun Phrase Constraint*, but must still obey *Upward Bounding*. Extraposition is upward bounded, which means that – in terms of movement – an extraposed phrase must not cross an S’-node (cf. Ross 1967/86:174ff.).

Kiss (2002) postulates an important difference between head-filler phrases and head-specifier phrases: In the latter case, the head’s *anchors set* contains the anchors of its specifier as well. They are hence available once the head has been introduced into the syntactic structure. In the former case, there is no corresponding head and hence the anchors become available only after the topicalized phrase has been realized. In this case, however, the anchors do not become available at all since the interaction of the Anchor Projection Principle with the Head-Filler Schema prohibits a projection of the anchors of the topicalized phrase. Hence, an extraposed relative clause cannot take an antecedent that has been topicalized.

Now since wh-moved objects as well as subjects are specifiers, the anchors set of a head that introduces the specifier, i.e. an inverted verb in the former case, and a finite verb in the latter case, contains the anchors of the specifier. The analysis thus also accounts for the fact that extraposed relative clauses can be realized as part of a VP although they are associated with subjects (cf. Culicover/Rochemont 1990:36f.).

Finally, the analysis also accounts for the fact that a contrast between wh-movement and topicalization does not show up in verb-second (V2) languages such as German, if V2 constructions are analyzed as instances of the Head-Specifier Schema. Grammatical cases of extraposition with topicalization and wh-movement are given in (8) and (9).

(8) Den Mann<sub>i</sub> hat sie gesehen, den<sub>i</sub> ich gestern getroffen hatte.  
The man has she seen who I yesterday met had  
‘She saw the man that I had met yesterday.’

(9) Wen<sub>i</sub> hat sie gesehen, den<sub>i</sub> ich gestern getroffen hatte?  
Who has she seen who I yesterday met had  
‘Who did she see that I had met yesterday?’

The following sections illustrate and elaborate the proposal. Section 2 briefly illustrates Kiss’ (2002) analysis of relative clause extraposition. Section 3 discusses the interaction of extraposition with heads and specifiers. Section 4 presents the analysis of the contrast given above, and section 5 discusses some implications of the proposal.

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<sup>4</sup> Pollard/Sag (1994:363-371) assume that specifiers include a variety of categories, among them *numerals* in NP and numeral modifiers in PP. Although we do not provide an analysis for these constructions, we assume tacitly that all the constructions mentioned there are *not* to be analyzed as specifiers in the sense used here.

## 1. A discourse-based analysis

As was suggested in the introduction, it seems worthwhile to explore whether the contrast exemplified above could be reduced to the discourse functions of the dislocated phrases.<sup>5</sup> In particular, one could assume that focused phrases must not appear in topic position (at least this seems to be forbidden in English clauses), and furthermore that a phrase which is related to an extraposed phrase is necessarily focused. Such a suggestion, however, exhibits a variety of problems once viewed under closer scrutiny. Although it is correct that an extraposed phrase shows a focusing effect (cf. Rochemont/Culicover 1990:64), this does not imply that the antecedent of an extraposed phrase necessarily has to be focused as well. To the contrary, Rochemont/Culicover (1990:64) show that the antecedent of an extraposed phrase can even be a *topic*, while the extraposed phrase is still focused. This is illustrated in (10), where capitalization indicates stress.

(10) **Q:** Did Mary meet any soldiers at the party?

**A:** Yeah, she met a soldier at the party that she really **LIKES**.

If *a soldier* in (10) can be classified as a topic, or at least as a clear non-focus, as suggested by Rochemont/Culicover (1990), why is it still impossible for such a phrase to appear in topic position? Example (11) is crashingly ungrammatical, even if it is given as an answer to the question in (10).

(11) \*A soldier she met at the party that she really **LIKES**.

With the ungrammaticality of (11), however, a discourse-based analysis of the contrast exemplified above collapses since such an example would have to be classified as grammatical. We will thus refrain from a discourse-based analysis and instead present a syntactic approach to the contrast in (1) to (7).<sup>6</sup>

## 2. Extraposition as adjunction

The analysis of relative clause extraposition presented in Kiss (2002) is based on the following hypotheses:<sup>7</sup>

1. A relative clause can be syntactically adjoined to all kinds of major phrases (D/NP, PP, VP).
2. A relative clause semantically modifies the semantic contribution of a phrase that is contained in the phrase to which the relative clause has been adjoined.

So-called anchors mediate the modification. For the present purposes, we may assume that an anchor is identical to the *index* of a sign.<sup>8</sup> An anchor is introduced by nouns and verbs, and is projected through a set-valued non-local attribute called ANCHORS. The projection is constrained by the following condition:

(12) *Anchor Projection Principle:*

The INHERITED|ANCHORS value of a headed phrase consists of the union of the INHERITED|ANCHORS values of the daughters less those anchors that are specified as TO-BIND|ANCHORS on the head daughter.

It is the effect of (12) that anchors project freely in a syntactic structure, as long as they are not specified as TO-BIND on the head daughter of a phrase. Let us briefly illustrate this identification process

<sup>5</sup> I would like to thank an anonymous reviewer for raising this issue.

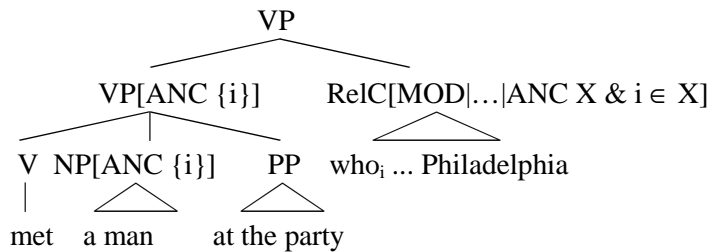
<sup>6</sup> There is a further problem with a discourse-based approach: Even if such an analysis were tenable, it would remain unclear how it could be integrated into HPSG. I admit though that this is less a problem of a discourse-based approach and more one of a theory which started out as an all-integrating approach to natural language.

<sup>7</sup> For a detailed account, the reader is referred to Kiss (2002).

<sup>8</sup> This identification immediately accounts for the requirement that a relative pronoun and its antecedent have to agree. The semantic representations used in Kiss (2002) are based on *Minimal Recursion Semantics* (MRS, cf. Copestake et al. 1995). Since handles in MRS model semantic subordination, an anchor actually consists of an index and its associated handle. This is irrelevant for our present purposes.

before we explain the TO-BIND condition of (12). In (13), a simple case of relative clause extraposition from object position is presented. The anchor of the object is represented through its index  $i$ , which is projected in the anchors set of the VP. Being present in the anchors set of its syntactic sister, the anchor can be identified by the relative clause and hence the adjunction is licensed.<sup>9</sup>

(13) John [<sub>VP</sub> met [<sub>NP</sub> a man] at the party who was from Philadelphia].



The Anchor Projection Principle in (12) is reminiscent to the *Nonlocal Feature Principle* of Pollard/Sag (1994:164). If an anchor is specified as TO-BIND, its projection is cancelled. We assume that the Head-Filler Schema (as given in Pollard/Sag 1994:164) and the Head-Specifier Schema (as given in Pollard/Sag 1994:362) are constrained to the effect that all anchors of the daughters are specified as TO-BIND|ANCHORS. English clauses are the result of either of the two schemata. It follows immediately that relative clause extraposition is *upward bounded*, since the Anchor Projection Principle blocks a further projection of the anchors once a structure has been built by either schema.

Since we assume that the subject of a clause is not realized through *Schema 1*, but through the Head-Specifier Schema, we can immediately account for the observation that an extraposed relative clause must remain within the VP if it relates to a non-moved object (cf. Culicover/Rochemont 1990).<sup>10</sup> The subject of the clause is a specifier, the resulting clause is hence an instance of the Head-Specifier schema. Consequently, an anchor originating from the object is no longer present and the relative clause could not be associated with it if it were adjoined to S. Hence the alternative structure for (13) sketched in (14) is excluded through the interaction of (12) and the Head-Specifier Schema.

(14) [[<sub>S</sub> [<sub>SPR-DTR</sub> John] [<sub>H-DTR</sub> met a man at the party]] [<sub>RelC</sub> who was from Philadelphia]].

### 3. Traces, head specifier constructions, and extraposition

To exclude ungrammatical examples like (15), where a phrase has been topicalized but a relative clause is realized in a position where it modifies the *trace* of the topicalized phrase, Kiss (2002) assumes that traces do not contain anchors.<sup>11</sup>

(15) \*[ Den Mann]<sub>i</sub> hat sie [<sub>t<sub>i</sub></sub> den ich gestern traf ] gesehen.  
 The man has she who I yesterday met seen

Since anchors belong to the NONLOCAL features, such a requirement is easily met by a trace, which shares only the LOCAL features with its antecedent. But if a trace does not contain anchors, it remains a mystery how the grammatical examples from German in (8) and (9) could be derived in the first place. Consider as an illustration example (8) in (16).<sup>12</sup>

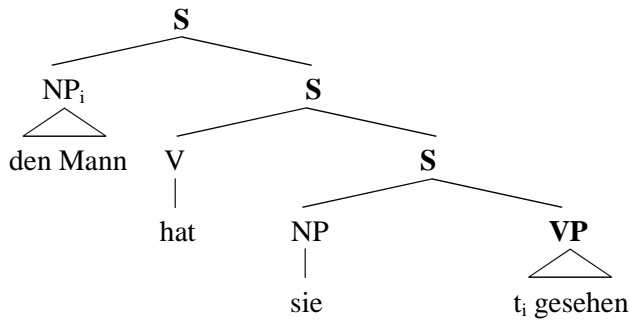
<sup>9</sup> Please note that for expository purposes we have shown only the anchor that will be bound by the relative clause. Depending on the PP and the RelC in (13), the RelC could even be associated with the NP complement of the preposition.

<sup>10</sup> Culicover/Rochemont (1990) and Rochemont/Culicover (1990) do not distinguish ‘moved’ from ‘non-moved’ objects in this respect.

<sup>11</sup> The same result could be achieved by assuming that traces do not exist (cf. Sag 1997). As has been pointed out by Kiss (2002), it remains unclear how so-called reconstruction effects are captured in a traceless analysis.

<sup>12</sup> Little will be said here about the details of the verb second construction in German. Pollard (1996), e.g. assumes that a verb in second position is a verb with a [INV +] specification. Following Borsley (1989), Kiss (1995) assumes that the verb in second position is actually the result of a dislocation (simulated through feature percolation). We follow Kiss’ analysis here since it allows a uniform treatment of subject and object extraction. With respect to English, we assume the clause structure given in Pollard/Sag (1994).

(16) Den Mann<sub>i</sub> hat sie gesehen, den<sub>i</sub> ich gestern getroffen hatte.

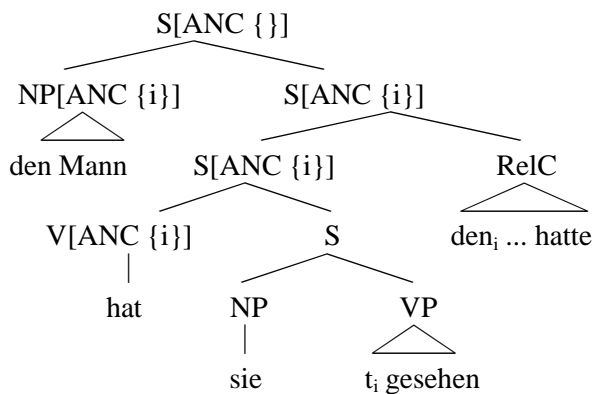


Given that traces do not contain anchors, the relative clause cannot adjoin to VP, since the trace in VP does not count as an antecedent. For the same reason, it cannot be adjoined to the lower S nodes either. And, given the formulation of the Anchor Projection Principle in (12), it also cannot adjoin to the highest S node, since the highest S node does not contain any anchor.

Kiss (2002) solves this problem by applying Pollard and Sag's analysis of *tough constructions* (1994:166-171) to V2 constructions. He assumes that a verb in second position contains a lexical TO-BIND|SLASH specification. It cancels the SLASH projection of its NP or VP complement and further selects the SLASHed constituent as its specifier. Moreover, Kiss (2002) assumes that the anchors of a specifier are also present in the lexical head that selects the specifier. Now example (8) can be analyzed by adjoining the relative clause to the lower S node, as is illustrated in (17).

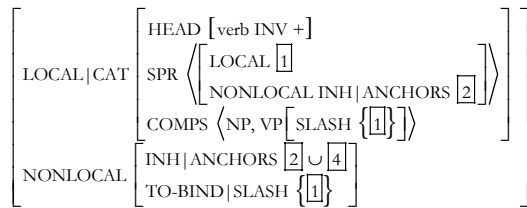
The lexical specification of a finite inverted English verb in (18) shows the crucial relationship between the NONLOCAL|INHERITED|ANCHORS value of the verb and its specifier (SPR). The anchors of the specifier are set-unioned with the anchors of the head itself, thus making the anchors of the specifier available once the head has been introduced. A German verb in second position would show the same representation, i.e. the anchors of the topicalized phrase become available once the verb in second position has been realized. There are differences, though, between inversion in English and German, which, however, are tangential to the present discussion and will hence be ignored.<sup>13</sup>

(17) Den Mann<sub>i</sub> hat sie gesehen, den<sub>i</sub> ich gestern getroffen hatte.



<sup>13</sup> An association of the relative clause with the subject is blocked since the *gender* of the subject is not compliant with the *gender* of the relative pronoun. We can thus safely ignore the anchor of the subject. Similarly, the anchors of the subjects are ignored in the analysis of (5) and (7).

(18) Lexical specification of English inverted verbs



4. Analyzing the data

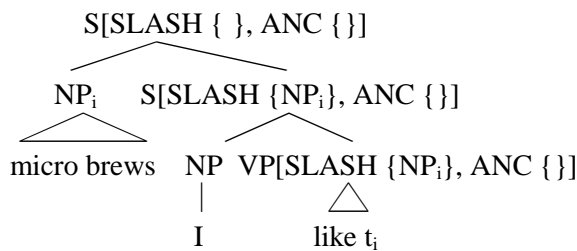
The basic tenets of the present analysis can be summarized as follows: Extraposed relative clauses are related to their antecedents through anchors and anchor projection. Anchors are discarded if a phrase is built by the Head-Specifier Schema or the Head-Filler Schema. In a Head-Specifier Schema, the lexical head bears the anchors of its specifier (apart from its own anchor).<sup>14</sup> Subjects are specifiers of non-inverted finite verbs. The specifier of an inverted verb originates as SLASH of its complement.<sup>15</sup>

Although superficially, the bracketed part of (2) resembles the structure of example (17), it becomes obvious under closer scrutiny that (2) resembles (16) more than (17). In the analysis of (2), the topicalized VP is adjoined to another phrase as an instance of the Head-Filler Schema. A filler differs from a specifier in that the former is not related to a lexical head. Such a lexical head, however, would be required to make the anchors of the ‘moved’ phrase available for the extraposed relative clause. Hence, (2) is excluded because the extraposed relative clause neither finds an antecedent in the VP nor in the S projections.

(2) \*The governor said he would meet a man at the party who was from Philadelphia, and [[<sub>VP</sub> meet a man at the party]<sub>i</sub> he did t<sub>i</sub> who was from Philadelphia].

Let us now turn to the analysis of (5). Just like (2), example (5) is an instance of the Head-Filler Schema. The topicalized constituent is adjoined to a phrase which does not have a lexical head.

(5) \*<sub>S</sub> [<sub>NP</sub> Micro brews]<sub>i</sub> [<sub>S</sub> I like t<sub>i</sub> ] which are located around the Bay Area.



As in the analysis of (2), it would only be possible to adjoin the relative clause to the VP or lower S and hence modify the subject, but not to adjoin the relative clause to VP or S and thus to modify the topicalized object. This conclusion follows since the anchor of the object is not present in VP or S.

<sup>14</sup> Sag (1997:466) mentions cases like (i), where the relative clause can only be related to the whole wh-phrase and not to a part of it.

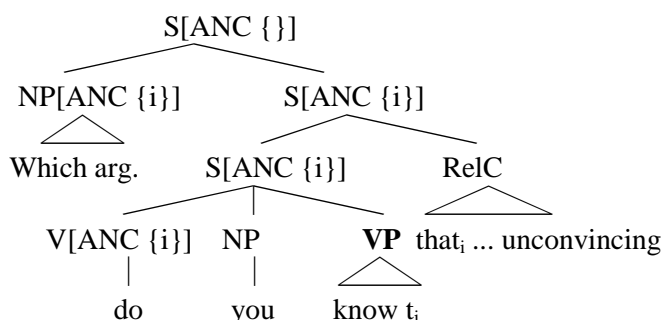
(i) [Which author<sub>i</sub>'s book]<sub>j</sub> do you know that<sub>\*i/j</sub> you like

The ungrammaticality indicated in (i) should not be derived by blocking NP-internal antecedents of a relative clause. As has been discussed by Haider (1996) and Kiss (2002) among others, a general ban against NP-internal antecedents of relative clauses would lead to an undergeneration, since relative clause extraposition is well-known to violate the CNPC (Ross 1967/86). It seems that the ungrammaticality of (i) is related to the fact that the NP-internal antecedent is a specifier itself. Kiss (2002) does not provide an analysis of NP-internal specifiers, but generally assumes that only N' parts of an NP project anchors.

<sup>15</sup> We assume that the subject in inverted structures is actually a subject daughter, as suggested in the initial formulation of the Head-Subject-Complement-Schema in Pollard/Sag (1994:388).

The relative clause cannot be adjoined to the higher S, since according to the Anchor Projection Principle, the resulting S does not contain any anchor. Let us finally consider example (7).

(7) Which argument<sub>i</sub> do you know [that<sub>i</sub> Sandy thought was unconvincing]?



The situation is different now: Example (7) shares its structure with example (17). In particular, it is an instance of the Head-Specifier Schema. The relative clause can be adjoined to the phrase before its antecedent is realized since the lexical head, the auxiliary *do*, contains the anchors of its specifier as well.

## 5. Some consequences

The following consequences of the present analysis deserve further attention.

**Subject related relative clauses inside VP** Culicover/Rochemont (1990) and Rochemont/Culicover (1990) have concluded that subject related relative clauses can be found inside a VP. In the present approach, this conclusion follows from the assumption that a subject is a specifier daughter. Since the anchors of specifier daughters are present in the lexical head that selects the specifier, an extraposed relative clause may be associated to the subject by selecting the anchor of the subject inside VP.

**Wh-phrases, specifiers, and indirect questions** It is a well-known fact that wh-phrases can be realized either in subject position or in a dislocated position in English and German. From the perspective of the phrasal typology presented in Pollard/Sag (1994:391), the availability of these positions is somewhat surprising since filler daughters and subject daughters do not share any property. In the present approach, a common daughters type allows the realization of wh-phrases and specifier daughters. We would thus assume that an example like (19) does not show a dislocation of the wh-element at all. Instead, it is realized in ‘subject’ position, where a subject of a verb, however, is analyzed as its specifier.

(19) I wonder who saw Kim.

It is also well known that wh-phrases may appear in indirect questions, although indirect questions are not lexically headed in English and German, as illustrated in (20).

(20) I wonder whom she saw.

A tentative proposal would be to assume that indirect questions are headed by an empty element, hence the relevant structure of (20) would be as given in (21), where *e* indicates an empty head, the specifier of which would be the wh-phrase.

(21) I wonder [[who] [e she saw]]

This empty element would behave exactly like an auxiliary verb in English or a verb in second position in German. Independent justification for empty heads in indirect questions has been provided in Bayer (1984) for Bavarian. An ‘empty head’ analysis follows the basic tenets of the analysis of relative clauses in Pollard/Sag (1994), which however has recently been criticized in Sag (1997) and Sag/Ginzburg (2001). Although we cannot currently provide an exact analysis of interrogative clauses, it would be interesting to explore the consequences of the present proposal for such an analysis.

**Linearization and structure** It should be apparent that the analysis suggested relies on a structural difference between sentences with and without fronted verbs. Kathol (2000) has suggested that the structure of German verb final clauses is identical – in the pertinent respects – to German verb second clauses. Transferring his approach to English, one would come to the conclusion that inverted clauses are not structurally different from non-inverted ones. If this conclusion were drawn, however, the contrast in (1) to (7) would remain mysterious. We thus suggest that the present approach is not only descriptively adequate in offering an analysis of the aforementioned contrasts, but in addition makes substantial claims about the structural representation of clauses. We assume that the contrast given is a structural one, i.e. a contrast that can be reduced to different structures of superficially similar clauses.

## 6. Summary

While an extraposed relative clause can be related to a ‘wh-moved’ phrase, it cannot be related to a topicalized phrase. The reason is that the latter is adjoined to a phrase, but the former is realized as a specifier of that phrase. We have offered a syntactic account for the contrast between topicalization and wh-movement in English, and also for the non-contrast between these two constructions in German. This account relies on the hypothesis that in English, two different structures have to be assumed for topicalization and question formation, while in German, topicalization and question formation pattern alike. English topicalization structures are analyzed as being headless. Since a local relationship between a head and the topicalized phrase cannot be established, a topicalized phrase may not serve as the antecedent of an extraposed phrase.

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