

Projective meaning and the licensing of Embedded Root Phenomena

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The paper discusses the occurrence and the licensing factors of Embedded Root Phenomena in German and in English. Mostly, embedded V2 in German and embedded topicalization in English occur in the same contexts, however, there are also differences which suggest different licensing conditions. I will show that embedded V2 in German is excluded from all clauses that project under the scope of an entailment-cancelling operator and that cannot be denied directly. In line with Beaver et al. (2010), both properties were assumed to be characteristic features of content that is not-at-issue. Therefore, I will conclude that embedded V2 is only licensed in clauses that express at-issue content.

1. Introduction

Since the work of Emonds (1970), root transformations are defined as transformations that can only apply in root clauses, that is, non-embedded clauses. For example, topicalization of the direct object is possible in the following root clause:

(1) This book, you should read.

However, as observed by Hooper & Thompson (1973) in their influential paper, root transformations are also available in a subset of embedded contexts. In the following example, the complement clause, which is embedded by the main clause predicate *believe*, admits topicalization of the direct object:

(2) John believes that this book Mary read.

Besides topicalization, Hooper & Thompson (1973) mention a wide range of other transformations, for the most part preposing transformations, that are possible in a subset of embedded contexts. Another phenomenon which can be subsumed under the notion of Embedded Root Phenomena (henceforth ERP) is V2 movement in German. In German, non-embedded declarative clauses such as (3-a) show V2-order, whereas in embedded clauses, the finite verb is in a sentence-final position and is not raised to the C-domain (see example (3-b)).

- (3) a. Maria **hat** das Buch gelesen.
 Maria has the book read.
 b. Peter glaubt, dass Maria das Buch gelesen **hat**.
 Peter believes that Maria the book read has.
 'Peter believes that Maria has read the book.'

However, the complement clause of example (3-b) can also be realized with V2-order:

- (4) Peter glaubt, Maria **hat** das Buch gelesen.
 Peter believes Maria has the book read.

The observation that root transformations can also occur in specific embedded contexts constitutes the beginning of a large number of investigations on Embedded Root or Main Clause Phenomena (see amongst others Antomo & Steinbach 2010, Bianchi & Frascarelli 2009, Coniglio 2007, Besten 1983, Ebert et al. 2006, Frank 2000, Gärtner 2001, Green 1976, Haan & Weerman 1985, Haegeman 2003, Haegeman 2007, Heycock 2005, Iatridou & Kroch 1992, Julien 2007, Kiparsky & Kiparsky 1970, Maki et al. 1999, Meinunger 2004, Pasch 1997, Reis 1997, Schefler 2005, Simons 2007, Truckenbrodt 2006, Uhmman 1998, Vikner 1995, Wechsler 1991, and Wegener 2000). The possibility for certain embedded clauses to undergo root transformations is a crosslinguistically observable phenomenon.

The most discussed phenomena being restricted to matrix clauses and a subset of embedded contexts are syntactic or structural transformations. Structural phenomena involve basically movement to the left periphery, the best known phenomena being subject-auxiliary inversion, topicalization, V2 movement or other preposing transformations. A selective summary of some of the structural root phenomena that have been discussed in the literature can be found in Heycock (2005). Thus, beside these syntactic operations involving movement, there is strong evidence to subsume the possibility to insert specific lexical items under the notion of ERP. As argued in amongst others Coniglio (2007), Green (1976), and Haegeman (2002), the possibility to admit modal particles or adverbial adjuncts expressing speaker attitude constitutes a main-clause like property. Like structural phenomena, the occurrence of those lexical elements is restricted only to a subgroup of embedded contexts.

One main issue investigated in the various works on ERP is to define the subset of embedded contexts which admit ERP. For example, whereas a clause embedded by the verb *believe* (or respectively *glauben* in German) admits root transformations (see examples (2) and (4)), the complement of a predicate such as *regret* (or *bereuen* in German) resists them as shown by the following examples:

- (5) a.*John regrets that this book Mary read.
 b.*Peter bereut, er **hat** geraucht.
 Peter regrets he has smoked.

Therefore, it is necessary to define the embedded contexts which license root phenomena. An interesting question, which so far has not been answered yet, is to know whether these contexts are cross-linguistically the same. A short overview of the most important licensing contexts for some selected root transformations is given in section 2.

Another crucial aim of the investigations is to explain the principles underlying the occurrence of ERP. So, what the theory of grammar has to explain is why those syntactic transformations are restricted to special licensing contexts and what properties are relevant for a context to license ERP. Basically, it is possible to distinguish two main types of approaches. Structural approaches explain the occurrence of ERP by resorting to syntactic constraints such as constraints on movement. On the other hand, functional approaches assume that non-structural, that is semantic and pragmatic, factors are decisive for the licensing of ERP. I will briefly discuss the most important functional approach which goes back to Hooper & Thompson (1973) in section 3.

The explanation of the principles underlying the distribution of V2 movement in embedded clauses in German constitutes the main issue of this paper. In sections 4 and 5, I will argue that V2 movement is only licensed in embedded clauses that express at-issue content.

2. Licensing contexts

One main issue of the investigations on ERP is to define the subset of embedded contexts which license root phenomena. Interestingly, those contexts are crosslinguistically very similar, including various phenomena. In this section, I will give an overview of the occurrence of V2 order in German, comparing this phenomenon to the occurrence of fronting operations such as topicalization and left dislocation in embedded clauses in English. We will see that the group of embedded contexts which license those two phenomena is quite homogeneous. However, there are differences in the occurrence of these two types of ERP, which suggest that they obey different licensing conditions. Naturally, the following overview is far from being exhaustive. For more information, the interested reader is referred to amongst others Antomo & Steinbach (2010), Gärtner (2001), Haegeman (2006), Heycock (2005), Hooper & Thompson (1973), Reis (1997), and Sawada & Larson (2004).

Let us start with complement clauses. It is a well known fact that, with respect to the availability of root transformations, we have to distinguish two types of complement clauses depending on the embedding predicate. A little simplified, the propositional complement of a factive predicate resists root phenomena, whereas a non-factive predicate selects a complement which licenses root transformations. That is why the clause embedded by *vergessen* (roughly ‘to forget’) cannot show V2 order, whereas V2 order is possible in the complement of the non-factive verb *glauben* (‘to believe’) (see also Frank 2000 and Reis 1997).

- (6) a. *Guido vergaß, Angela **hat** eine neue Frisur.
 Guido forgot Angela has a new haircut.
 b. Guido glaubt, Angela **hat** eine neue Frisur.
 Guido believes Angela has a new haircut.

As we have already seen in (2) and (5-a), here repeated as (7), the same holds for argument fronting in English, which is only possible in the complement embedded by a non-factive predicate such as *believe* (see also Hooper & Thompson 1973 and Maki et al. 1999).

- (7) a. John believes that this book, Mary read.
 b. *John regrets that this book, Mary read.

If we consider the availability of root phenomena in adverbial clauses, the result is also very homogeneous. Exemplarily, I will only investigate the occurrence of root transformations in causal and temporal clauses. Concerning the availability of embedded topicalization in conditional clauses see Haegeman (2003) and Haegeman (2006), as well as Günthner (1996) for a discussion of the occurrence of V2 in German concessive clauses.

Let us start with causal clauses. Sawada & Larson (2004) have shown that adverbial clauses expressing causality crosslinguistically license root phenomena. They admit fronting operations such as Left Dislocation in example (8) from Sawada & Larson (2004), as well as V2 movement in spoken German as shown in example (9):

(8) Mildred drives a Mercedes because her son, he owns stock in Xerox.

(9) Jenny studiert in Athen, weil sie mag griechisches Essen.
Jenny studies in Athens because she likes Greek food.

The position of the finite verb in German adverbial clauses introduced by *weil* is often linked to a semantic difference between a content modification and an epistemic or speech-act modification. In this paper, I will not investigate these different interpretations; for more information consider amongst others Antomo (2009), Antomo & Steinbach (2010), Blühdorn (2008), Breindl (2009), Pasch (1997), Scheffler (2008), Uhmann (1998), Volodina (2010), and Wegener (1993).

In contrast to adverbial clauses expressing causation, temporal clauses crosslinguistically resist root phenomena (see Altmann 1997, Breindl 2009, Haegeman 2007, and Sawada & Larson 2004). This is illustrated by the ungrammaticality of the following examples involving Left Dislocation in English and V2 order in German.

(10) *Mildred bought a Mercedes when/before/after her son, he purchased stock in Xerox.

(11) *Jenny studierte in Athen, als/bevor/nachdem Daniel war in Boston.
Jenny studied in Athens when/before/after Daniel was in Boston.

Note that the incompatibility of root phenomena in temporal clauses does not arise when the temporal clause is used to express an adversative relation as shown by Altmann (1997), Breindl (2009), and Haegeman (2007). This is shown in the following examples from Haegeman (2007:289) and Altmann (1997):

(12) His face not many admired, while his character still fewer felt they could praise.

(13) Sie steht jeden Morgen früh auf, während ihr Mann, der faulenzet
she gets every morning early up, while her husband, he lazes around
den ganzen Tag.
the whole day.

Since in the examples (12) and (13), the connective is clearly used to express an adversative and not a temporal relation, we can conclude that the sentences are not counterexamples to the observation that temporal clauses resist root phenomena.

Sawada & Larson (2004) show that the breadth of the phenomenon covers a wide variety of different root transformations, which are all excluded from temporal clauses, whereas they are

possible in causal clauses, and that the correlation extends beyond English and German.

Finally, consider embedded clauses that depend on a nominal antecedent. Relative clauses can be restrictive or non-restrictive, furthermore, they can modify a definite or an indefinite antecedent. Both distinctions are crucial if we consider the availability of root phenomena. Non-restrictive relative clauses admit fronting operations as shown in the following example from Hooper & Thompson (1973:489):

(14) This car, which only rarely did I drive, is in excellent condition.

However, even if they license root phenomena in English, non-restrictive relative clauses never undergo V2 movement in German as observed by Gärtner (2001). This is illustrated by the following example:

(15) *Ich habe mir ein neues Fahrrad gekauft, das **gefällt** übrigens Tina.
'I bought a new bicycle, which, by the way, Tina likes.'

The examples show that V2 order in German and fronting operations in English are not licensed in exactly the same contexts.

If we consider the availability of ERP in restrictive relative clauses, it is important to distinguish between a definite and an indefinite antecedent. If the embedding DP is indefinite, both V2 order and topicalization are possible as shown in example (16-a) from Hooper & Thompson (1973:490) and (16-b) from Gärtner (2001:112).¹

(16) a. I saw a dress which under no circumstances would I have bought.
b. Das Blatt hat eine Seite (/), die **ist** ganz schwarz.
the sheet has a side that is completely black.

Whereas restrictive relative clauses on indefinite heads license ERP, root transformations are blocked if a restrictive relative clause depends on a definite antecedent as can be seen in the following example from Hooper & Thompson (1973:489):

(17) *The car that only rarely did I drive is in excellent condition.

The situation is similar for German V2 movement, which is banned from restrictive relative clauses on definite heads (see also Gärtner 2001:114).

(18) *Dominik liebt die Frau, die arbeitet bei der Polizei.
Dominik loves the woman who works at the police.

In this section, I have given a short, non-exhaustive overview of the most important licensing contexts for V2 order in embedded clauses. The occurrence of German V2 movement has been compared to the possibility to undergo fronting transformations in English. We have seen that, for the most part, these two different root phenomena occur in the same contexts. However,

¹According to Gärtner (2001:112), example (16-b) is eindeutig a restrictive relative clause and not a juxtaposed main clause since the relative clause is prosodically integrated into its preceding matrix clause (/'). Furthermore, the antecedent is clearly taken to be restrictively modified, otherwise the matrix clause would get the interpretation that the sheet of paper referred to has no more than one side.

with respect to non-restrictive relative clauses, the two kinds of root transformations show a different behavior. Whereas topicalization is possible in non-restrictive relative clauses in English, in German, V2 movement is blocked in this context. The following table summarizes these findings:²

	V2 order in German	fronting in English
complement of a factive verb	-	-
complement of a non-factive verb	+	+
temporal adverbial clause	-	-
causal adverbial clause	+	+
non-restrictive relative clause	-	+
restrictive relative clause on a definite head	-	-
restrictive relative clause on an indefinite head	+	+

Table 1: Licensing contexts for ERP

²If we consider the occurrence of ERP in conditional clauses, there are important differences between German V2 movement and topicalization in English. In English, the availability of ERP depends on the interpretational domain (see Haegeman 2002 and Haegeman 2003). If the adverbial clause modifies the propositional content of the main clause, embedded topicalization is blocked as shown in example (i-a) from Haegeman (2003:332). In contrast, if the conditional clause is interpreted with respect to the discourse structure, topicalization is possible (see (i-b) from Haegeman 2003:332).

- (i) a. *If these final exams you don't pass, you won't get the degree.
 b. If his SYNTACTIC analysis we can't criticise, there is a lot to be said against the SEMANTICS of the paper.

Haegeman (2003) argues that the two kinds of conditional clauses differ with respect to their internal, as well as their external syntax. Whereas a content-modifier such as (i-a) has a reduced C-domain, lacking ForceP and TopP, an event-modifier such as (i-b) has a full-fledged CP and is attached higher.

Whereas in English, the occurrence of embedded topicalization in conditional clauses depends on the interpretational domain, in German, this factor does not influence the licensing of V2 movement in conditional clauses. V2 order is excluded from content modifiers (see (ii-a)), as well as from a relevance conditional such as (ii-b), even if relevance conditionals are syntactically disintegrated as shown in (ii-c).

- (ii) a. *Peter bleibt zu Hause, wenn Maria **kommt** heute.
 Peter stays at home if Maria comes today.
 b. *Im Kühlschrank ist noch Pizza, wenn du **bist** hungrig.
 In the fridge is still pizza if you are hungry.
 c. Wenn du hungrig bist: Im Kühlschrank ist noch Pizza.

That the interpretational domain does not influence the licensing of embedded V2 is also shown by the following example. The adverbial clause introduced by *nachdem* ('after') modifies the speech act. Nevertheless, V2 is not possible:

- (iii)*Hilf mir mal, nachdem du **bist** ja schon hier.
 Help me PART after you are PART already here.

3. Previous accounts

Defining the contexts which license root phenomena has been one main issue of numeral works. Another crucial aim of the investigations has been to explain the principles underlying the occurrence of ERP. So, what the theory of grammar has to explain is why those specific syntactic transformations are restricted to special licensing contexts and what properties are relevant for a context to license ERP. Furthermore, the question, whether those licensing conditions are the same for all different kinds of root transformations, remains unresolved.

An approach that aims to explain the occurrence of different kinds of ERP in different languages with the same licensing factors is confronted with the following problems: First, it is not at all clear, which phenomena have to be subsumed under the notion of ERP. Whereas V2 movement in German is, for example, restricted to special licensing contexts, in the Roman languages, *Clitic Left Dislocation* is possible in all finite embedded clauses, so that it is difficult to speak of a main clause phenomenon (see for a discussion Bianchi & Frascarelli 2009). Furthermore, it is not uncontroversial if the insertion of speaker-oriented expressions such as modal particles in German constitutes a root phenomenon. Finally, the contexts in which different kinds of root phenomena occur are not totally the same in all languages. With respect to V2 movement in German and embedded topicalization in English, we have already seen that the two phenomena do not exactly occur in the same contexts. Whereas topicalization is possible in non-restrictive relative clauses, V2 movement is excluded in this environment. Therefore, it is likely that the two phenomena do not obey the same licensing conditions.

If we consider previous approaches, roughly speaking, it is possible to distinguish basically two main directions: syntactic approaches on the one hand, and more functional explanations on the other hand. In this section, I will only briefly discuss the most important functional approaches. Purely syntactic approaches, which aim to explain the occurrence of ERP by terms of constraints on movement, are not going to be investigated. The interested reader is referred to amongst others den Besten (1983) and Haegeman (2010).³

³Den Besten (1983) concentrates on the distribution of V2 order in Germanic, which he analyzes as involving movement of the finite verb to C⁰ and movement of another XP to the specifier of C. Basically, the main idea is that V2 order and the presence of a lexical complementizer are complementary distributed as shown in example (3). Therefore, den Besten (1983) concludes that the movement of the finite verb to C is not licensed by any semantic or pragmatic concept, but simply by an empty complementizer position. The restriction of V2 order to root sentences is therefore treated as an epiphenomenon, the real asymmetry being the one between clauses with and without overt complementizer. Problematic for this purely structural account is the fact that in the Scandinavian languages and in Frisian, V2 order can co-occur with an overt complementizer (cf. Haan & Weerman 1985, Heycock 2005, Iatridou & Kroch 1992, and Vikner 1995). As we have seen in section 2, the same holds for causal clauses in German. If V2 is viewed as being derived only from the absence of a lexical complementizer, co-occurrence of V2 and a complementizer shouldn't be possible. To reconcile such examples with the general view on V2 order as movement of the finite verb to C⁰, it has been proposed that these data are cases of CP-recursion (cf. Rizzi & Roberts 1996, Vikner 1995). Nevertheless, it remains unclear why CP recursion is limited to a subset of embedded clauses.

Another, completely different approach to explain the distribution of ERP in purely syntactic notions is given in Haegeman (2007) and more recently in Haegeman (2010), who focus mainly on the availability of argument fronting in English adverbial clauses. The starting point of the analysis is the observation that English temporal and conditional clauses resist argument fronting. Haegeman (2007) and Haegeman (2010) try to derive this restriction based on a movement analysis of adverbial clauses. According to the movement analysis, adverbial clauses are

The most prominent functional approach goes back to the influential paper of Hooper & Thompson (1973), who argue that a wide range of root transformations are licensed by the same semantic concept, namely assertion (see also Kiparsky & Kiparsky 1970). The basic idea is that ERP are only possible in embedded clauses which are asserted, whereas presupposed clauses resist them. Dividing the verbs which take sentential complements in five classes, Hooper & Thompson (1973) state that ERP are only licensed in asserted environments, namely in the complements of verbs of saying and thinking such as *say*, or *suppose*. According to Hooper & Thompson (1973), such embedded statements have the characteristics of (direct or indirect) assertions. In example (19) from Hooper & Thompson (1973:474), the predicate *explain* selects a complement that expresses reported discourse. Here, the embedded clause expresses even the main assertion. As we can see, ERP are possible.

(19) The inspector explained that each part he had examined very carefully.

In contrast, factive predicates such as *regret* or *be strange* select a sentential complement which is presupposed and therefore cannot undergo root transformations. The following example from Hooper & Thompson (1973:479) expresses merely an attitude about a presupposed complement: ERP are not possible.

(20) *It's strange that this book, it has all the recipes in it.

Based on this observation, Hooper & Thompson (1973:479) conclude that "for the majority of speakers, (...), clauses which are presupposed and not asserted may not undergo root transformations". Beside the complements of factive and non-factive predicates, the analysis is also adopted for relative and adverbial clauses. According to Hooper & Thompson (1973), non-restrictive relative clauses are not presupposed and, consequently, admit ERP. In contrast, restrictive relative clauses on definite heads express presupposed content, therefore, ERP are blocked.

Whereas Hooper & Thompson (1973) concentrate on English data, their analysis has been adopted to a wide range of ERP in other languages. The idea that a unified semantic concept such as assertion distinguishes the group of licensing contexts has seen further development in the work of (amongst others) Julien (2007), Gärtner (2001), Meinunger (2004), Sawada & Larson (2004), Truckenbrodt (2006), and Wechsler (1991) which all observe that there is somehow a correlation between a semantic phenomenon like assertion (versus presupposition) and the possibility of certain syntactic operations. The robustness of this correlation is underscored by the fact that, crosslinguistically, the licensing contexts for ERP are very similar. Most of the more recent works translate the semantic concept of assertion and presupposition into more pragmatic terms, by claiming that only embedded clauses which have an own illocutionary force potential allow root transforms. In part, the approaches establish a connection between syntax and semantics by assuming that illocutionary force is encoded in a syntactic head Force⁰ (for

derived by the movement of an operator to the left periphery. The basic idea is that the movement of the operator interacts with the movement of the fronted argument. Hence, Haegeman (2010) concludes that the oddness of examples like (10) is due to an intervention effect. The main shortcoming of purely syntactic analyses is that they aim to explain the occurrence of one phenomenon in one isolated context (such as adverbial clauses in the case of Haegeman 2010 or complement clauses in den Besten 1983).

example Coniglio 2007, Julien 2007, and Meinunger 2004), the most prominent being the analysis given in Haegeman (2003), who assumes that embedded clauses which can undergo ERP have a full fledged C system in the sense of Rizzi (1997), whereas embedded clauses which resist them have a truncated left periphery.

Now, if we consider the occurrence of V2 in German, it is correct to observe that V2 is excluded from presupposed contexts such as the complement of a factive predicate. However, in contrast to English, the inversion of Hooper & Thompson's (1973) argument, i.e. ERP are licensed in non-presupposed clauses, does not apply. Non-restrictive relative clauses are not presupposed, since they express new information. The utterance of a non-restrictive relative clause is even ungrammatical if its propositional content is aforementioned as shown by Chierchia & McConnell-Ginet (1990) and Beaver et al. (2010) (see also section 4).

(21) Jill lost something on the flight. #If Jill, who lost something on the flight, likes to travel by train, she will be happy.

As predicted by Hooper & Thompson (1973), non-restrictive relative clauses admit ERP in English such as topicalization (see (16-a)). Now, what is unexpected is that they cannot undergo V2 movement in German, as we have seen in section 2. This shows that a revision of the understanding of the licensing factors for embedded V2 in German is necessary. So if it is not presupposition, what is it that all the contexts which resist V2 movement share? In the following section, I will argue that the main property shared by all those contexts is not-at-issueness as defined in Beaver et al. (2010) and Roberts et al. (2009).

4. On projective meaning

An interesting correlation, which, to my knowledge, has not been mentioned so far, is that clauses which resist root phenomena project under embedding, where projection is defined as survival under the syntactic scope of an entailment-cancelling operator such as negation (cf. Beaver et al. 2010). For example, a sentence like (22-a) has (at least) two implications: (i) Elton was invited to the royal wedding, and (ii) he forgot it. Only the first implication survives under negation as shown in (22-b).

- (22) a. Elton forgot that he was invited to the royal wedding.
 b. Elton didn't forget that he was invited to the royal wedding.
 >> Elton was invited to the royal wedding.
 > Elton forgot that he was invited to the royal wedding.

Projection has been classically analysed as being one core property of presuppositions. Presupposed content typically survives when the expression that triggers the presupposition occurs under the syntactic scope of an entailment-cancelling operator such as negation or modals. Constructions like those in (23), the so called "family of sentences" tests, are typically used as a diagnostic for presupposition (cf. amongst others Chierchia & McConnell-Ginet 1990, Geurts 1999, and Karttunen 1973). So if B is a presupposition of A, then B should survive if the initial utterance A is embedded under negation, a question operator, an epistemic modal, or if it

constitutes the antecedent of a conditional:

- (23) a. $\neg A \gg B$
 b. It is possible that $A \gg B$
 c. $A \rightarrow C \gg B$
 d. $A? \gg B$

If we consider our initial example in (22-a), the implication (i) projects in all the family sentences (see (24)). This is expected since the factive predicate *to forget* presupposes its complement.

- (24) a. Did Elton forget that he was invited to the royal wedding?
 b. It is possible that Elton forgot that he was invited to the royal wedding.
 c. If Elton forgot that he was invited to the royal wedding, he will never be invited again.

Recall that a clause embedded under a factive predicate such as *to forget* resists root transformations. This observation has led to the conclusion that it is presupposition what blocks root phenomena. And indeed: The complement of a non-factive predicate such as *believe*, which, as it is well known, admits root phenomena, does not project under embedding. This is shown in the following examples in which the implication that Elton was invited to the royal wedding does not arise.

- (25) a. Peter believed that Elton was invited to the royal wedding.
 b. Peter didn't believe that Elton was invited to the royal wedding.
 c. It is possible that Peter believed that Elton was invited to the royal wedding.

The correlation between projection and the availability of root phenomena applies also to temporal adverbial clauses. In section 2, we have seen that, crosslinguistically, temporal clauses resist root phenomena. Interestingly, their propositional content survives if the temporal clause is under the scope of an entailment-cancelling operator as shown in the following examples. The content of the temporal clause survives in all sentences.

- (26) a. The commissioner reached the crime scene after the corpse was found.
 b. The commissioner didn't reach the crime scene after the corpse was found.
 c. Did the commissioner reach the crime scene after the corpse was found?
 d. It is possible that the commissioner reached the crime scene after the corpse was found.
 e. If the commissioner reached the crime scene after the corpse was found, she must have hurried.
 \gg The corpse was found.

Projection under embedding is often considered as being one constituent property of presuppositions. However, as observed by (amongst others) Beaver et al. (2010), Potts (2005), and Roberts et al. (2009), not all implications which survive under embedding are presupposed. As an example, consider non-restrictive relative clauses which show the typical projection behavior in all the family of sentences tests:

- (27) a. Jill, who lost something on the flight, likes to travel by train.

- b. Jill, who lost something on the flight, doesn't like to travel by train.
- c. Does Jill, who lost something on the flight, like to travel by train?
- d. It's possible that Jill, who lost something on the flight, likes to travel by train.
- e. If Jill, who lost something on the flight, likes to travel by train, she will be happy.
 >> Jill lost something on the flight.

Although the content of a non-restrictive relative clause projects under embedding, Chierchia & McConnell-Ginet (1990) and Holler (2005) argue convincingly that non-restrictive relative clauses are not presupposed. Indeed, non-restrictive relative clauses are clearly used to introduce new information and do not obey a common ground constraint. Even more, the use of a non-restrictive relative clause is infelicitous if its proposition is aforementioned as observed by Beaver et al. (2010). That's why example (21), here repeated as (28) is not well-formed:

- (28) Jill lost something on the flight. #If Jill, who lost something on the flight, likes to travel by train, she will be happy.

The fact that non-restrictive relative clauses are not presupposed is in agreement with the observation that they admit root phenomena such as embedded topicalization in English (see example (14)). However, following the view, that non-presupposed clauses admit ERP, it is unexpected that non-restrictive relative clauses resist V2 movement as shown in (15). Therefore, in the following chapter, I will argue that, in German, the decisive criterion is not the opposition between assertion and presupposition but rather at-issueness. We will see that the group of those meanings which project under embedding equates to the group of clauses which block V2 movement in German. In this view, projection is not tied to presuppositional expressions. Rather, presuppositions constitute a subset of projective meanings in general.

So far, the discussion has shown that projection cannot be used as a sufficient test for presupposition. Rather, projection is a phenomenon shared by more implications than just presuppositions. Besides non-restrictive relative clauses, expressives such as the expression *son-of-a-bitch* in the following example from Beaver et al. (2010) project under embedding without being presupposed:

- (29) If that son-of-a-bitch Bill left, he'd better not have taken the flower arrangement.

More recently, Beaver et al. (2010) and Roberts et al. (2009) have analyzed projection as a pragmatic property shared by all expressions which are not-at-issue. Based on the observation that projective meaning is not always presupposed, Beaver et al. (2010) and Roberts et al. (2009) conclude that projection is not tied to presupposition but to discourse structure. They show that projective meanings have a particular discourse status: they are not part of the main point, or, in their terms, they are not-at-issue. Assuming that operators such as negation target the main point of an utterance, Beaver et al. (2010) assume that meanings, which are not part of the at-issue content, are ignored by operators and hence project.

To distinguish at-issue content from those implications which are not at-issue, Beaver et al. (2010) rely on Robert's (1996) concept of Question Under Discussion (QUD), which is defined as the (actual or implicit) question corresponding to the current discourse topic. Being at-issue then comes up to being relevant relative to the QUD by entailing a partial or a complete answer

to it. Their "Hypothesis about what projects and why" is summarized in (30):

- (30) a. All and only those implications of (embedded) sentences which are not-at-issue relative to the Question Under Discussion in the context have the potential to project.
 b. Operators (modals, negation, etc.) target at-issue content.

To identify the content of an utterance which constitutes the main point and which is the target of operators, at-issueness is defined in terms of the yes/no question associated with a proposition as shown in (31) (where ?p corresponds to the question whether p):

- (31) A proposition p is at-issue relative to a question Q iff ?p is relevant to Q.

Let us consider how this works applied to an example. In (32), A's utterance contains an embedded clause $p = \textit{Marge had her hair done}$, which projects.

- (32) QUD: Why is Marge so angry?

A: Homer didn't notice that she got her hair done.

Then the question $?p = \textit{Did Marge get her hair done?}$ has no answer which is relevant to the QUD. We can therefore conclude that the embedded proposition is not at-issue, and for this reason it is ignored by negation and projects. The same holds for the non-restrictive relative clause in the following dialogue as an answer to the current QUD:

- (33) QUD: Will Jill take the car or will she take the train?

A: Jill, who lost something on the flight, likes to travel by train.

If $p = \textit{Jill lost something on the flight}$, then the answer to ?p must be either p or $\neg p$. Neither of the set of worlds, those in which p is true or those in which p is false, does entail an answer to the QUD. Being not at-issue, the content of the relative clause projects. Note that the utterance of a non-restrictive relative clause is ruled out if the content of the relative clause is at-issue as shown in the following example:

- (34) QUD: Did Jill lose something on the flight?

a.#Jill, who lost something on the flight, likes to travel by train.

Therefore, we can conclude that non-restrictive relative clauses cannot be used to express at-issue-content. In contrast, a non-factive complement clause can entail an answer to the current QUD. Consider the following example. Here, the content of the clause embedded under the predicate *say* is relevant with respect to the QUD.

- (35) QUD: Why is Marge so sad?

A: Homer said that they won't be able to buy a car.

At-issueness as defined in Beaver et al. (2010) is not conventionally triggered but depends on the actual use in discourse. The context-dependence of the projective behavior of embedded clauses is going to be discussed in the following chapter.

Beside projection, another common property of clauses that are not at-issue is that replying

with a direct denial cannot be taken to deny the truth of the clause. Direct denial as defined in Roberts et al. (2009) is replying with *no*, whereas *Hey! Wait a minute!* or *What dya mean?* constitute possible ways of indirect rejection. For example, the content of the factive complement clause in the following example cannot be challenged by (B), but only indirectly as in (B'). Replying with a direct denial as in (B) commits the speaker to the embedded proposition.

- (36) A: Peter forgot that Elton is invited to the royal wedding.
 B: No. #They invited Mick, not Elton.
 B':Hey, wait a minute! - Elton isn't invited to the royal wedding. They invited Mick.

Note that von Stechow (2004)'s "Hey-wait-a-minute"-test has been classically used in conjunction with presupposition. However, it can also be applied to a clearly not presupposed proposition as in the following example. The content of a non-restrictive relative clause can only be denied indirectly, showing once again that the relevant property is not being presupposed, but being not-at-issue.

- (37) A: Jill, who lost something on the flight, likes to travel by train.
 B: No. #Jill didn't lose anything on the flight.
 B':Hey, wait a minute! - Jill didn't lose anything on the flight.

In contrast to non-restrictive relative clauses, the content of the complement of the non-factive verb *believe* can be challenged by a direct denial:

- (38) A: Peter believes that Elton is invited to the royal wedding.
 B: No. They invited Mick, not Elton.

Therefore, neither the family sentences, nor the "Hey-wait-a-minute"-strategy can serve as a sufficient test to diagnose presuppositional content. Rather, as has been shown in this chapter, both strategies are in fact valid diagnostics to distinguish at-issue content from meanings which are not-at-issue. The latter are ignored by operators and therefore project, moreover, they cannot be denied directly. Thus, not all meanings that are not-at-issue are also presupposed: Presupposed content forms a subset of not-at-issue implications as shown in figure 1.⁴

In this chapter, we have seen that there is a correlation between the availability of embedded V2 in German and projection under embedding. Clauses whose content projects under the scope of an entailment-cancelling operator cannot undergo V2 movement. At first sight, this correlation could be interpreted as evidence for the traditional view that presupposed clauses, that project, do not license ERP. However, following Beaver et al. (2010) and Roberts et al. (2009), I have shown that projection is not a property that applies only to presuppositions. Rather, all kinds of meanings that are not-at-issue show the typical projection behavior under embedding, where projection is the result of the scope of operators being limited to the main point of an utterance. Only a subset of the projective meanings, or of the not-at-issue content, is presupposed. The so far investigated clauses can be characterized by the two features [+/-at-issue] and

⁴Following Beaver et al. (2010) and Roberts et al. (2009), I therefore assume that expressive meaning is not presupposed but simply [-at-issue]. Note, however, that there are different opinions on that. Sauerland (2007) and Schlenker (2007) argue, for example, that expressive items carry presuppositions.

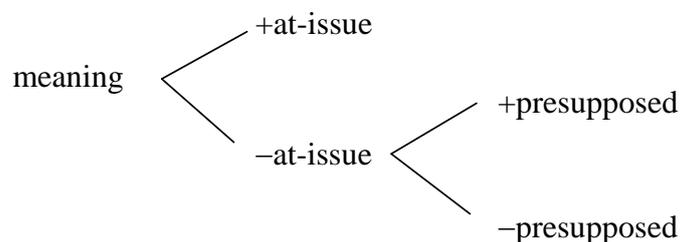


Figure 1: Dimensions of meaning

[+/-presupposed], giving us a total of three sub-groups.⁵

In the following chapter, different types of embedded clauses are going to be classified with respect to the two features [+/-at-issue] and [+/-presupposed]. Furthermore, the correlation between the two features and the licensing of embedded V2 is going to be explored in more detail.

5. *At-issueness and the licensing of Embedded Root Phenomena*

The revised conception of the source of projection as presented in the previous chapter has significant theoretical consequences for the understanding of the licensing of ERP. The traditional view, according to which non-presupposed clauses can undergo V2 movement, cannot account for the degradation of V2 order in non-restrictive relative clauses, which are clearly non-presupposed expressions. Instead of analyzing this as an exception to the rule, I propose an alternative view on the licensing of embedded V2.

In the previous chapter, we have seen that non-restrictive relative clauses share two crucial properties with presupposed clauses: they project under embedding and they cannot be denied directly. In line with Beaver et al. (2010) and Roberts et al. (2009), both properties were assumed to be characteristic features of content that is not-at-issue. Interestingly, the group of contexts resisting V2 movement in German corresponds to the group of meanings that project. Therefore, I will defend the following hypothesis:

(39) **Hypothesis about the licensing of embedded V2 in German**

Only embedded clauses that express at-issue content license V2 movement.

The hypothesis predicts that all clauses being able to undergo V2 movement (i) can be cancelled via a direct denial, (ii) do not project under embedding, and (iii) entail a complete or partial answer to the current QUD. Let's consider one by one the relevant licensing contexts.

⁵Beaver et al. (2010) show that in specific contexts presupposed clauses can also express at-issue content. An example is going to be discussed in section 5 (see (41)).

Let us start with **(I) the complements of factive predicates**. In example (36), we have already seen that the content of a factive complement clause cannot be denied directly. Furthermore, factive complement clauses project under embedding as shown in (22) and (24). Both properties suggest that factive complement clauses express [-at-issue] content. And indeed, in (32), we have seen that they do not entail a complete or partial answer to the current QUD. Thus, factive complement clauses are [-at-issue]. This is consistent with the fact that they cannot undergo V2 movement in German (see example (6-a)). Typically, if the content of a factive complement clause is rendered [+at-issue], the utterance is not well-formed as shown in the following example from Beaver et al. (2010) (their 20).

- (40) QUD: What's the weather like?
 a.#Bob realizes that its raining.

However, in specific contexts, a complement clause embedded by a factive predicate can express at-issue content. In the following example, the embedded proposition is highly relevant with respect to the QUD. Interestingly, in this case, V2 order in the complement clause is possible as predicted by the hypothesis in (39).⁶

- (41) QUD: Warum bist du denn so traurig?
 'Why are you so upset?'
 A: Ich habe gerade erfahren, ich bin durchgefallen.
 I have just found out I am failed.
 'I just found out that I failed at the exam.'

Since factive complement clauses are typically [+presupposed] and [-at-issue], we cannot decide yet, whether V2 movement is excluded due to the feature [-at-issue] or [+presupposed]. More precisely, so far, it is not clear, if V2 movement in embedded clauses is licensed by the feature [+at-issue] or b the feature [-presupposed].

In contrast to factive complement clauses, **(II) non-factive complement clauses** can be denied directly (see example (38)), furthermore, they do not project under embedding as shown in (25). That they really express at-issue content has been shown in (35), where the complement clause is relevant with respect to the current QUD. We can therefore conclude that non-factive complement clauses are [+at-issue], which is expected since they can undergo V2 movement in German. Since at-issueness is, at least in part, context-dependent, we would expect that the availability of V2 order in non-factive complement clauses depends on the context, too. If the content of a complement clause is not relevant with respect to the QUD, V2 order should not be possible. I leave the verification of this prediction for further research.

As a third group consider now **temporal clauses (III)**. The following example shows that direct denial of the propositional content of a temporal clause is not possible. The embedded clause can only be challenged indirectly:

- (42) A: The commissioner reached the crime scene after the corpse was found.

⁶Note, that the embedded V2-clause is intonationally clearly integrated into its matrix clause. Furthermore, it cannot be omitted, since the resulting clause *Ich habe gerade erfahren* is not grammatical. Both properties show that the V2-clause is clearly embedded and not juxtaposed. (Thanks to Jochen Geilfuß-Wolfgang for the example.)

B: No, that's false. #The corpse wasn't found.

B': Hey, wait a minute! - The corpse wasn't found yet!

Furthermore, in example (26), we have already seen that temporal clauses project out of the scope of an entailment-cancelling operator, which suggests that they are [-at-issue]. This can be proved if we investigate the appropriateness of temporal clauses as an answer to the current QUD. If the content of a temporal clause is relevant with respect to the current QUD in the sense of definition (31), the utterance is not well-formed as can be seen in the following dialogue. Here, the temporal clause contains the decisive information, and therefore, the sentence is not well-formed.⁷

(43) QUD: Did Peter buy the car?

a.#Peter went to the movies after he bought the car.

In contrast, in the following example, the answer to the question $p? = \textit{Did Peter buy the car?}$ is not relevant with respect to the QUD. In this case, the utterance is well-formed.

(44) QUD: When did Peter go to the movies?

A: He went to the movies after he bought the car.

Therefore, we can conclude that temporal clauses are always [-at-issue]. This corresponds with their incapacity to undergo V2 movement in German. Maybe, temporal clauses are also [+pre-supposed], as assumed by amongst others Lascarides & Oberlander (1993) and Van der Sandt (1992). This question will not be investigated in this paper.

In contrast to temporal clauses, **causal clauses (IV)** admit V2 order as shown in section 2. I would therefore predict that they are able to express at-issue content. First of all, we can observe that the content of a causal clause can be denied directly:

(45) A: Maria won't be here today because she is ill.

B: No, that's wrong. She is on vacation.

If we consider the projectional behavior, causal clauses are ambiguous. If they project or not, depends on the context. For example, the following utterance allows two interpretations, one in which the embedded proposition projects, and one, in which it does not.

(46) Did Peter marry Sharon because she is rich?

Not surprisingly, causal clauses can express at-issue content, that is, they can answer the current QUD.

(47) QUD: Does Peter like Maria?

⁷The same utterance is possible if the QUD is first answered by *Yes*. In this case, the content of the temporal clause is at the moment of utterance not part of the at-issue content, since the QUD has already been answered.

(i) QUD: Did Peter buy the car?

A: Yes. And he went to the movies after he bought the car.

A: He married her because he likes her!

Thus, causal adverbial clauses can express at-issue-content.

So far, it is not clear whether V2 movement is licensed by the feature [+at-issue] or [-presupposed]. However, if we consider relative clauses, we will see that only one feature is a possible licensing factor.

In example (37), we have already seen that **non-restrictive relative clauses (V)** cannot be denied directly. Furthermore, their content projects out of the scope of entailment-cancelling operators as shown in (27). That non-restrictive relative clauses cannot express at-issue content has been shown by the fact that they cannot be used to answer the current QUD (see (34)). Therefore, non-restrictive relative clauses are always [-at-issue]. This is consistent with the fact that, in German, they do not admit V2 order. What is important now is that in contrast to factive complement clauses and temporal clauses, non-restrictive relative clauses are clearly [-presupposed]. For this reason, they cannot express a proposition that is already given in the context as shown in example (21). Thus, with non-restrictive relative clauses, we have a proposition that is [-at-issue] and [-presupposed]. Therefore, we can conclude that [-presupposed] is not a sufficient criterion to license V2 movement. Rather, a clause must be [+at-issue] to admit V2 order in German. In contrast, non-restrictive relative clauses admit root phenomena such as topicalization in English. This suggests that embedded topicalization in English is licensed in clauses that are [-presupposed], whereas V2 order in German is only possible in clauses that are [+at-issue]. Thus, V2 order is licensed only in a subset of the contexts that license embedded topicalization in English.

If we consider **(VI) restrictive relative clauses**, it is important to distinguish restrictive relative clauses on definite heads from those on indefinite heads since only the latter accept V2 order. The relevant examples from Gärtner (2001:114) are repeated in (48):

- (48) a. Ich kenne einen Linguisten, der hat über Toba Batak gearbeitet.
 I know a linguist who has on Toba Batak worked.
 b.*Ich kenne den Linguisten, der hat über Toba Batak gearbeitet.
 I know the linguist that has on Toba Batak worked.

This seems to be a context-independent observation, which, at first sight, does not seem to be linked to at-issueness. However, upon closer examination, restrictive relative clauses on indefinite heads turn out to be always [+at-issue], whereas a restrictive clause depending on a definite antecedent expresses [-at-issue] content. To begin with, consider restrictive relative clauses depending on a definite antecedent. As shown by the following example, a direct denial typically targets the main clause proposition. To challenge the content of the relative clause, utterance B' is more appropriate.

- (49) A: Dominik loves the woman who works for the police.
 B: No. #Elizabeth is a teacher.
 B':Hey, wait a minute! Elizabeth is a teacher.

Furthermore, they project under embedding. In the following clauses, the implication that there is a (unique) woman working for the police, survives.

- (50) a. Dominik doesn't love the woman who works for the police.
 b. Does Dominik love the woman who works for the police?
 c. It is possible that Dominik loves the woman who works for the police.
 d. If Dominik loves the woman who works for the police, he has taste.

As predicted, a restrictive relative clause which depends on a definite antecedent expresses [-at-issue]-content. This becomes also clear if we consider the following examples. Imagine example 2 as an answer to the following QUD:

- (51) Background: A linguist in the upper age is interviewed by a journalist.
 QUD: During your career as a language researcher, what impressed you most?
 A: I know the linguist who cannot read.

Here, what is at-issue is not the content of the relative clause but rather the main clause. So what is impressing is the fact that the speaker knows the alphabetic linguist and not the fact that there is a linguist who cannot read. Another example makes it more clear. In the following example, the interpretation in which the relative clause is at-issue is forced. Here, what is clearly relevant to the QUD is the propositional content of the relative clause, not the main clause. As we can see, the utterance is not well-formed.

- (52) QUD: Does [the car]_i have air conditioning?
 a. #I bought [the car which doesn't have air conditioning]_i.

Therefore, we can conclude that restrictive relative clauses depending on a definite antecedent are always [-at-issue]. For this reason, they cannot undergo V2 movement in German. Furthermore, there is good evidence that restrictive relative clauses on definite heads are also [+pre-supposed] as argued in amongst others Hooper & Thompson (1973). Both properties can be explained by their specific function in discourse. But first consider restrictive relative clauses on indefinite heads, which allow V2 order. As shown by the following example, their content can be challenged by a direct denial:

- (53) A: Dominik loves a woman who works for the police.
 B: No, that's not true! Elizabeth is a teacher.

Another important difference between restrictive relative clauses on definite and those on indefinite heads is that the latter do not project embedded in the family sentences as shown in the following examples. The implication that there is a unique woman working for the police does not survive.

- (54) a. Dominik loves a woman who works for the police.
 b. Dominik doesn't love a woman who works for the police.
 c. Does Dominik love a woman who works for the police?
 d. It is possible that Dominik loves a woman who works for the police.
 e. If Dominik loves a woman who works for the police, he should be always honest.

Both properties suggest that restrictive relative clauses depending on an indefinite antecedent express at-issue content. And, indeed, they can entail an answer to the current QUD. Consider the following dialogue. Here, what is clearly relevant to the QUD is the propositional content of the relative clause, not the main clause, which, alone, is not informative.

(55) Background: A linguist in the upper age is interviewed by a journalist.

QUD: During your career as a language researcher, what impressed you most?

A: I know a linguist who cannot read.

Since restrictive relative clauses on indefinite heads are [+at-issue], they admit V2 movement in German.

The observation that restrictive relative clauses on indefinite heads are always at-issue whereas restrictive relative clauses on definite heads express not-at-issue content and are presupposed is linked to their specific function in discourse. The predominant function of a restrictive relative clause is to narrow down the referential range of the antecedent for identificational purposes. However, there are important differences with respect to the function of a restrictive relative clause depending on whether it modifies a definite or an indefinite head. A restrictive relative clause depending on a definite head serves to identify an already given discourse referent. In discourse semantics, such as Discourse Representation Theory or File Change Semantics (see Heim 1982 and Kamp & Reyle 1993), an indefinite DP introduces a new discourse referent, whereas a definite DP does merely update an already given antecedent. In short, a definite description is subject to a familiarity condition and it must be bound by an antecedent x . For example, in sentence (49), an already established discourse referent x , that is the antecedent of the definite DP *the woman*, is updated by the condition *love (Dominik, x)*. The restrictive relative clause serves to identify the discourse referent to which the condition must be added. That means that, in order to fulfill its function, a restrictive relative clause depending on a definite DP must contain an information about the referent which allows the hearer to identify the antecedent x . This can only be an information about x which is already given. Thus, if the hearer does not have any knowledge of a woman working for the police, he is not able to identify the relevant discourse referent of the definite DP in example 2.

Other than restrictive relative clauses on definite heads, those on indefinite heads are not subject to the familiarity condition. Typically, the indefinite referent is introduced for the first time and the relative clause provides crucial information about this referent. Often, the relative clause expresses even the main point of the whole utterance. In the following examples from Gärtner (2001), the absence of the relative clause would lead to an uninformative utterance:

(56) In Leipzig gibt es Häuser, die (stehen) leer (stehen).

'In Leipzig, there are houses which are vacant.'

Table 2 summarizes the main findings concerning at-issueness and the availability of root phenomena in the discussed clause types.

The table shows that all clauses that express at-issue content license V2 order in German as well as fronting movements in English. However, if we consider non-restrictive relative clauses, we can discover a difference between the occurrence of these two root transformations. Whereas topicalization in English is possible, V2 order in German is blocked. In section 3,

	V2 in German	fronting in English	[at-issue]
complement of a factive verb	-	-	-
complement of a non-factive verb	+	+	+
temporal adverbial clause	-	-	-
causal adverbial clause	+	+	+
non-restrictive relative clause	-	+	-
restrictive relative clause on a definite head	-	-	-
restrictive relative clause on an indefinite head	+	+	+

Table 2: ERP and at-issueness

we have seen that non-restrictive relative clauses cannot be aforementioned, therefore, they are never presupposed. This is conform to Hooper & Thompson's claim that ERP are licensed in non-presupposed contexts. With respect to German, however, being non-presupposed is not a sufficient criterion to license V2 movement. I therefore assume that V2 movement is licensed in contexts that are [+at-issue], whereas for fronting transformations in English, it is sufficient for a context to be [-presupposed].

6. Conclusion

In this paper, I discussed the occurrence and the licensing conditions of embedded V2 in German. The fact that V2 order is excluded from non-restrictive relative clauses, which are clearly non-presupposed items, suggests that V2 movement, contrary to the traditional analysis going back to Hooper & Thompson (1973), is not possible in all embedded clauses that are not presupposed. Rather, I have shown that all clauses that resist V2 movement project under embedding and cannot be denied directly. Both properties were assumed to be characteristic features of content that is not-at-issue. Adopting the analysis of Beaver et al. (2010) and Roberts et al. (2009), I have shown that clauses which resist V2 movement in German do not express at-issue content. I therefore concluded that V2 movement in German embedded clauses is licensed by the feature [+at-issue]. In contrast, topicalization in English is possible in all contexts that are [-presupposed], as originally predicted by Hooper & Thompson (1973).

Further research is needed to investigate other types of adverbial clauses, such as concessive or conditional clauses, with respect to the occurrence of ERP and at-issueness. Moreover, it is not yet clear if at-issueness and non-at-issueness are conventionally or conversationally triggered. On the one hand, at-issueness is context-dependent, which favors a conversational triggering. On the other, some embedded clauses such as temporal or non-restrictive relative clauses cannot express at-issue content, which is in argument in favor of a conventional analysis. Finally, other root phenomena and other languages have to be investigated with respect to the proposed analysis.

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AnchorP

Argument structure of the Russian *be*-possessive

Aysa Arylova

In this paper I present an analysis of the argument structure of the Russian *be*-possessive. I claim that the *be*-possessive is an existential statement with the possessor *u*-PP acting as an Anchor element. I extend the Anchor analysis to other *u*-PP constructions. I also claim that the *have*-possessive in Russian has a structure different from that of the *be*-possessive.

1. Introduction

The focus of this paper is the argument structure of the Russian *be*-possessive construction illustrated in (1):

- (1) U menja byl-a mašin-a.
at I.GEN be.PST-F.SG car.F-NOM.SG
'I had a car.'

The *be*-possessive in (1) is the basic means of expressing predicative possession in Russian. The possessor is expressed by the prepositional phrase '*u* + DPGEN', the possessum is a Nominative DP, and the verb *byl* 'be' agrees with the possessum. The construction is an instantiation of what Stassen (2009) calls locational possessives.

The argument structure of the *be*-possessive has been discussed in a range of contexts. Several authors stressed the similarity between existential, locative and possessive constructions (Freeze 1992; Chvany 1975; Partee & Borschev 2007). The same range of constructions was discussed in the light of the relation between 'be' and 'have' (Kayne 1993; Den Dikken 1998; Dyakonova 2007; Jung 2008). In Chvany (1975), Harley (2002) and Dyakonova (2007) the argument structure of the possessive construction was set to reflect the relation of the construction to the double object construction.

In what follows I propose an analysis of the *be*-possessive where the possessor is constructed as an element anchoring the existential statement that contains the possessum. I extend the analysis of the *be*-possessive to other constructions where the *u*-PP is used with arguably similar

properties, such as the *imet'sja*-possessive in (2-a), the external possession construction in (2-b) and the world-creating construction in (2-c).

- (2) a. U menja ime-et-sja kartočk-a vaš-ego magazin-a.
 at I.GEN have:PRES-3SG-REFL card.F-NOM.SG your-M.GEN.SG shop.M-GEN.SG
 'I have your shop's client card.'
- b. U menja sloma-l-sja komp'juter.
 at I.GEN break-PST:M.SG-REFL computer.M:NOM.SG
 'My computer broke down.'
- c. U tebjja vs-e xoroš-ie knjig-i dolžn-y zakančiva-t'-sja
 at you.GEN all-NOM good-NOM.PL book.F-NOM.PL must-PL end-INF-REFL
 ploxo.
 badly
 'According to you, all good books must end badly.'

Before I bring my proposal to light, a review of the existing analyses of the *be*-possessive is in order. Here I discuss the two most recent analyses: Dyakonova (2007) and Jung (2008).¹

1.1. Dyakonova (2007): *Vappl*

Dyakonova (2007) is a work on the ditransitive construction in Russian, which also contains a proposal on the treatment of possessive constructions. The discussion of possessives constitutes just several pages in Dyakonova's paper – the fact that I direct so much attention (and critique) at Dyakonova's proposal should be considered as a tribute to its powerfulness.

In her analysis of the ditransitive construction, Dyakonova (2007), building on such works as McIntyre (2006) and Pylkkanen (2002), develops the notion of the applicative predicate VAPPL that introduces the Goal argument in (3):

- (3) a. Ja kupi-l-a muž-u podarok.
 I.NOM buy-PST-F.SG husband-DAT.SG present.M:ACC.SG
 'I bought my husband a present.'
- b. [_{vP} Agent [_v [_{V_{appl}P} Goal [VAPPL [_{VP} Theme [V Complement]]]]]]]

The properties of VAPPL are the following:

- (4) a. it is a semantically contentful light verb;
 b. it has the following meaning: HAVE (*x* spec, *y* compl) asserts of *x* that it stands in a possession relationship to *y*;
 c. it can select either for an entity or an event. Dyakonova (2007:18-19)

Possession in (4-b) is understood as an abstract notion, such that experiences and states can be viewed as possessums, along with concrete objects. Besides Goals, VAPPL introduces such arguments as Experiencers, Bene-/Malefactors, and also Possessors.

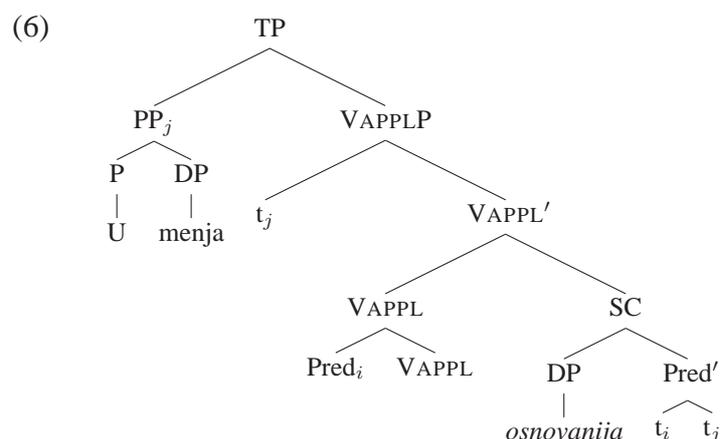
¹Some other well-known analyses of the Russian *be*-possessive are Chvany (1975) and Freeze (1992).

Dyakonova follows Den Dikken (1998) who proposes that the double object construction and the possessive construction are derived from one underlying structure. Dyakonova applies her VAPPL-analysis to the three predicative possessive constructions in Russian:

- (5) a. U menja est' osnovani-ja polaga-t'...
 at I.GEN be.PRS reason.N-NOM.PL think-INF
 'I have reasons to think that...'
 b. U menja ime-jut-sja osnovani-ja polaga-t'...
 at I.GEN have:PRS-3PL-REFL reason.N-NOM.PL think-INF
 'I have reasons to think that...'
 c. Ja ime-ju osnovani-ja polaga-t'...
 I.NOM have:PRS-1SG reason.N-NOM.PL think-INF
 'I have reasons to think that...'

Dyakonova (2007)

Dyakonova proposes that the *u*-PP is introduced into the structure as a locative predicate and acquires possessor semantics when it moves to the specifier of VAPPLP. The structure in (6) presents Dyakonova's derivation of the possessive in (5-a):



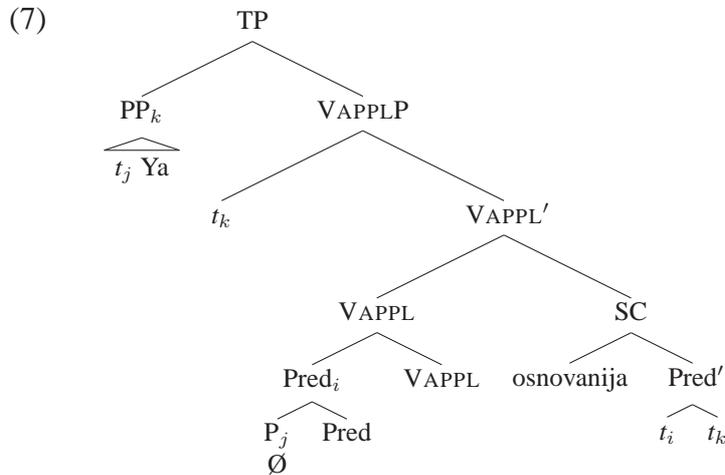
In (6) the would-be possessum *osnovanija* 'reasons' is the subject of the small clause, and the *u*-PP is its locative predicate. The head of the small clause, *Pred*, incorporates into VAPPL and thus extends the domain (in the manner of Den Dikken (1998)) for the movement of the *u*-PP to SpecVAPPLP, where the *u*-PP picks up the possessor θ -role.² The possessor/locative *u*-PP then moves on to SpecTP, becoming the subject of the clause. The complex 'VAPPL + Pred' is spelled out as a form of *byt* 'be'.

The derivation for the *imet'sja*-possessive in (5-b) is the same as in (6) – the difference is that the complex 'VAPPL + Pred' is spelled out as *imet'sja*. Dyakonova notes that her tentative analysis of possessives does not contain a principled account of the choice for the spell-out of the 'VAPPL + Pred' complex at this point. Dyakonova permits the possibility that, given the reflexive morphology on *imet'sja*, the derivation for this construction is more complex than in (6).

The *have*-possessive has almost the same structure as (6), except that the P heading the

²Note that this is movement into a θ -position, and the initially locative *u*-PP thus becomes doubly θ -marked.

possessor phrase is a null affix, which due to its affix nature must incorporate into a higher-up head, Pred (in the manner of Baker (1988)). The head-complex ‘P+Pred+VAPPL’ is spelled out as *imet* ‘have’.



Dyakonova’s analysis, though cleverly designed, encounters a series of problems. Some of the problems are noted by Dyakonova herself, such as the choice of spell-out as either *byt*’ or *imet’sja*, and the unconventional movement into a thematic position.

Two other problems are connected to negated sentences in (8). First, it would be difficult to derive the spell-out of *net* in negated present tense possessive and existential sentences as opposed to *ne* in negated small clause constructions:

- (8)
- a. U menja net deneg.
at I.GEN NEG.be.PRS money-GEN
‘I don’t have money.’
 - b. Ivan ne student.
Ivan:NOM NEG student.M:NOM.SG
‘Ivan is not a student.’
 - c. Bog-a net.
god.M-GEN.SG NEG.be.PRS
‘There is no God.’

Presumably, in Dyakonova’s analysis both the possessive sentence in (8-a) and the copular construction in (8-b) contain a small clause structure, the only difference between them being that the structure of (8-a) contains a VAPPLP. One could thus attribute the spell-out of *net* to the presence of VAPPL. However, we also see *net* in the existential construction in (8-c), where VAPPLP is not motivated, as there are no relevant θ -roles. Besides negation in the present tense, it is also not clear how Dyakonova would handle the distribution of the Genitive of Negation in (8). Dyakonova argues that the appearance of the Genitive of Negation is constrained semantically: the case occurs only on Themes under negation. Assuming that the possessum in (8-a) acquires a Theme status under the VAPPL predicate, it is not clear what would be responsible for the Theme status of *Boga* in the existential sentence in (8-c). In order to account for the Genitive of Negation in (8-c), one might posit that the status of Theme is acquired simply by

being situated in the subject position of a small clause – but then one would erroneously predict the appearance of this case in (8-b).

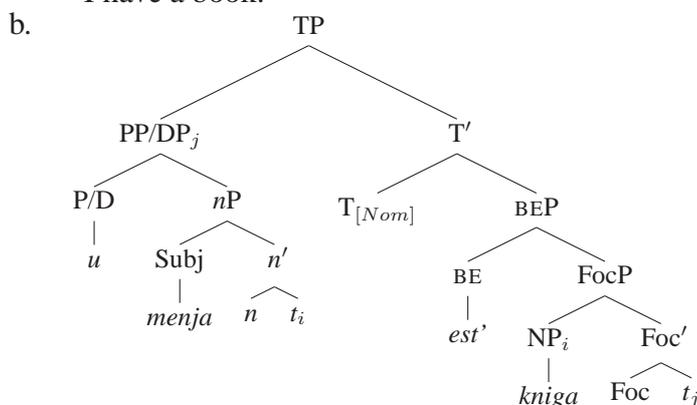
To account for the distribution of *est’/net* and the Genitive of Negation, Dyakonova would minimally have to distinguish between two types of *Pred*: simple *Pred* in copular sentences, and *Pred* \exists for existential and possessive sentences. Arguably, this step would undermine Dyakonova’s initial motivation of projecting the Theme and the *u*-PP in a small clause with a purely locative meaning.

1.2. Jung (2008): PP/DP

Jung (2008) develops an analysis of the argument structure of the Russian *be*-possessive with the intention of parameterizing the *have/be* alternation in “possessive and possessive-related” constructions. Jung assumes that *have* and *be* are “distinct surface spell-outs of a semantically empty functional head”. *Have* is the spell-out of the functional head with a [+Case] feature, whereas *be* represents the [-Case] allomorph of the head (Jung 2008:173).

In his treatment of the *be*-possessive Jung augments the analysis of Kayne (1993) with the Low Focus projection of Belletti (2001) and Erechko (2002):

- (9) a. U menja est’ knig-a.
 at I.GEN be.PRS book.F-NOM.SG
 ‘I have a book.’



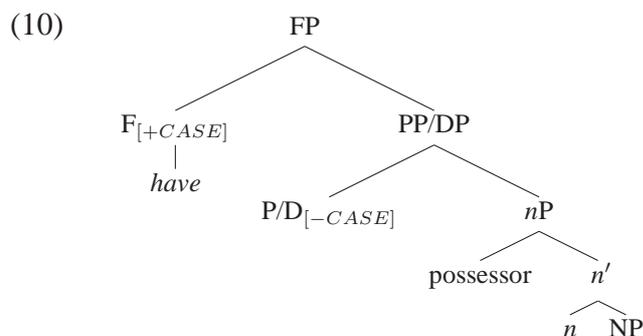
In (9) the possessor and the possessum are projected within the same *nP*. The possessor NP is the subject of the *nP* and receives its Genitive case from the immediately c-commanding P/D (lexicalized as *u* ‘at’).³ The possessum NP moves to the specifier of the TP-internal Low Focus projection – the movement is motivated by the observation that in the *be*-possessive the possessum constitutes new information. After the possessum NP vacates the PP, the whole PP remnant-moves to SpecTP to satisfy the EPP (Jung allows the possibility of the PP first moving to a low topic position immediately dominating LowFocP, before moving to SpecTP).⁴ Jung

³Jung uses the term *proper head-government* when describing the required configuration. This conflicts with the Agree framework for agreement and case assignment that Jung subscribes to; the terminological inconsistency might be a consequence of a direct translation of Kayne (1993) into the recent minimalist terms.

⁴Elsewhere in his dissertation, Jung provides a different derivation for the *be*-possessive, where the *n*'-layer

(2008:123-124) remains agnostic on the source of the existential interpretation and allows the possibility that there might be an existential layer or projection in the structures he discusses.

The *have*-possessive in Jung's analysis has the same structure as in (9-b) – the difference is that the prepositional complementizer P here has a [-Case] feature specification, which motivates the insertion of the [+Case] predicate (Jung 2008:188):



Jung extends his analysis to the perfect tense construction in North Russian as in (11-a) and deontic modal constructions as in (11-b), and argues that applicability to these constructions strengthens the analysis.

- (11) a. U nas postroe-n-o èt-ot dom.
 at we.GEN build-PRT-N.SG this-M.NOM.SG house.M:NOM.SG
 ‘We have built this house.’
- b. Gde mne byl-o spa-t’?
 where I.DAT be.PST-N.SG sleep-INF
 ‘Where was I (supposed) to sleep?’

It is dubious, however, to what extent Jung's analysis of possessives is applicable to the deontic modal construction in (11-b): without going into further detail, I simply indicate that the *wh*-word (whose route Jung does not explicitly illustrate) in (11-b) undergoes either extraction out of a subject or improper movement.

Furthermore, it is not clear how Jung would analyze the *imet'sja*-possessive. The construction, not addressed in the dissertation, would most probably be problematic for Jung, as the *have*-possessive and the *be*-possessive involve conflicting feature specifications in his analysis, such that the derivation of the *imet'sja*-possessive would not be straightforward.

2. Proposal for the *be*-possessive

In this section I propose an alternative view of the argument structure of the Russian *be*-possessive, where the *u*-PP is introduced as an *anchor* for the existential statement containing

containing the possessum NP moves to the Low Focus projection, and the PP/DP projection with the upper layer of the *nP* remnant-moves to SpecTP. This derivation is parallel to what Jung posits in deontic modal constructions and in North Russian perfect constructions. It is not clear from the dissertation whether Jung is being inconsistent, or whether he posits no principal difference between the movement of the *n'*-layer and the movement of just the possessum NP. In this paper I illustrate the structure that Jung explicitly posits for the *be*-possessive.

the would-be possessum. Before I proceed to the notion of anchor elements, let me make a brief excursion on the nature of the existential predicate.

I assume that the existential predicate in Russian is a one-place unaccusative. There is a range of scholars that envisage the existential as a two-place predicate, with a Theme and a Location argument (see Partee & Borschev (2007) and references therein). I do not pursue the debate in this paper and simply assume, on the basis of examples like (12), that the existential predicate has just one argument, Theme:

- (12) a. Est' vopros-y, na kotor-yje čelovečestv-o nikogda ne
 be.PRS question.M-NOM.PL on which-ACC.PL humanity.N-NOM never NEG
 najd'-ot otvet-ov.
 find.FUT-3SG answer.M-GEN.PL
 'There are questions to which humanity never will find answers.'
- b. Net sčast-ja bez ljubv-i.
 is.not happiness.N-GEN without love.F-GEN
 'There is no happiness without love.'
- c. Bog est'.
 god.M:NOM.SG be.PRS
 'There is God.'
- d. Friendly fire isn't.

When faced with examples like (12), the proponents of the two-place-predicate view of the existential posit an implicit locative (something like 'this world'), arguing that if an entity exists, it necessarily exists in some location. Note, however, that by this reasoning all predicates, existential and non-existential alike, should have an implicit locative: if an entity carries out an action or is in some kind of state, this action or state should take place at some location.⁵ I assume that there is no need to posit implicit locatives everywhere and hold examples like (12) as evidence that the existential is a one-place predicate.

However, existentials do tend to occur with some locative phrase or other – in which case linguists talk about *locative inversion*. I posit that in this case we are not dealing with an argument of the existential predicate, but with an anchor element that takes the existential statement as complement.

The notion of the anchor element is consonant with Partee and Borschev's (2007) notion of the Perspectival Center, and Langacker's (1993) notion of a reference point.

Partee & Borschev (2007) aim to account for the distribution of the Genitive of Negation in Russian *be*-sentences:

- (13) a. Doktor ne byl v gorod-e.
 doctor.M-NOM.SG NEG be.PST-M.SG in town.M-LOC.SG
 'The doctor was not in town.'
- b. V gorod-e ne byl-o doktor-a.
 in town.M-LOC.SG NEG be.PST-N.SG doctor.M-GEN.SG
 'There was no doctor in town.'

⁵I thank Zhenya Markovskaya for this observation.

Partee and Borschev state that the differences between the locative sentence in (13-a) and the locative-existential sentence in (13-b) stem from the choice of different elements as the *Perspectival Center* – the normally presupposed participant of the situation from whose point of departure the situation is structured (Partee & Borschev 2007:156). In (13-a) the Theme *doktor* is chosen as the Perspectival Center. The Location is chosen as the Perspectival Center in (13-b) – and in other constructions that are commonly analyzed as locative inversion. The authors consider possessive *u*-PPs to be a type of locative, and thus the treatment of (13-b) extends to the possessive construction.

Partee & Borschev (2007) do not explicate the syntactic implementation of their proposal; their provisional hypothesis is that the choice of the Perspectival Center follows from the choice of argument structure. This means that if the location/possessor is chosen as the Perspectival Center, there should be a way in the syntax to project it in a prominent position, without recourse to inversion. The analysis of Partee and Borschev (2007) opens a possibility for dissociating the phenomenon of locative inversion from obligatory syntactic movement.

Cienki (1995) treats possessive and locative PPs in Russian as *reference points* in the sense of Langacker (1993). A reference point is an entity that helps establish mental contact with another entity in the conceptual space. Possessors serve as reference points for objects located in their abstract region of control. Thus in the Russian *be*-possessive the *u*-PP profiles the reference point for the rest of the sentence.

- (14) U Ivan-a est' knig-a.
 at Ivan-GEN be.PRS book.F-NOM.SG
 'Ivan has a book.' Cienki (1995:92)

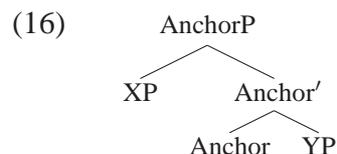
In (14) the existence of the book is constructed in reference to the *u*-PP. Remember in this connection Isačenko's (1974) discussion of the notion of possession: Isačenko argues that the *u*-PP in the *be*-possessive is a mere *adverbial expansion* of an existential statement and expresses a "relation of concern or implication", rather than possession.

According to Cienki, the *u*-PP is used as a reference point in other constructions, as in (15):

- (15) a. Syn u menja uč-it-sja v Prag-e.
 son:NOM.SG at I.GEN study:PRS-3SG-REFL in Prague-LOC
 'My son is studying in Prague.'
 b. U sil'n-ogo vseгда bessil'n-yj vinovat.
 at strong-M.GEN.SG always weak-M.NOM.SG guilty:M.SG
 'The strong one always holds the weak one as guilty.'
 Mrázek and Brym (1962, 101)

I employ the intuitions of Partee and Borschev (2007) and Cienki (1995) in my analysis: the notions of the locative Perspectival Center and the reference point contribute to the understanding of the notion of the Anchor element.

I assume that anchor elements are a syntactic phenomenon in that they are introduced by a specially designated predicate. The predicate takes two arguments: an anchor element XP and the phrase YP that needs to be anchored:



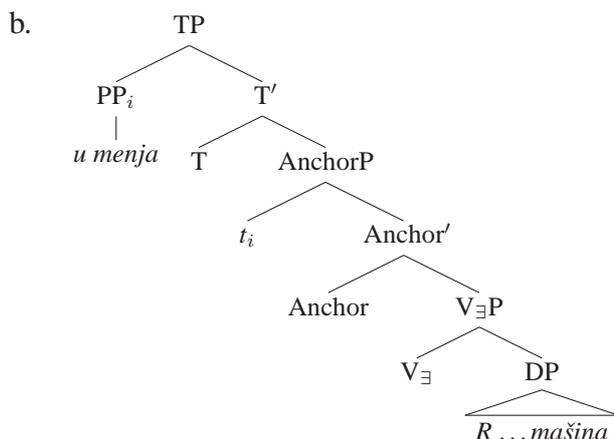
YP in (16) can vary in size depending on the construction. In the *be*-possessive YP corresponds to the $V_{\exists}P$ phrase containing the Theme. I apply the Anchor analysis to other constructions where the *u*-PP is used and claim that in the external possession construction the Anchor predicate takes TP as complement, and CP in the world-creating constructions.

More generally, I restrict the range of elements that can be used as anchors to a certain subset of locatives, possessors and time expressions, and namely the subset defined by *prominence*. This means that the PPs in (17) are analyzed as anchors with a common structure in (16), whereas the PPs in (18) would be some sort of locative complements:

- (17)
- a. U menja est' knjig-a.
at I.GEN be.PRS book.F-NOM.SG
'I have a book.'
 - b. V derevn-e est' doktor.
in village.F-LOC.SG be.PRS doctor.M:NOM.SG
'There is a doctor in the village.'
 - c. V naš-e vrem-ja bessonnice-j strada-jut okolo
in our-N.NOM.SG time.N-NOM.SG insomnia.F-INST.SG suffer:PRS-3PL around
10 procent-ov naseleni-ja razvit-yx
10 percent.M-GEN.PL population.N-GEN.SG developed-F.GEN.PL
stran.
country.F:GEN.PL
'Nowadays 10% of the population of the developed countries suffer from insomnia.'
- (18)
- a. M'ač u Aršavin-a.
ball.M:NOM.SG at Aršavin-GEN
Aršavin (a football player) has the ball.'
 - b. Doktor v derevn-e.
doctor.M:NOM.SG in village.F-LOC.SG
'The doctor is in the village.'
 - c. Metodik-i lečeni-ja sil'no izmeni-l-i-s' v
method.F-NOM.PL treatment.N-GEN.SG strongly change-PST-PL-REFL in
naš-e vrem-ja.
our-N.NOM.SG time.N-NOM.SG
'Treatment methods have changed a lot nowadays.'

The proposed structure for the *be*-possessive is given in (19):

- (19)
- a. U menja est' mašin-a.
at I.GEN be.PRS car.F-NOM.SG
'I have a car.'



The DP *mašina* ‘car’ is the Theme argument of the lexical predicate V_{\exists} . The *u*-PP is introduced into the structure as an anchor element for $V_{\exists}P$ before moving to the subject position, SpecTP.

I do not assume that the *u*-PP inherently expresses a possessor θ -role. The possession interpretation arises from the properties of the construction, possibly from the binding relation between the *u*-PP and a relation/possessor variable within the Theme DP, represented in (19-b) as *R* (cf. the discussion of the relation variable *R* in possessive constructions in Partee & Borschev (2001)). The internal structure of the Theme DP can be as suggested in Kayne (1993): relation variable *R* occupies the specifier of *nP*. My position is that other possessor-like elements that can occupy the specifier of *nP* in Russian are possessive pronouns (*moj* ‘my’), reflexive possessive pronouns (*svoj* ‘self’s’), possessive adjectivals (*mamin* ‘mother’s’) – but never *u*-PPs.

The presence of the relation variable in the Theme DP is not obligatory – in (20) the “possessums” are represented by definite saturated DPs:

- (20) a. U nee est’ ty.
 at she.GEN be.PRS you.NOM
 ‘She has you (to help her, to take care of her).’
 b. U menja est’ religi-ja.
 at I.GEN be.PRS religion.F-NOM.SG
 ‘I have religion (to seek consolation in).’

In (20) the existential predicate restates the existence of definite entities in relation to the *u*-PP anchor. Constructions like (20) can be regarded as evidence against DP-internal analyses of the *be*-possessive, like Jung (2008): the “possessum” DPs in (20) are saturated and there is no position inside those DPs where the *u*-PPs could have generated.

I also allow for a possibility that the *be*-possessive has a greater degree of fusion than what is indicated in the structure in (19-b). The *be*-possessive might have had its historical source in (19-b), but later proceeded to petrify, yielding a more stable construction, where the Anchor element and the existential predicate come to depend more on each other, and the whole construction is associated with possession. Considering that possession is a basic concept quite central to human cognition, one might expect that a possessive expression with time would develop its own construction. Such a petrification process would explain why in the *be*-possessive the *u*-PP seems to be more deeply entrenched in the clausal structure (with regard to reflexive

binding, for example) than in other *u*-PP constructions. I leave this possibility to be spelled out in future research.

The structure in (19-b) accounts for some well-known properties of the *be*-possessive. For example, the behavior of the *be*-possessive in the present tense and under negation now does not have to be stated for the *be*-possessive independently, but can simply be attributed to the presence of the lexical V_{\exists} predicate (see the data in (8)).

Another property to be discussed is reflexive-binding. As widely noted, the *u*-PP in the *be*-possessive binds reflexives within the possessum and in the rest of the clause:

- (21) a. U Ivan-a est' svo-ja mašin-a.
 at Ivan-GEN be.PRS POSS.REFL-F.NOM.SG car.F-NOM.SG
 'Ivan has his own car.'
- b. U Ivan-a byl-i den'g-i s sob-oj.
 at Ivan-GEN be.PST-PL money.PL-NOM with REFL-INST
 'Ivan had money on him.'
- Chvany (1975:99-100)

The PP layer of the *u*-phrase does not form a barrier for c-command relations – this is an assumption made in all analyses of the *be*-possessive. Yadroff (1999) and Franks & Yadroff (2002) show that functional prepositions (that contain preposition *u* 'at' among their ranks) in general do not create opaque domains for purposes of c-command. Note that the structure in (19-b) conforms to several theoretical models of binding. The *u*-PP as the subject conforms to the mainstream model of binding which posits reflexive-binding to be a property of the element in SpecTP. According to the derivational model of binding represented by Williams (2006) and Bailyn (2009), the configuration relevant for Principle A must be established before vP – AnchorP can be regarded as a structural analogue of vP . Zwart (2006) presents binding as a realization of the dependency between the controller and the dependent: in (19-b) the *u*-PP takes the phrase containing the possessum as dependent at every stage of the derivation – prior and after the movement of the *u*-PP to SpecTP.

The analysis does not suffer from Minimal Link Condition violations: the *u*-PP does not cross over any other elements that are initially closer to the SpecTP, and thus there is no necessity for any preliminary movement operations “preparing” the *u*-PP for its movement to SpecTP.

Furthermore, the elements in (19-b) do not participate in multiple θ -relations (remember that double θ -marking was an issue in Dyakonova's analysis). The way I defined the anchoring relation in (16), the Anchor predicate does indeed require an “anchoree” – however, this role is assigned not to *mašina* 'car' in (19-b), but to the whole complement of the Anchor predicate, $V_{\exists}P$; the only role that the DP *mašina* has is that of V_{\exists} 's Theme.

Compared to Jung's analysis, the representation in (19-b) also has an advantage. The analysis of Jung (2008) crucially depends on the availability of a low Focus projection: to derive the word order facts, the possessum must move to the Low Focus projection such that the PP/DP layer containing the *u*-PP can remnant-move to SpecTP. My analysis, though in principle compatible with the idea of a Low Focus projection, does not depend on it (or on the theoretical plausibility of X' -movement): the *u*-PP and the Theme DP are two independent constituents that can move on their own.

The main message of the proposal is that the possessor in the *be*-possessive does not derive

its high (dominating the possessum) position by some kind of inversion, but is introduced as a more prominent argument from the start.

3. *AnchorP in other constructions*

As I have stated earlier, I restrict the notion of anchors to a subset of locatives, possessors and time expressions that have a prominent position in the clause – in other words, to elements that occur in what is traditionally called locative inversion. In this section I illustrate how the Anchor analysis of the *be*-possessive is applied to other constructions where the *u*-PP is used. These are external possession constructions, world-creating *u*-PP constructions and the *imet'sja*-possessive.

(22) *external possession*

U menja det-i kapust-u ne ed-jat.
 at I.GEN children-NOM cabbage.F-ACC.SG NEG eat:PRS-3PL
 ‘My children do not eat cabbage.’

(23) *world-creating u-PPs*

U tebjja vs-e durak-i.
 at you.GEN all-NOM fool.M-NOM.PL
 ‘According to you, everybody is a fool.’

(24) *the imet'sja-possessive*

U nego ime-l-a-s' svo-ja kvartir-a.
 at he.GEN have-PST-F.SG-REFL REFL-F.NOM.SG flat.F-NOM.SG
 ‘He had his own flat.’

I present the properties and analyses of each construction in what follows. Before I proceed, I indicate the properties (apart from the use of the *u*-PP) that are common for these constructions and the *be*-possessive. First, the referent of the *u*-PP enjoys a certain prominence, discourse salience, in all of these constructions. Second, neither of these constructions can be embedded under a control predicate. Third, in almost all constructions (the world-creating *u*-PP constructions present an exception) there tends to be a “possessum”, an element with a relation variable that is bound by the *u*-PP. A further investigation might reveal more common properties; I hold that a unified analysis for all of these constructions is sufficiently motivated already at this point.

3.1. *External possession*

In contrast to adnominal possession where the possessor is constructed as a semantic as well as syntactic argument of the possessum, in external possession constructions the possessor contributes to the referential specification of the possessed DP but is encoded outside of that DP. External possession has been discussed in such works as Kayne (1977), Vergnaud and Zubizarreta (1992), Landau (1999), Šarić (2002), among others.

In Russian, an external possessor can be expressed by an *u*-PP:

- (25) a. U menja v èt-om god-u syn pojd-et v
 at I.GEN in this-M.LOC.SG year.M-LOC.SG son:NOM.SG go.FUT-3SG in
 škol-u.
 school.F-ACC.SG
 ‘My son will go to school this year.’
- b. U mam-y bol-it golov-a.
 at mother-GEN.SG ache:PRS-3SG head.F-NOM.SG
 ‘Mother has a headache.’

The *u*-PPs in (25) are interpreted as possessors of clause-internal DPs. Furthermore, the *u*-PP has an interpretation of a sentential topic, which introduces the following statement into the discourse. External possession constructions in (25) have an information structure different from that of sentences with an adnominal possessor as in (26):

- (26) Mo-j syn v èt-om god-u pojd-et v
 my-M.NOM.SG son:NOM.SG in this-M.LOC.SG year.M-LOC.SG go.FUT-3SG in
 škol-u.
 school.F-ACC.SG
 ‘My son will go to school this year.’

(26) is somewhat awkward in an out-of-the-blue utterance, when the listener does not know whether the speaker has children at all. The *u*-PP in (25-a) eases the previously unmentioned son into the conversation.

The *u*-PP can be associated with several DPs in its scope:

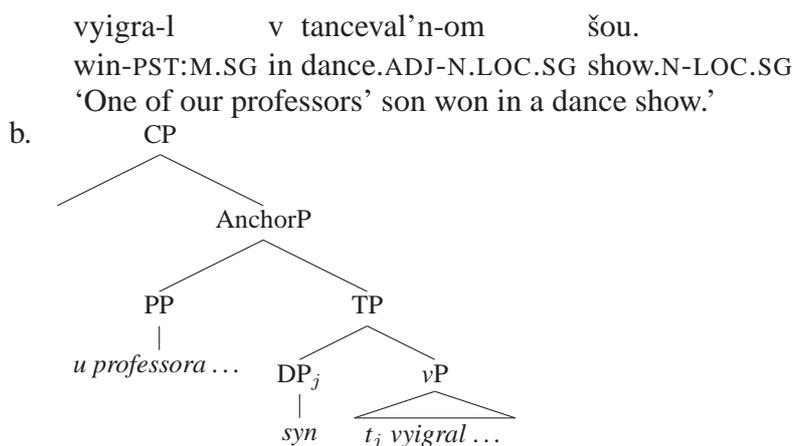
- (27) a. U Peti mat' zarabat-yva-et bol'she čem
 at Petja-GEN mother.F:NOM.SG earn-IMPF:PRS-3SG more than
 otec.
 father.M:NOM.SG
 ‘Petja’s mother earns more than his father.’ Paducheva (2004:353)
- b. U nee syn-a sobak-a pokusa-l-a.
 at she.GEN son-ACC.SG dog.F-NOM.SG bite-PST-F.SG
 ‘Her son was bitten by a/her dog.’

In (27-a) the clause-initial *u*-PP provides a reference for two relational NPs in the clause: *mat'* ‘mother’ and *otec* ‘father’. In (27-b) the referent of the *u*-PP is related not only to the son, but may also be the owner of the dog. Association with multiple DPs undermines a movement analysis of *u*-PPs in external possession.

External possession *u*-PPs in my analysis are introduced by the Anchor predicate that takes the whole clause (TP) as its complement:⁶

- (28) a. U odn-ogo iz naš-ix professor-ov syn
 at one-M.GEN.SG from our-GEN.PL professor.M-GEN.PL syn:NOM.SG

⁶My treatment of the external possession construction is somewhat similar to that of Rivero & Savchenko (2004), my AnchorP is reminiscent of their ApplP.



Positing AnchorP under CP in (28-b) is motivated by the fact that clause-initial *u*-PPs can be preceded by *wh*-words and complementizers:

- (29) a. Kaki-je u Ivan-a očk-i sloma-l-i-s'?
- which-NOM.PL at Ivan-GEN glasses-NOM break-PST-PL-REFL
 'Which glasses of Ivan broke?'
- b. Ja skaza-l-a emu, što u menja syn zabo-l-el.
- I.NOM tell-PST-F.SG he.DAT that at I.GEN son:NOM.SG get.sick-PST-M.SG
 'I told him that my son got sick.'

On the other hand, reflexive-binding data show that the clause-initial external *u*-possessors are not situated within the TP projection of the clause:

- (30) a. U Ivan-a_i sloma-l-i-s' (*svo-i_i) očk-i.
- at Ivan-GEN break-PST-PL-REFL REFL-NOM.PL glasses-NOM
 'Ivan's own glasses broke.'
- b. U nee_i (*svo-j_i) syn pojd-et v škol-u.
- at she.GEN REFL-M.NOM.SG son:NOM.SG will.go-3SG in school.F-ACC.SG
 'Her own son will go to school.'
- c. U nee_i syn_j pojd-et v svo-ju_{*i/j} škol-u.
- at she.GEN son:NOM.SG will.go-3SG in REFL-F.ACC.SG school.F-ACC.SG
 'Her son will go to her/his own school.'

The data in (29) and (30) support the structure in (28-b).

The so-called possessum in external possession constructions has been argued to have a relation variable by some scholars: Vergnaud & Zubizarreta (1992), Rivero & Savchenko (2004) and Paykin & van Peteghem (2003) posit an empty Possessor argument in the Possessum DP – I follow these scholars by positing the variable R in the DP *syn* 'son' in (30-b). This coincides with the relation variable R in the *be*-possessive discussed in the previous section.

3.2. World-creating *u*-PPs

The next construction presents a case where the Anchor predicate might take an even bigger complement. To the best of my knowledge, constructions such as in (31) have not been discussed in generative literature:

- (31) a. U tebjā vs-e durak-i.
 at you.GEN all-NOM fool.M-NOM.PL
 ‘According to you, everybody is a fool.’
- b. U menja vs-e xoroš-ije, ja vs-ex opravd-yva-ju.
 at I.GEN all-NOM good-NOM.PL, I.NOM all-ACC justify-IMP:PRS-1SG
 ‘I think that everybody is nice, I justify everyone.’
- c. U tebjā vs-e xoroš-ie knig-i dolžn-y zakančiva-t’-sja
 at you.GEN all-NOM good-NOM.PL book.F-NOM.PL must-PL end-INF-REFL
 ploxo.
 badly
 ‘According to you, all good books must end badly.’

In (31) the *u*-PP represents the holder of an opinion that is deemed erroneous by the speaker. Goritskaya (2007) and Boguslavskij (1996) state that the *u*-PP in these constructions has a ‘world-creating’ function (*miroporoždajuščaja funkcija*): the *u*-PP provides the world within whose boundaries the opinion is true. I suggest that the world-creating *u*-PPs can also be included into the range of anchor elements. The complement of the *u*-PP in world-creating constructions seems to be a proposition, thus I assume the size of the complement to be at least CP. The structure is given in (32-b):

- (32) a. U tebjā vs-e durak-i.
 at you.GEN all-NOM fool.M-NOM.PL
 ‘According to you, everybody is a fool.’
- b.
-
- ```

graph TD
 AnchorP --> u_tebja[u tebjā]
 AnchorP --> Anchor_prime[Anchor']
 Anchor_prime --> Anchor[Anchor]
 Anchor_prime --> CP[CP]
 CP --> vse_duraki[vse duraki]

```

I have not investigated world-creating constructions in sufficient detail, such that I cannot develop the proposal beyond (32-b). The constructions have some characteristics that might tell us something about the internal structure of the CP complement of the *u*-PP. The complement of the *u*-PP must contain a universal quantifier-like element, such as *vse* ‘all’, *vsegda* ‘always’, *každyj* ‘every’. The evaluative or deontic component is also crucial: sentences in (32-a) and (32-b) contain evaluative NP/AP predicates, if there is no evaluative NP/AP predicate, the sentence must contain a deontic modal, as in (32-c). Compare (32-c) to (33) where the modal is dropped, and the sentence cannot be interpreted as a world-creating construction, but rather as an external possession construction (the second translation in (33)):

- (33) U tebj<sub>a</sub> vs-e xoroš-ie knig-i zakančiva-jut-sja ploxo.  
 at you.GEN all-NOM good-NOM.PL book.F-NOM.PL end:PRS-3PL-REFL badly  
 \*‘According to you, all good books end badly.’  
 ‘All of your good books end badly.’

I hope to return to world-creating *u*-PP constructions in future research.

### 3.3. The *imet'sja*-possessive

The last *u*-PP construction to be discussed is the *imet'sja*-possessive in (34):

- (34) U menja ime-et-sja kartočk-a vaš-ego magazin-a.  
 at I.GEN have:PRS-3SG-REFL card.F-NOM.SG your-M.GEN.SG shop.M-GEN.SG  
 ‘I have your shop’s client card.’

The predicate in (34) is a reflexive form of *imet'* ‘have’ which agrees with the Nominative possessum; the possessor in the construction is expressed by the *u*-PP.

Remember that this possessive is problematic both for Dyakonova and for Jung. The common problem for these two analyses is that the authors try to derive the *have*-possessive and the *be*-possessive from the same underlying structure and attribute the differences to featural specifications. Meanwhile, the *imet'sja*-possessive sports both a prepositional possessor and the form of *imet'* ‘have’.

Before proceeding to my proposal of the syntax of the *imet'sja*-possessive, I must spell out my stand on the *have*-possessive. I claim that the *have*-possessive and the *be*-possessive in Russian have different representations and different etymological sources.

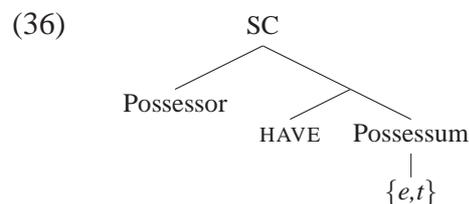
#### 3.3.1. The *have*-possessive

The main means of expressing predicative possession in Russian is the *be*-possessive, whereas the *have*-possessive has a restricted and idiosyncratic usage – all authors writing on the issue of possession in Russian are aware of that. For example, the *have*-possessive is avoided in modern Russian when the possessum is animate (see Popov (1974), Timberlake (2004), McAnallen (to app.) for a description of the distribution of the two possessives). In this section I propose that the *have*-possessive in Russian, illustrated in (35), should have a structure different from that of the *be*-possessive. I offer distributional and typological evidence in favor of this hypothesis. I do not provide a full analysis of the *have*-possessive, but mere indications.

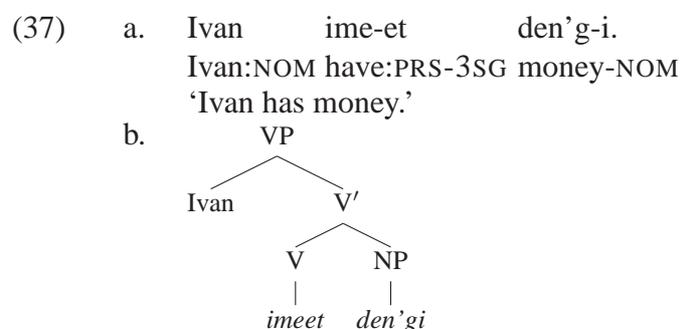
- (35) Ja ime-ju mašin-u.  
 I.NOM have:PRS-1SG car.F-ACC.SG  
 ‘I have a car.’

The construction in (35) is a classic *have*-possessive: the verb *imet'* ‘have’ has two arguments, the Nominative possessor (with which it agrees) and the Accusative possessum. Whereas the *be*-possessive in my analysis is given the Anchor structure, the *have*-possessive receives a more

widely accepted kind of analysis. Namely, I assume that the *have*-possessive has the structure in (36), where the possessor and the possessum originate in a small-clause configuration:



In (36) the possessor is the subject of the small clause, and the possessum is the predicate. I remain agnostic on what kind of processes underlie the derivation of the *have*-construction. The predicate HAVE may be a spell-out of more syntactic material, such as the predicate of the small clause and some abstract preposition (pick your favorite Benveniste-inspired theory). For the purposes of this paper the structure in (36) may just as well be interpreted as (37-b):



The configurations in (37-b) and (36) are compatible with for example Harley's (2002) proposal for *have*-possessives. The structure in (37-b) is motivated by several properties of the *have*-possessive that distinguish it from the *be*-possessive in Russian.

The first property to be discussed here is that *imeet*' seems to be incompatible with R-expressions:

- (38) a. \*Ja ime-ju tebja.  
I.NOM have:PRS-1SG you.ACC.SG  
'I have you.'
- b. U menja est' ty.  
at I.GEN be.PRS you.NOM  
'I have you.'

Assuming that the sentence in (38-b) involves a simple structure, without covert CPs, why is the pronominal possessum ungrammatical in (38-a)? The answer might lie in the structure in (37-b): the possessum must be a property (an NP, not a DP).

The *have*-possessive has several more properties that point to its small-clause-like nature/origin. In (39) and (40) only the *have*-possessive can be used, the *be*-possessive is ungrammatical:

- (39) a. Èt-a materi-ja ime-et metr  
 this-F.NOM.SG cloth.F-NOM.SG have:PRS-3SG meter.M:ACC.SG  
 širin-y.  
 width.F-GEN.SG  
 ‘This cloth is one meter wide.’
- b. \*U èt-oj materi-i (est’) metr širin-y.  
 at this-F.GEN.SG cloth.F-GEN.SG be.PRS meter.M:NOM.SG width.F-GEN.SG
- c. Bašn-ja ime-et st-o metr-ov v  
 tower.F-NOM.SG have:PRS-3SG hundred-ACC meter.M-GEN.PL in  
 vysot-u.  
 height.F-ACC.SG  
 ‘The tower is one hundred meters high.’
- d. \*U bašn-i (est’) st-o metr-ov v vysot-u.  
 at tower.F-GEN.SG be.PRS hundred-NOM meter.M-GEN.PL in height.F-ACC.SG

The dimensional “possessums” in (39) are probably most readily analyzed as predicates of a small clause. It is thus interesting that whereas the *have*-possessive is used in this type of constructions, the *be*-possessive is ruled out.

The sentence in (40) contains one too many nouns to be paraphrased by the *be*-possessive:

- (40) Nansen ime-l zadač-ej dostiženi-je  
 Nansen:NOM have-PST:M.SG task.F-INST.SG reaching.N-ACC.SG  
 Severn-ogo poljus-a.  
 northern.M-GEN.SG pole.M-GEN.SG  
 ‘Nansen’s task was to reach the Northern pole.’

I do not have an analysis for (40), but again it feels like a small-clause configuration is involved here – *imet’* might embed a structure of the type in (41):

- (41)
- 
- ```

  graph TD
    SC[SC] --- Z[zadača  
‘task’]
    SC --- Pred_prime[Pred']
    Pred_prime --- Pred[Pred]
    Pred_prime --- D[dostiženije  
‘reaching’]
  
```

Furthermore, there is a range of “possessums” of the type *Noun + Infinitive*, with which both possessive constructions can be used: (42) presents the relevant nouns, and (43) gives some examples.

- (42) *želanije* ‘desire’, *vozmožnost* ‘possibility’, *šans* ‘chance’, *osnovanija* ‘grounds’, *pravo* ‘right’.
- (43) a. On ime-l vs-e osnovani-ja opasa-t’-sja.
 he.NOM have-PST:M.SG all-NOM reason-ACC.PL fear-INF
 ‘He had all reasons to be cautious.’

- b. U nego byl-i vs-e osnovani-ja opasa-t'-sja.
at he.GEN be.PST-PL all-NOM reason-NOM.PL fear-INF
'He had all reasons to be cautious.'
- c. Esli vy ime-ete želani-je dobi-t'-sja uspex-a...
if you.NOM have-2PL desire.N-ACC.SG reach-INF success-ACC
'If you have the desire to reach success...'
- d. Esli u vas est' želani-je dobi-t'-sja uspex-a...
if at you.GEN be.PRS desire.N-NOM.SG reach-INF success-ACC
'If you have the desire to reach success...'

What is interesting is that there is also a set of *Noun + Infinitive* possessums that can be used only with the *have*-possessive.

- (44) *derzost'* 'audacity', *naglost'* 'insolence', *sčast'je* 'happiness',
udovol'stvi-je 'pleasure', *mužestvo* 'bravery', *smelost'* 'courage'.
- (45) a. On ime-l derzost' vozraža-t'.
he.NOM have-PST:M.SG audacity.F-ACC.SG object-INF
'He had the audacity to object.'
- b. *U nego byl-a derzost' vozraža-t'.
at he.GEN be.PST-F.SG audacity.F-NOM.SG object-INF
'He had the audacity to object.'
- c. Ja uže ime-l udovol'stvi-je s nej
I.NOM already have-PST:M.SG pleasure.N-ACC.SG with she.INST
poznakomi-t'-sja.
meet-INF-REFL
'I have already had the pleasure to meet her.'
- d. *U menja uže byl-o udovol'stvi-je s nej
at I.GEN already be.PST-N.SG pleasure.N-NOM.SG with she.INST
poznakomi-t'-sja.
meet-INF-REFL

What is special about the nouns in (44), how are they different from the nouns in (42)? A significant difference might be that the nouns in (44) designate properties that can be construed as small-clause predicates:

- (46) a. He was audacious enough [to Inf].
b. He was happy [to have done something].

I have not found an analysis of constructions in (45) and I am not going to develop one here. I simply hold that again, as in the previous cases, it is the small-clause configuration that conditions the use of the *have*-possessive. These constructions suggest that the *have*-possessive should be analyzed as involving a small clause configuration.

My proposal to treat the *have*-possessive and the *be*-possessive in Russian as two different constructions has typological grounds as well. Stassen (2009) discusses the four main types of predicative possession crosslinguistically: the *have*-possessive, the locational possessive, the

topic possessive and the *with*-possessive. In Russian, two strategies are observed: the *have*-possessive and the *be*-possessive, which is an instance of the locational strategy. Stassen states that the construction types can shift into each other and makes the following two observations that are relevant in the context of this discussion:

(47) *Stassen (2009:208)*

- a. ... if a language starts to reanalyze its possessive construction in the direction of some other major type, the output ... will always be a *have*-possessive.
- b. Locational possessives never turn into something else.

If one wants to relate two or more possessive constructions in underlying syntax, one should take into account diachronic grammaticalization paths. The constructions that give rise to *have*-possessives are *with*-possessives and topic possessives, but never locational possessives. Thus there is one more reason to treat the *be*-possessive and the *have*-possessive in Russian differently.

The fact that the *have*-possessive in Russian suffers from various restrictions might be due to the circumstance that Russian stopped the development of the *have*-possessive at an intermediate stage and invested into the development of the *be*-possessive instead. The absence of the auxiliary or modal use of the verb *imet'* in modern standard Russian might also be due to this stop in the development of the *have*-construction.

The main message of this section is that the *be*-possessive and the *have*-possessive in Russian have different structures and different etymological sources. In this section we have seen some of the distributional properties of the two possessive constructions in Russian and noted that each possessive has its peculiarities. How do proponents of one underlying structure for the *have*-possessive and the *be*-possessive account for these peculiarities? Dyakonova and Jung would have to rely on some interaction of featural specifications of P or F that would determine how the structure is going to be spelled out: with a Nominative or *u*-PP possessor, with *byt'* or *imet'(sja)*. For me, the differences stem from what constructions are compatible with the structural configurations of each possessive construction.

3.3.2. *Imet'sja = Anchor + existential*

The *imet'sja*-construction is derived from the *have*-construction via a reflexivization process. Slavic literature abounds in analyses of reflexive clitics. According to Kaufmann (2004) the general function of the Russian reflexive *-sja* is to mark that one of the arguments is not projected in the structure. Thus, the *-sja* on *imet'sja* signals that the possessor argument of *imet'* is not projected.

Whatever analysis of the reflexive clitic we adopt, we have to account for the fact that *imet'sja* can be used with an existential meaning:

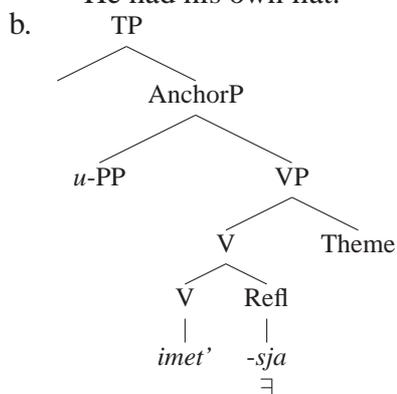
- (48) Ime-et-sja beskonešno-je množestv-o vseleonn-yx,
 have:PRS-3SG-REFL endless-N.NOM.SG multitude.N-NOM.SG universe.F-GEN.PL
 javljaušč-ix-sja dvojniki-ami naš-ej Vseleonn-oj.
 being-GEN.PL-REFL duplicate.M-INST.PL our-F.GEN.SG universe.F-GEN.SG
 ‘There is an endless multitude of universes – duplicates of our Universe.’

How is the existential interpretation achieved in (48)? Rivero & Sheppard (2003) analyze the reflexive clitic in Polish and Slovenian as a variable with an existential quantifier that in most reflexive constructions needs to be existentially disclosed.⁷ As for a syntactic application, Fehrmann et al. (2010) provide an analysis of reflexive clitics across Slavic languages and argue for the following properties of reflexive clitics in all Slavic languages:

- (49) a. a reflexive is a clitic, even in East Slavic languages;⁸
 b. a reflexive is a syntactic head;
 c. V and Refl form a head-adjunction structure.

Following the proposals of Rivero & Sheppard (2003) and Fehrmann et al. (2010), I suggest that in (48) the reflexive clitic head-adjoins to the V *imet’* ‘have’, and the existential interpretation is due to the (existentially undisclosed) existential quantifier contained in the reflexive clitic. The *imet’sja*-possessive is derived from such an existential structure by the addition of AnchorP:

- (50) a. U nego ime-l-a-s’ svo-ja kvartir-a.
 at he.GEN have-PST-F.SG-REFL REFL-F.NOM.SG flat.F-NOM.SG
 ‘He had his own flat.’



In its general configuration – an existential statement anchored by an *u*-PP – the *imet’sja*-possessive parallels the *be*-possessive. At the same time, this possessive is derived from the *have*-possessive. The double nature of the *imet’sja*-possessive explains why it aligns sometimes with the *be*-possessive and sometimes with the *have*-possessive in its distribution. Here I describe some of the distributional characteristics of the three possessives, such as semantic restrictions on possessums and appearance in certain syntactic configurations.

As already mentioned, the *have*-possessive is dispreferred with animate possessums – the

⁷The authors borrow the notion of existential disclosure from Chierchia (1995) and Dekker (1993).

⁸Fehrmann et al. note that although *-sja* behaves as a verbal affix in Russian, it has a peripheral position, after all agreement morphemes.

same applies to the *imet'sja*-possessive:

- (51) ??U menja ime-et-sja doč.
 at I.GEN have:PRS-3SG-REFL daughter.F:NOM.SG
 'I have a daughter.'

R-expressions are also ungrammatical in the *imet'sja*-possessive (cf. the same effect in the *have*-possessive in (38-a)):

- (52) *U menja ime-eš-sja ty.
 at I.GEN have:PRS-2SG-REFL you.NOM
 'I have you.'

As with the *have*-possessive, I attribute the restriction on animate nouns and R-expressions to the specifications of the verb *imet'*: as I indicated in (37-b), V_{HAVE} needs a property-like (NP) complement.

With regard to syntactic restrictions, the *imet'sja*-possessive tends to align with the *be*-possessive – consider, for instance, control configurations in (53) and gerundives in (54). In (53-a) the possessor argument of *imet'* can be substituted by PRO. The *be*-possessive and the *imet'sja*-possessive, on the other hand, cannot be embedded under a control predicate, whether we try to turn the possessor or the Nominative possessum into PRO.

- (53) a. On_i mečta-et [PRO_i ime-t' sobstvenn-yj dom].
 he.NOM dream.PRS-3SG have-INF own-M.NOM.SG house.M-NOM.SG
 'He dreams of having a house of his own.'
 b. *U nego mečta-et [PRO_i by-t' / ime-t'-sja] sobaka_i.
 at he.GEN dream-3SG be-INF / have-INF-REFL dog.F-NOM.SG
 c. *On_i mečta-et [PRO_i by-t' / ime-t'-sja] sobak-a].
 he.NOM dream:PRS-3SG be-INF / have-INF-REFL dog.F-NOM.SG
 'He dreams about having a dog.'

The *have*-possessive is also the only one that can appear in gerundive constructions:

- (54) a. Vy mož-ete sozda-t' sajt ne imeja special'n-yx
 you.NOM can-2PL create-INF site.M-ACC.SG NEG have-GER special-GEN.PL
 znani-j.
 knowledge-GEN.PL
 'You can create a website without having special knowledge.'
 b. *Buduči u nego, mašin-a zaržave-l-a.
 be.GEN at he.GEN car.F-NOM.SG rust-PST-F.SG
 'While in his possession, the car rusted.'
 c. *Imejas' u každygo človek-a, appendix ne
 have-GER-REFL at every-M.GEN.SG man-GEN.SG appendix.M:NOM.SG NEG
 predstavja-et funkcional'n-oj pol'z-y.
 present:PRS-3SG functional-F.GEN.SG use.F-GEN
 'While every man has it, the appendix does not present any functional use.'

The distributional differences between the three possessives observed in (53) and (54) are presumably due to the presence of AnchorP in the *be*-possessive and the *imet'sja*-possessive, and namely the conflict of the Anchor element with the structural requirements imposed on the highest argument in infinitival and gerundive constructions.

4. Conclusion

In this paper I have proposed an analysis of the *be*-possessive in Russian, where the *u*-PP possessor is constructed as an element anchoring an existential statement. The Anchor analysis of the *be*-possessive is extended to other constructions where the *u*-PP is used with similar properties, and more generally, to locative inversion constructions. I also claim that the *have*-possessive and the *be*-possessive in Russian have different structures and different historical sources; the claim is supported by the distributional properties of the two possessives and by typological observations. The *imet'sja*-possessive in my analysis is a combination of the anchoring *u*-PP and an existential statement derived from the *have*-possessive.

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Deriving parasitic gaps by fission und fusion

Anke Assmann

This paper presents a new approach to parasitic gaps which is able to implement the observation that two gaps have only one antecedent by transferring the concepts of fission and fusion to the syntactic component. I argue that the antecedent of a parasitic gap construction first fissions into two independent parts—thereby allowing it to occupy two different base positions—and is then fused again into one item which occupies the surface position. I further show that this analysis makes the correct predictions concerning the properties of parasitic gaps, setting it apart from previous approaches, which all had to struggle with capturing the behavior of parasitic gaps. In particular, I will present solutions to the following questions: (i) why are parasitic gaps only selectively sensitive to islands? (ii) Why do the real and the parasitic gap exhibit different properties concerning reconstruction and extractability from weak islands? (iii) Why can parasitic gaps only be licensed by \bar{A} -movement but not by A-movement?

1. Introduction

The answer to the question of how *one* dislocated syntactic category can be traced back to *two* different base positions in two different clauses has posed a challenge to linguistic theory for almost fifty years now. Discovered by Ross (1967), this phenomenon was thoroughly described by Taraldsen (1981) and Engdahl (1983) who introduced the term *parasitic gap* referring to the idea that there is actually only one real base position whereas the second putative base position is a gap that parasitically attaches to the antecedent-gap dependency.

In spite of many attempts to find an adequate analysis for this phenomenon—whereby scholars have put special emphasis on developing approaches which classify parasitic gap constructions as instances of other syntactic constructions—none of the solutions could succeed in fully capturing the idiosyncratic properties of parasitic gap constructions.¹

This paper presents a new account of parasitic gaps, analyzing the puzzling fact that one item seems to be able to occur simultaneously in two different positions by allowing it to fission into

¹For an overview of properties and analyses of parasitic gaps, see Culicover (2001).

two parts. Under this approach, no use of concepts like interarboreal movement (Nunes 1995, 2001, 2004) or empty operator movement (e.g. Chomsky 1986a; Nissenbaum 2000) is necessary. Theories which make use of these syntactic means are shown to make wrong empirical predictions.

In what follows, parasitic gaps are gaps which are covered by the definition in (1) (cf. Taraldsen 1981; Engdahl 1983).

- (1) *Parasitic gaps*
 A *parasitic gap* (*pg*) is a gap which is licensed by the antecedent of another *real gap* (*t*) created by movement.

Constructions in several languages meet this definition. Consider the examples in (2) and (3) from English and German, respectively.

- (2) Which article did you file *t* [without reading *pg*]?
 (3) Welchen Artikel hast du [ohne *pg* zu lesen] *t* abgeheftet?
 which article have you without to read filed
 ‘Which article did you file without reading?’

In both these sentences, the *wh*-phrase *which article* has moved from its base position in the matrix clause—which is the complement position of the verb *file*—to the left periphery of the sentence, thereby licensing a second gap in the complement position of the verb *read* inside the adverbial clause.

Despite the fact that the behaviors of parasitic gaps in English and German are not fully identical, parasitic gap constructions in both languages show certain conspicuous properties.

The aim of this paper is to provide answers to major questions concerning parasitic gaps. First and foremost, we have to clarify what parasitic gaps are (4-a), i.e., how a 2-1 dependency can be established, and which syntactic operation they originate in if not movement (4-b).

- (4) a. What are parasitic gaps?
 b. Which syntactic operation do parasitic gaps originate in?

Then, we have to find explanations for the puzzling properties of parasitic gaps based on the answers to the two general questions. In particular, I will discuss and solve the following four conundrums parasitic gap constructions pose:

- (5) a. Why are parasitic gaps only selectively sensitive to islands?
 b. Why can complex antecedents only be reconstructed into the real gap but not the parasitic gap?
 c. Why are certain properties of the antecedent only important for its relation to the real gap but not to the parasitic gap?
 d. Why can parasitic gaps only be licensed by \bar{A} -movement but not by A-movement?

In order to answer these questions, I will start in section 2 by presenting a new idea of why parasitic gap constructions exist and how they come into existence. This new approach will then provide natural explanations for the puzzling properties summarized in the questions in (5) (sec-

tion 3). Afterwards, in section 4, I will discuss empirical and theoretical questions concerning this new approach in comparison to previous analyses of parasitic gaps. Section 5 concludes.

2. *The fission approach to parasitic gaps*

In order to answer the general questions about parasitic gaps I suggest a new approach, its main idea being that one lexical item can fission into two parts, making use of the concept of the morphological operation of fission (Halle & Marantz 1993). Fission will be construed as an operation that precedes the syntactic derivation. As a result of presyntactic fission, two unstable objects are created that may be targeted separately by syntactic operations for some time but will eventually have to be recombined, or fused, just like two morphemes may undergo morphological fusion (see Halle & Marantz 1993). Thus, fission and fusion explain how it is possible that in parasitic gap constructions there is only one overtly realized antecedent but two gaps, using concepts which are already established to derive completely different linguistic phenomena in morphology.

In this section, I will show that such syntactic fission integrated into a standard minimalist framework has major impact on derivations which in turn naturally explain the idiosyncratic properties of parasitic gap constructions.

In order to do so, I will begin by thoroughly clarifying the assumptions the analysis is based on before I introduce the syntactic fission operation and go through a detailed derivation of a parasitic gap sentence.

2.1. *Background assumptions*

Syntactic structure:

The syntactic structure I assume is shown in (6). Following standard minimalist assumptions, there are three functional heads above VP: v, T and C. Nominal categories are headed by a functional head D (Abney 1987).

(6) [CP C [TP DP_{Subj} T [vP DP_{Subj} v [vP V DP_{Obj}]]]]

Assumptions about derivation (Chomsky 1995, 2000, 2001, 2008):

I assume that syntax is strictly derivational and obeys the Strict Cycle Condition (Chomsky 1973), and that derivations allow no look-ahead.²

The structure-building operation is Merge triggered by features [**F**] and the probe operation is Agree triggered by features [***F***] (Sternefeld 2006; Heck & Müller 2007; Müller 2010a).³ Agree is possible if a probe feature [***F***] c-commands a matching feature [**F**] or vice versa (Koopman 2006; Baker 2008; Riedel 2009) as long as [***F***] and [**F**] belong to the same phase.

²For a discussion of whether derivations which involve fission require look-ahead, see section 4.2.

³There is no operation *Move* per se. Rather, Move is understood as re-Merge. For reasons of notational simplicity and the fact that the exact implementation of Move does not play a role here, re-Merge will be depicted in the derivations below by letting the same item appear in different positions.

Spell-out of syntactic structure is cyclic, proceeding in phases with designated phase heads v , C and D (Chomsky 2000, 2001; see Svenonius 2004, Heck & Zimmermann 2004 for D) and successive-cyclic movement is enabled by edge features $[\bullet X \bullet]$ (Chomsky 2000) which can be added to phase heads whenever the edge feature condition is met.

CED-based islands:

The analysis of CED-based islands is adapted from the theory of Müller (2010a), which predicts that categories become islands if they are last-merged categories in a phase. This prediction results from the following assumptions: probe ($[\ast F \ast]$) and structure-building ($[\bullet F \bullet]$) features on heads are ordered on stacks, i.e., only one feature is accessible to the derivation at a time. Assuming that Merge only deletes features $[\bullet F \bullet]$ and Agree only features $[\ast F \ast]$ and that every instance of these two operations must delete a feature (cf. *Last Resort*, Müller 2010a:42), it follows that all Merge and Agree operations triggered by a head are strictly ordered. Now, in order to derive the result that only last-merged categories become islands, the following restrictions on edge feature insertion are imposed⁴:

(7) *Edge feature condition (adapted from Müller 2010a:42)*

An edge feature $[\bullet X \bullet]$ can be assigned to the head γ of a phase only if (a) and (b) hold:

- a. there are still operation-triggering features in the edge domain of the γ -phase.
- b. $[\bullet X \bullet]$ ends up on top of γ 's stack of operation triggering features.

As long as a phase head or a specifier of the phase head still has operation-triggering features, the phase head can host edge features, which allow extraction. But if a category α with no operation-triggering features is the last-merged specifier in a phase, it deletes the last operation-triggering feature of the phase head and with it the possibility for further edge feature insertion. Possessing no edge feature, the phase head can no longer trigger movement, such that no categories in α can move out of α . Hence, last-merged categories are expected to be islands for movement as long as they do not host operation-triggering features themselves.

Let us have a look at an example to show how the theory works in detail. The sentence in (8) contains an adjunct clause which is an island for movement preventing the *wh*-phrase *who* from leaving the adjunct clause.

(8) *Who did Mary cry after John hit *t*? *Huang (1982:503)*

The ungrammaticality of (8) can be derived as follows: the derivation starts by building the embedded clause *after John hit who*. Then, the matrix vP is derived based on the feature specification of v in (9-a): first, v has to merge with the matrix VP . This operation deletes the feature $[\bullet V \bullet]$ as shown in (9-b). After this step, the subject *Mary* is merged, deleting $[\bullet D \bullet]$ but not introducing new operation-triggering features to the edge domain of the matrix vP (cf. (9-c)).

⁴The edge feature condition in Müller (2010a) differs from the one in (7) in that only operation-triggering features on the phase head γ itself may allow edge feature insertion. In (7), however, also features on specifiers of γ may do so. This extension of the edge feature condition is important for parasitic gap constructions where (adjunct) islands can be circumvented under certain circumstances, in contrast to (adjunct) islands in non-parasitic gap constructions. See sections 2.3 and 3.1 for derivations of parasitic gap constructions and how specifiers of a phase head can keep it active for edge feature insertion.

Assuming that adjunction does not delete operation-triggering features, the phase head's feature stack is empty at the point when the temporal adverbial clause is adjoined to the matrix vP, and since there are no further operation-triggering features in the edge domain of the vP, no edge feature can be inserted on v.⁵ Without the insertion of an edge feature, however, *who* cannot escape the embedded clause.

- (9)
- a. *Feature specification of v*
v [•V• < •D•]
 - b. *Merge of VP deletes [•V•]*
[_v v [•V• < •D•] [_{VP} cry]]
 - c. *Merge of subject deletes [•D•] → v becomes inactive*
[_v Mary [_v v [•D•] [_{VP} cry]]]
 - d. *Merge of adjunct clause → v is already inactive*
[_{VP} [_v Mary [_v v [] [_{VP} cry]]] [_{CP} after John hit who]]

2.2. Prederivational fission

In what follows now, I will introduce a fission mechanism that manipulates the feature specification of certain lexical items in the numeration. Because of this feature manipulation, the behavior of fissioned items and their interaction with other items in the derivation is expected to differ from the behavior and interaction properties of items that have not undergone fission. Afterwards, I will show how this fission operation combined with the background assumptions presented in section 2.1 derives parasitic gap constructions.⁶

As has been widely discussed, parasitic gaps show a behavior that differs drastically from other non-parasitic gaps.⁷ I propose that this special behavior of parasitic gaps and the fact that something like a parasitic gap exists at all both come from the possibility of having imperfect numerations. Imagine the following scenario: instead of forming a numeration which leads to a converging derivation, we have a numeration where there are fewer items than needed to guarantee a successful derivation. I would like to suggest that these defective numerations lead to parasitic gap constructions.

- (10) *Working hypothesis*
Sentences with parasitic gaps are based on defective numerations.

⁵Note that even if Merge of adjunct clauses were triggered by a structure-building feature [•C•] (Alexiadou 1994, 1997; Cinque 1999, 2004), the feature would be deleted when the adjunct clause is merged, so that no edge feature can be inserted on v afterwards.

⁶The following analysis is adapted from Assmann (2010), where a version of the present theory was first developed. The approach outlined here differs from Assmann (2010) in two points. First, the prederivational operation that applies in parasitic gap constructions was called 'duplication' and was described as a copy operation. Although the idea and the effects of the two operations are the same, the term 'fission' is more adequate to describe the operation and is supposed to make the idea of the process clearer. Second, *duplication* introduced a new type of feature [▷F◁] into the grammar. This additional feature type has been dismissed and replaced by normal probe features [*F*], thereby simplifying the theory. I would like to thank Fabian Heck and Gereon Müller for this suggestions.

⁷See e.g. Postal (1993) about the differences between parasitic gap constructions and across-the-board movement. See also section 3.

Specifically, I claim that a parasitic gap sentence as in (11) has a numeration as shown in (12).

(11) Which article did you file *t* [before reading *pg*]?

(12) *Numeration of (11):*

N = [<i>which</i>	[D, ϕ , wh, •N•, ..., PHON ⁸ , SEM],
	<i>article</i>	[N, ...],
	C	[C, •wh•, •T•, ...],
	<i>you</i>	[D, ϕ , ...],
	T	[* ϕ •, T, EPP, •v•, ...],
	v	[•D•, * ϕ •, v, •V•, ...],
	<i>file</i>	[•D•, V, ...],
	Op _{temp} ⁹	[...],
	<i>before</i>	[C, •T•, ...],
	T	[* ϕ •, T, EPP, •v•, ...],
	PRO	[D, ϕ ...],
	v	[•D•, * ϕ •, v, •V•, ...],
	<i>read</i>	[•D•, V, ...]]

If we look at the feature specifications of the lexical items in (12), we can see that we have four features [•D•] and four features [* ϕ •].¹⁰ These features can only be checked by their respective counterparts [D] and [ϕ]. Of these counterparts, however, we only have three features each. So, what renders this numeration defective is that exactly one lexical item with the features [D, ϕ] is missing. No matter how the derivation proceeds otherwise, it is bound to crash since the uninterpretable features [•D•, * ϕ •] cannot be deleted (cf. *Full Interpretation*, Chomsky 1986b). Put differently, an additional instance of one of the D items is the only possibility to save the numeration. This possibility is enabled by a fission operation as defined in (13).¹¹

(13) *Fission (N = [L, ...])*

- a. There are structure-building and probe features [•F₁•], ... [•F_i•], [*F_j*], ... [*F_n*] in the numeration N that do not have matching features [F₁], ... [F_n].
- b. There is a lexical item L in N that has features [F₁, ..., F_n, G₁, ..., G_m].
- c. L fissions into two items L₁ and L₂, whereby L₂ has the features [F₁, ..., F_n] and L₁ has the features [*F₁*], ..., [*F_n*], G₁, ..., G_m].

⁸ The features PHON and SEM are labels for feature sets. 'PHON' encompasses all phonological features and 'SEM' all semantic features. Assuming a realizational morphology like Distributed Morphology (Halle & Marantz 1993) which adopts the principle of late insertion, the phonological features will be realized postsyntactically.

⁹Following Larson (1988), I assume that temporal adverbial clauses contain a temporal operator. For reasons of simplicity, I take this operator to be base-generated in Spec,CP even though it is actually moved from a lower position. See Larson (1988); Dubinsky & Williams (1995).

¹⁰Following Chomsky (2000), I assume that case assignment is a by-product of ϕ -Agree. Thus, case is not a feature per se and therefore not part of the feature specification of the nominal categories in (12).

¹¹The idea of fission as an operation that conditions syntactic derivations is not new but has already been explored in depth by Agbayani (1998) where fission is an operation that applies inside the derivation. Agbayani & Ochi (2007) discuss how fission can be used to describe parasitic gaps. However, the fission operation I am proposing differs from the one of Agbayani & Ochi (2007) in important respects, and it makes different predictions (cf. section 3).

The first condition (13-a) under which fission applies is exactly the situation found in the numeration in (12): there are operation-triggering features which cannot be checked. The second condition (13-b) demands that the numeration has matching features available at all. If these two conditions are met, fission applies with the result that there is an additional item which enables a convergent derivation. Furthermore, the definition of the fission operation in (13) forces the two parts to fuse again in the derivation by inserting probe features on one part which must be checked by its counterpart.

Assume that, in our example numeration in (12), fission will affect the lexical item *which*, creating the items *which*₁ and *which*₂.

- (14) a. *Before fission*
which [D, ϕ , wh, •N•, ..., PHON, SEM]
 b. *After fission*
*which*₁ [*D*, * ϕ *, wh, •N•, ..., PHON, SEM]
*which*₂ [D, ϕ]

Now, having two instances of *which*, the defective numeration is repaired and the derivation of the sentence can start.

But before I continue with the derivation of the sentence in (11), three notes are in order. First, note that the phonological features remain with *which*₁, i.e., *which*₂ is phonologically empty. The fission operation in (13) demands that only features which are necessary for the convergence of the derivation are fissioned. Since phonological features are not needed—otherwise, empty categories should not be possible at all—all phonological features remain with one part of a fissioned item with the result that the other part is phonologically empty. In fact, if the phonological features fissioned as well, they would become a part of the checking configuration between the two parts of this item so that a part of the phonological features would be deleted. This would result in a deviant realization of the item (cf. footnote 8). Hence, we would falsely predict that the pronunciation of lexical items depends on whether it is the antecedent of a parasitic gap or not.

Second, fission in (14) is simplified regarding semantic features. Whatever is necessary to guarantee a successful interpretation, e.g. a referential index, also takes part in fission.¹²

Third, the fission operation in (13) is defined as a last-resort operation. Alternatively, a new numeration could be computed which contains an additional pronoun that must be bound by *which*. Such a numeration leads to a sentence where the position of the parasitic gap is occupied by a pronoun.

¹²See Browning (1989); Řezáč (2004) for theories which assume that the ϕ -features of a nominal category are linked to the referential index. Under this analysis, the referential index together with the ϕ -features would be present on both items after fission which furthermore ensures that the probe features on *which*₁ can only be checked by *which*₂.

2.3. A sample derivation

In this section, I will integrate the fission operation introduced above in (13) into the general framework outlined in section 2.1. In doing so, I will go through a detailed derivation of (11), repeated in (15), which is based on the numeration after fission of the lexical item *which* has applied.

(15) Which article did you file *t* [before reading *pg*]?

Assuming that numerations consist of subarrays of lexical items which are activated one after the other (Chomsky 2000), the first subarray of the numeration of (15) contains all items that belong to the vP phase of the embedded adverbial clause (16). At first, *read* merges with *which*₂, i.e. the item that only has a categorial feature and ϕ -features. Then, *v* merges with VP which deletes the feature $[\bullet V \bullet]$ on *v* followed by ϕ -Agree with *which*₂ deleting the feature $[*\phi*]$. Now, an edge feature is inserted on *v* which allows movement of *which*₂ to the edge domain of the vP . Finally, *v* merges with PRO whereby its last operation-triggering feature $[\bullet D \bullet]$ is deleted.¹³ The development of the feature stack of the phase head *v* during these steps of the derivation is shown in (17) and the structure in (18).

(16) Subarray vP_1
 $\{_{vP_1} \textit{read}, \textit{which}_2, v_1, \textit{PRO}\}$

(17) Feature stack of v_1

a.	v_1 $[\bullet V \bullet \prec * \phi * \prec \bullet D \bullet]$	→ (Merge of VP)
b.	v_1 $[\bullet V \bullet \prec * \phi * \prec \bullet D \bullet]$	→ (ϕ -Agree)
c.	v_1 $[* \phi * \prec \bullet D \bullet]$	→ (edge feature insertion)
d.	v_1 $[\bullet X \bullet \prec \bullet D \bullet]$	→ (movement of <i>which</i> ₂ to <i>Spec, vP</i>)
e.	v_1 $[\bullet X \bullet \prec \bullet D \bullet]$	→ (Merge of PRO)
f.	v_1 $[\bullet D \bullet]$	

(18)

```

graph TD
    vP1 --> PRO
    vP1 --> v1_prime[v1']
    v1_prime --> which2_upper[which2]
    v1_prime --> v1_prime_sub[v1']
    v1_prime_sub --> v1
    v1_prime_sub --> VP
    v1 --> read
    v1 --> which2_lower[which2]
    which2_upper -.-> which2_lower
  
```

¹³The fact that intermediate movement steps precede external Merge of the outermost specifier, i.e., that in this case *which*₂ ‘tucks in’ below the subject PRO , follows directly from the *Intermediate Step Corollary* (Müller 2010b:5).

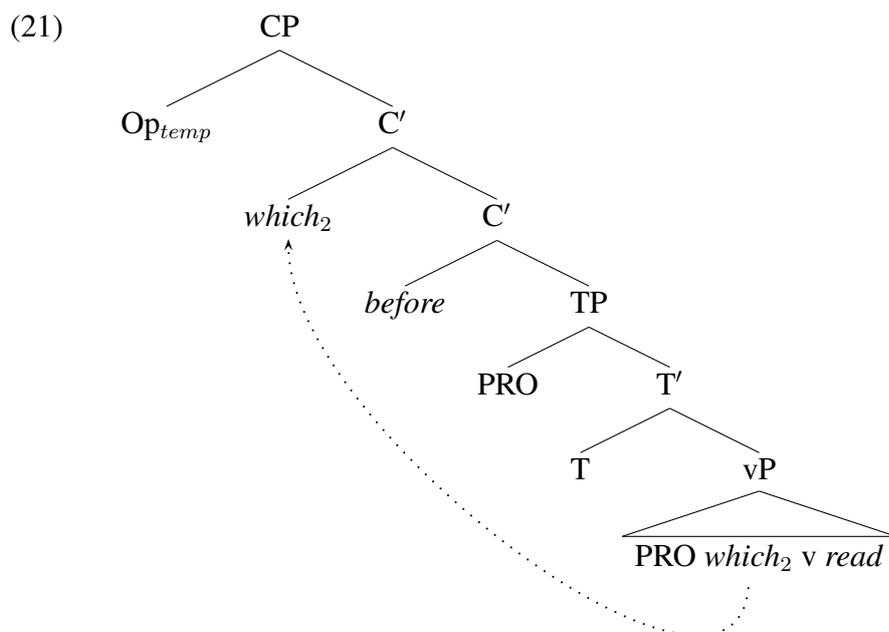
- (i) *Intermediate Step Corollary*:
 Intermediate movement steps to specifiers of X (as required by the PIC) must take place before a final specifier is merged in XP .

Next, the subarray containing the items of the embedded CP is selected (19). Here, the first step is Merge of T and vP₁. PRO then ϕ -agrees with T and moves to Spec,TP in order to satisfy T's EPP property. After this step, the complementizer *before* is merged with TP. Since *before* has only one operation-triggering feature left, namely [\bullet Op \bullet], an edge feature can be inserted, which again enables movement of *which*₂ to the edge of the CP phase. Finally, the temporal operator is merged and the CP phase is completed. The feature stack of *before* is shown in (20) and the final structure of the adjunct clause in (21).

- (19) Subarray CP₁
 {_{CP₁} T, *before*, Op}

- (20) Feature Matrix of C

- a. *before* [\bullet T \bullet \prec \bullet Op \bullet] → (Merge of TP)
- b. *before* [\bullet T \bullet \prec \bullet Op \bullet] → (edge feature insertion)
- c. *before* [\bullet X \bullet \prec \bullet Op \bullet] → (movement of *which*₂ to Spec,CP)
- d. *before* [\bullet X \bullet \prec \bullet Op \bullet] → (Merge of Op_{temp})
- e. *before* [\bullet Op \bullet]



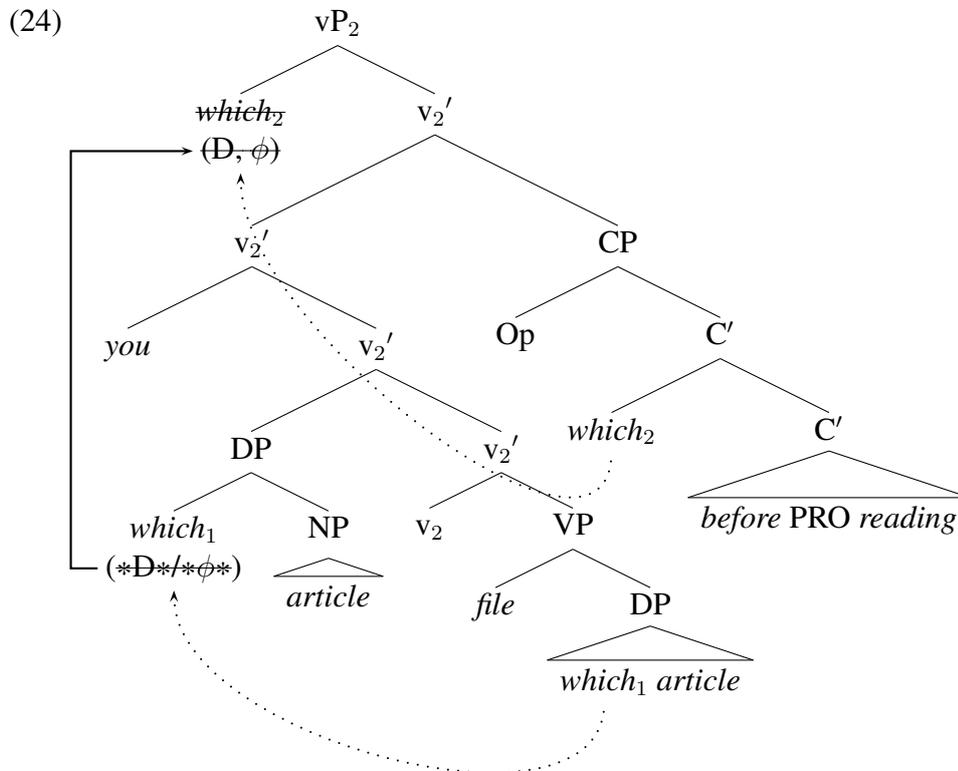
Afterwards, the subarray of the matrix vP is activated (22). Before this step, the subarray of the DP has been activated and *which*₁ has merged with *article*. The resulting DP *which*₁ *article* is now merged with *file*. Then, *v* merges with VP and agrees with *which*₁ *article*. Now, an edge feature is inserted which is deleted by movement of *which*₁ *article* to Spec,vP. Next, *you* merges with *v'* and the adjunct clause adjoins to *v'*. Although at this point, *v* itself has no operation-triggering features anymore, there is one item in its edge domain that has such features, namely *which*₁. Due to fission, *which*₁ has probe features that must be checked by *which*₂. Adopting the edge feature condition in (7), these probe features on *which*₁ now allow edge feature insertion on *v* (see (23-g)) and thus enable movement of *which*₂ to Spec,vP, creating a configuration where

*which*₁ can agree with *which*₂ in categorial and ϕ -features, i.e., Fusion applies.¹⁴ Assuming that elements can be deleted under recoverability (Chomsky 1980)—which is a given when all features of one element, here *which*₂, have entered into Agree with another designated item, here *which*₁—*which*₂ can be deleted (see Roberts 2010 for related ideas). The development of the feature stacks after each derivational step is shown in (23). The final structure of the matrix vP is given in (24).

- (22) *Subarray vP*₂
 {_{vP}₂ *file*, *which*₁, *v*₂, *you*}

- (23) *Feature Matrix of v*

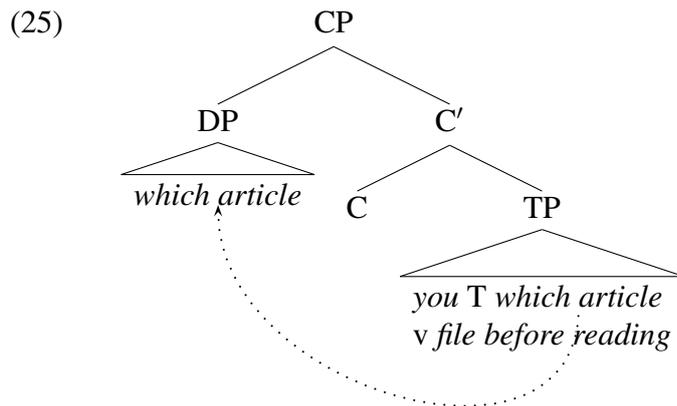
- a. *v*₂ [**•V•** < * ϕ * < **•D•**] → (Merge of VP)
 b. *v*₂ [**•V•** < * ϕ * < **•D•**] → (Agree with *which*₁ article)
 c. *v*₂ [* ϕ * < **•D•**] → (edge feature insertion)
 d. *v*₂ [**•X•** < **•D•**] → (movement of *which*₁ article to Spec,vP)
 new features in the edge domain of *v* (*D*/ ϕ *)
 e. *v*₂ [**•X•** < **•D•**], *which*₁ [*D*/ ϕ *] → (Merge of *you*)
 f. *v*₂ [**•D•**], *which*₁ [*D*/ ϕ *] → (Adjunction of adjunct clause)
 g. *v*₂ [], *which*₁ [*D*/ ϕ *] → (edge feature insertion)
 h. *v*₂ [**•X•**], *which*₁ [*D*/ ϕ *] → (movement of *which*₂ to Spec,vP)
 i. *v*₂ [**•X•**], *which*₁ [*D*/ ϕ *] → (Agree between *which*₁ and *which*₂)
 j. *v*₂ [], *which*₁ [*D*/ ϕ *]



¹⁴It might be argued that Agree between *which*₁ and *which*₂ is impossible due to minimality since the subject is a closer potential goal (cf. (24)). Note, however, that the subject bears a different referential index than *which*₁. Since *which*₁ can only check its probe features with a referentially identical goal (see section 2.2 and footnote 12), the subject cannot undermine Agree in this case.

Note that Agree between *which*₁ and *which*₂ is possible since *which*₂ c-commands *which*₁ and both are specifiers of the same phase (cf. the conditions of Agree in section 2.1). If *which*₂ had not moved out of the embedded CP, the probe features on *which*₁ would not be deleted and the derivation would crash.¹⁵

Finally, the last subarray containing the items of the matrix CP phase is selected. The derivation continues until C is merged, carrying a feature [**wh**] that is checked by *which* article. The final structure of (11) is given in (25).



2.4. Interim summary

In this section, I developed a new approach to parasitic gaps which is based upon a prederivational fission operation. I have proposed that sentences with parasitic gaps originate from numerations which do not have enough lexical items to enable a converging derivation. If this is the case, one item of the numeration has to fission into two in order to enter the derivation twice, thereby preventing the numeration from crashing. Nevertheless, the fission of a lexical item is not without costs: only if the two parts can fuse back together into one item is the derivation successful. This fusion of categories has been implemented as full Agree with deletion under recoverability.

Thus, the main result so far is that we can answer the general questions about parasitic gaps in (4) at the end of section 1:

1. Which syntactic operation do parasitic gaps originate in if not movement?

Parasitic gaps are the result of a prederivational fission operation which, on the one hand, allows a lexical item to occur in two different base positions by fissioning the item but imposes a condition of fusion on the other hand. Fusion is implemented as full Agree of the two parts where one part can be deleted under recoverability. Since the configuration for this Agree operation is only given when the two parts belong to the same phase, both parts have to move to higher positions which are specifier positions of *v* in the case above.

¹⁵Note that if Merge of the two parts of *which* were vice versa, i.e., *which*₁ had been base-generated in the embedded clause and *which*₂ in the matrix clause, the derivation would crash as well due the fact that the probe features on *which*₁ could not be deleted. This issue is discussed in detail in section 4.2.

2. *What are parasitic gaps?*

A parasitic gap is a gap whose antecedent is the deleted part of a formerly fissioned lexical item.

With this background, we are now able to answer further questions about parasitic gaps concerning their apparently idiosyncratic behavior.

3. *Answering more questions*

One of the main goals of this paper is to find solutions to four important conundrums parasitic gap constructions pose, which were listed in (5). In what follows, I will give a detailed introduction to each problem and show how the fission approach to parasitic gaps can solve it.

3.1. *Conundrum I: Why are parasitic gaps ‘selectively’ sensitive to islands?*

The paradoxical property of parasitic gaps to be separable from their antecedent by one island but not by more than one island (Kayne 1983, 1984; Bennis & Hoekstra 1985; Longobardi 1984; Koster 1986; Chomsky 1986a; Manzini 1994; Nunes 1995, 2001, 2004) is shown in (26).¹⁶

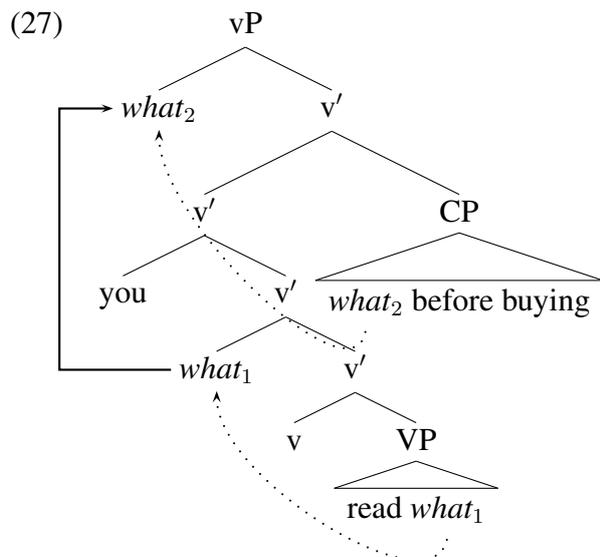
- (26) a. What did you read t [_{isl} before buying pg]?
 b. *What did you read t [_{isl} after expecting me to call the editor [_{isl} before buying pg]]?

In (26-a), *what* is separated from the parasitic gap by one adjunct island while in (26-b) there are two islands between them. Why do islands matter in (26-a) but not in (26-b)? The solution to this puzzle within the fission approach of section 2 falls out from the conditions imposed on fusion of the two parts of the antecedent.

Note that the derivations of the two sentences in (26) are identical up to a certain point. In both cases, *what* fissions into *what*₁ and *what*₂, leaving *what*₁ with additional probe features that must be checked by *what*₂. Since *what*₂ is merged in an adjunct clause while *what*₁ is merged in the matrix clause and since fusion can apply only locally, *what*₂ must leave the adjunct clause, i.e., it must leave an island. In (26-a), this is possible since the following configuration is given:

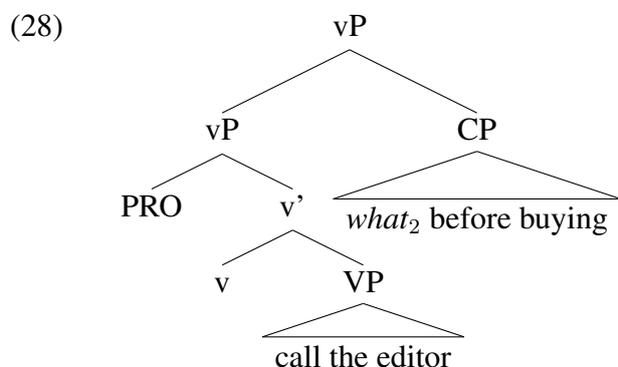
¹⁶This property of parasitic gap constructions can be observed in other languages as well, e.g. German.

- (i) a. Welchen Artikel hast du [_{isl} ohne pg zu lesen] t abgeheftet?
 which article have you without to read filed
 ‘Which article did you file without reading?’
 b. *Welchen Artikel hast du [_{isl} ohne den Autor zu kennen [_{isl} der pg geschrieben hat]] t
 which article have you without the author to know who written has
 abgeheftet?
 filed
 ‘Which article did you file without knowing the author who wrote?’



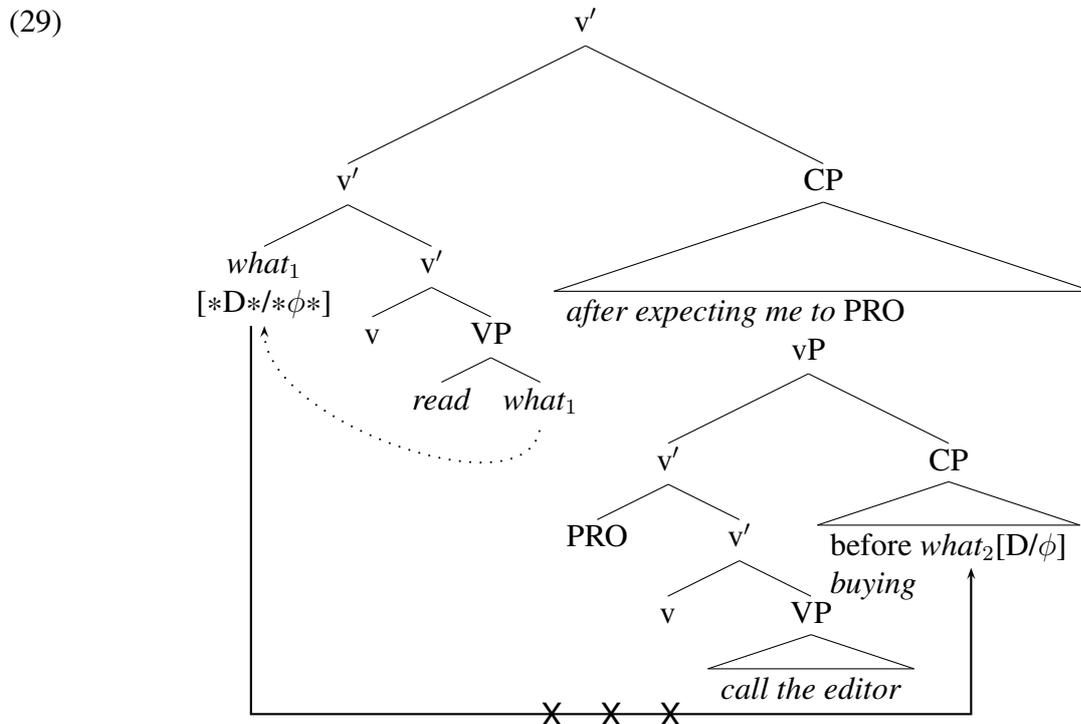
Remember from section 2.1 that the adjunct clause would be an island if there were no operation-triggering features in the edge domain of the vP phase at the point where the adjunct clause adjoins to v'. The reason is that movement from the adjunct clause is only possible if v has edge features which in turn can only be inserted in presence of other operation-triggering features (cf. (7)). Indeed, the v head has no such features since it has already checked its agreement features with *what₁* and its selection feature [**•D•**] with the subject *you*. Due to fission, however, *what₁* has operation-triggering features which are present in the edge domain of the vP phase as a result of an intermediary movement step to Spec,vP, which is needed for independent reasons given that all movement proceeds from phase edge to phase edge (PIC, see Chomsky (2000)). These features can keep the phase head active, allowing edge feature insertion on v (cf. the edge feature condition in (7)). With an edge feature comes the possibility for *what₂* to leave the adjunct clause. Thus, the adjunct island in (26-a) can be circumvented which in turn gives the impression that parasitic gaps are not sensitive to islands.

Now, the derivation of (26-b) is basically the same as that of (26-a) with only one major difference: *what₂* is further embedded than in (26-a). This difference, however, leads to a crash of the derivation. The critical point in the derivation is shown in (28).



Again, v has agreement features which are checked by *the editor*. The structure-building feature [**•D•**] of v is deleted by Merge of the covert subject PRO. But in contrast to the derivation of

(26-a), there are no further operation-triggering features in the vP phase at the point when the lowest adjunct is adjoined. Hence no edge feature can be inserted and *what*₂ is stuck in the adjunct clause; any movement of *what*₂ would fatally violate the PIC. Thus, *what*₁ and *what*₂ can never be in a configuration where they can fuse, and the probe features on *what*₁ remain unchecked, leading to a violation of *Full Interpretation* (Chomsky 1986b) as shown in (29).



In summary, parasitic gaps are always sensitive to islands. But in the derivation of a parasitic gap sentence, the highest potential island is rendered accessible by the additional probe features on the antecedent of the parasitic gap, which are originally the result of fission, and which now show up in the very edge domain of the phase whose specifier needs to be targeted by the antecedent of the parasitic gap, given the PIC.

3.2. Conundrum II: Why can complex antecedents only be reconstructed into the real gap but not the parasitic gap?

Binding data as in (30) suggest that the position of the parasitic gap cannot host a complex DP in contrast to the real gap.

- (30) a. [Which books about himself₁]₂ did John₁ file *t*₂ before Mary read *pg*₂?
 b. *[Which books about herself₁]₂ did John file *t*₂ before Mary₁ read *pg*₂?
 Kearney (1983)

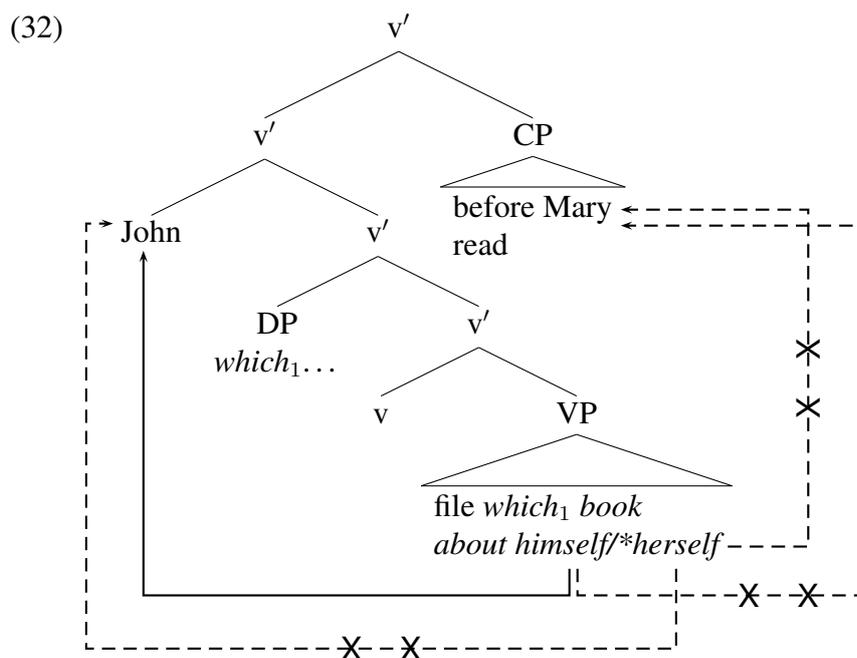
In (30), the complex *wh*-phrase contains an anaphor which must be bound by an antecedent that agrees with the anaphor in gender. Having two potential base positions in two different clauses,

the anaphor inside the *wh*-phrase has available two potential antecedents, namely the subjects of the respective clauses, of which, however, only one agrees with the anaphor in gender. In this context, the following asymmetry can be noticed: in (30-a), binding of the anaphor *himself* is possible but in (30-b), binding of the anaphor *herself* fails.

The fission approach offers a principled explanation for this binding asymmetry. In (30), fission of *which* creates the following two items.

- (31) *which* [D, ϕ , acc, wh, $\bullet N\bullet$, SEM, PHON, ...]
 a. *which*₁ [*D*, * ϕ *, *acc*, wh, $\bullet N\bullet$, SEM, PHON, ...]
 b. *which*₂ [D, ϕ , acc]

Note that only one part, namely *which*₁, has the feature [$\bullet N\bullet$] which enables it to merge with the NP *books about him/herself*. The resulting DP *which*₁ *books about him/herself* is merged in the matrix clause where the anaphor can be bound by the subject *John*. But the subject of the adjunct clause *Mary* cannot bind the anaphor since it does not c-command it from its position inside the adjunct clause. Thus, the only antecedent available for the anaphor is the matrix subject but not the embedded subject. The configuration is shown in (32).



The tree in (32) shows that the anaphor in the matrix clause can under no circumstances be bound by the subject of the adjunct clause. However, in case of gender agreement, it can be bound by the matrix subject. Since the matrix subject *John* is masculine, only the masculine anaphor *himself* can be bound but not the feminine anaphor *herself*. Hence, the anaphor *herself* is never bound and the sentence in (30-b) is expected to be ungrammatical.

3.3. *Conundrum III: Why are certain properties of the antecedent only important for its relation to the real gap but not to the parasitic gap?*

3.3.1. *Wh-islands*

Another asymmetry between the real and the parasitic gap shows up in contexts where gap and antecedent are separated by weak islands such as *wh*-islands.¹⁷ In German, for example, *wh*-movement is known to be sensitive to *wh*-islands, in contrast to other types of movement such as (argument) topicalization (Fanselow 1987; Müller & Sternefeld 1993).

- (33) a. *Welche Radios weißt du nicht [CP wie man *t* repariert]?
 which radios know you not how one repairs
 ‘Which radios don’t you know how to repair?’
 b. ?Radios weiß ich nicht [CP wie man *t* repariert].
 radios know I not how one repairs
 ‘As for radios, I don’t know how to repair them.’

In (33), the *wh*-phrase *wie* creates a weak island from which only non-*wh*-phrases can be extracted. Thus, the *wh*-phrase *welche Radios* cannot move out of the embedded clause while the topicalized non-*wh*-phrase *Radios* can do so.

If *wh*-islands are combined with parasitic gap constructions, we can observe that sentences are strongly deviant if the *wh*-island intervenes between the antecedent and the real gap (34-a) but not if it intervenes between the antecedent and the parasitic gap (34-b).¹⁸

- (34) a. *Welche Radios weißt du [CP wie man [ohne *pg* zu reparieren] *t* verkauft]?
 which radios know you how one without to repair sells
 lit.: ‘Which radios do you know how to sell without repairing?’
 b. ?Welche Radios hast du [ohne zu wissen [CP wie man *pg* repariert]] *t*
 which radios have you without to know how one repairs
 verkauft?
 sold
 lit.: ‘Which radios did you sell without knowing how to repair?’

Thus, it seems that the *wh*-property of the antecedent only matters for its relation to the real but not the parasitic gap. This is exactly what we expect, given that according to (14-b), *welche*₂ merged in the position of *pg* does not bear a [wh] feature after fission (and thus does not qualify as a *wh*-phrase), whereas *welche*₁ merged in the position of *t* is equipped with a [wh] feature after prederivational fission.

¹⁷The asymmetries between real and parasitic gap which are illustrated in (34) and below in (36) have not been described in the literature so far. I would like to thank Gereon Müller for bringing these data to my attention.

¹⁸Note that the grammaticality judgements here are independent of the presence or absence of the *ohne*-clause including the parasitic gap.

3.3.2. Long-distance scrambling

Another example for this behavioral asymmetry comes from scrambling. In German, scrambling is strictly clause-bound (Ross 1967) as shown in the contrast between (35-b) and (35-c).

- (35) a. dass ich glaube [_{CP} dass der Mann_j das Radio_i reparieren muss]
 that I believe that the man the radio repair must
 ‘that I believe that the man has to repair the radio’
- b. dass ich glaube [_{CP} dass das Radio_i der Mann_j t_i reparieren muss]
 that I believe that the radio the man repair must
 ‘that I believe that the man has to repair the radio’
- c. *dass ich das Radio_i glaube [_{CP} dass der Mann_j t_i reparieren muss]
 that I the radio believe that the man repair must
 ‘that I believe that the man has to repair the radio’

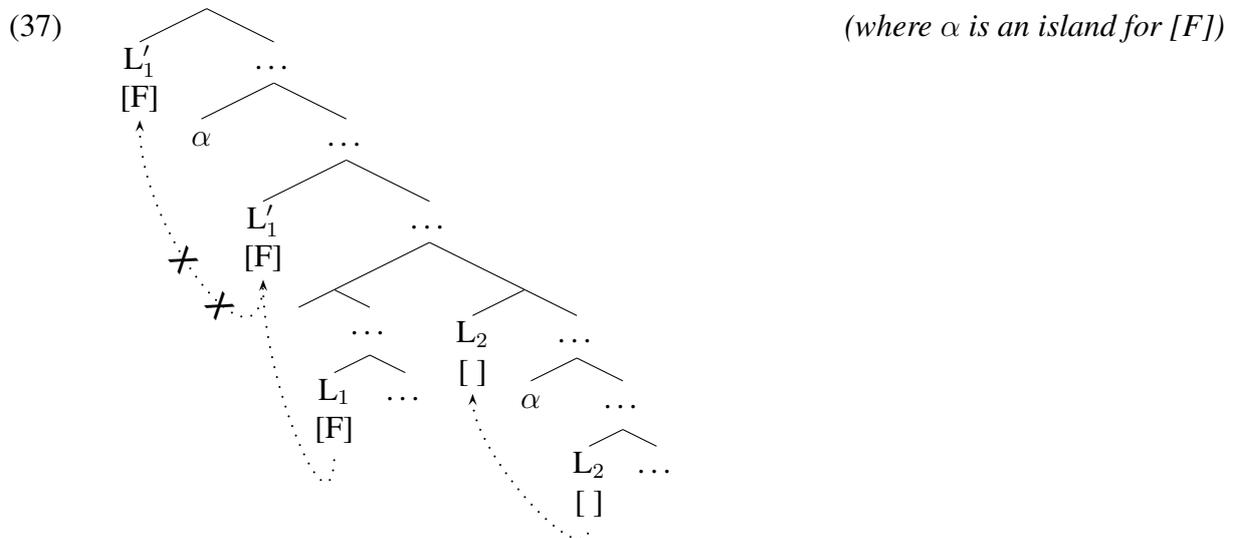
Since scrambling is able to license parasitic gaps in German (see (36-a); Felix 1985; Bennis & Hoekstra 1985; Webelhuth 1992; Mahajan 1990; also see Assmann & Heck 2011 vs. Fanselow 2001), we can test whether the property of clause-boundedness is given in parasitic gap contexts.

- (36) a. dass ich das Radio [ohne pg zu reparieren] t verkauft habe
 that I the radio without to repair sold have
 ‘that I have sold the radio without repairing it.’
- b. *dass ich das Radio glaube [_{CP} dass man [ohne pg zu reparieren] t verkaufen kann]
 that I the radio believe that one without to repair sell
 kann]
 can
 ‘that I believe that one can sell the radio without repairing it’
- c. ?dass ich das Radio [ohne zu sagen [_{CP} dass man noch pg reparieren muss]] t verkauft habe
 that I the radio without to say that one still repair must
 verkauft habe
 sold have
 ‘that I have sold the radio without saying that one still has to repair it’

Obviously, the finite clause boundary does intervene between the antecedent *das Radio* and the real gap (36-b) but not between the antecedent and the parasitic gap (36-c). Assuming that scrambling is triggered by a scrambling feature [Σ] and movement of categories which bear a [Σ] feature may not cross a finite CP, we can explain the asymmetry illustrated in (36) as follows: the D head *das* is fissioned into two parts *das*₁ and *das*₂, of which only *das*₁ has the scrambling feature [Σ] (in analogy to the [wh] feature of *welche* in (34)). Then, movement of *das*₂ may freely cross finite CPs whereas *das*₁ bearing the [Σ] feature must not do so.

3.3.3. *The pattern*

The asymmetries we have seen so far seem to belong to a general pattern of asymmetries between the behavior of the two antecedent-gap dependencies. Assuming that movement types have certain properties because the item that is moved has a special feature [F] that encodes central aspects of the movement type—i.e., phrases to be *wh*-moved have a feature [wh]; phrases to be scrambled have a scrambling feature [Σ]—the aforementioned pattern (which may include other cases as well) is predicted by the fission approach since the antecedent in a parasitic gap construction is fissioned into two parts whereby only one part has the feature [F] (L_1). This part, however, is merged in the position of the real gap. Hence, we end up with the following configuration.



Let α be a category that creates a weak island for the feature [F]. Then, only items that do not bear [F] should be able to leave it. In other words, L_2 , which is the part of the antecedent L that is merged in the position of the parasitic gap, should be insensitive to the α -island since it has no feature [F] while L_1 , which is the part merged in the position of the real gap, should be sensitive to α -islands. Hence, we predict that sentences such as (34-b) and (36-c) should be possible since neither does a *wh*-phrase cross a *wh*-island nor a scrambled phrase a finite clause boundary. On the other hand, sentences such as (34-a), (36-b) must be ungrammatical because the *wh*/ Σ -phrase L'_1 cannot move out of the α -island.

3.4. *Conundrum IV: Why can parasitic gaps only be licensed by \bar{A} -movement but not by A-movement?*

Finally, it is known that parasitic gaps can be licensed by movement types such as *wh*-movement, relativization, topicalization or scrambling, which are all \bar{A} -movement types, but not by movement types such as passive movement or raising, which are A-movement types (Engdahl 1983:13).

- (38) a. *John was killed *t* by a tree falling on *pg*.
 b. *Mary seemed *t* to disapprove of John's talking to *pg*.

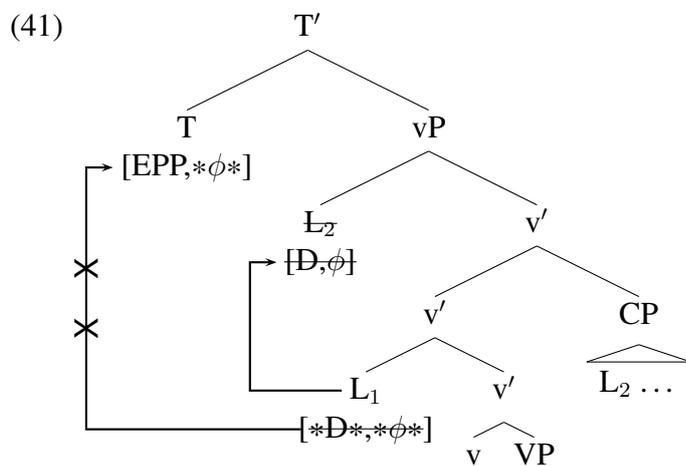
Interestingly, parasitic gaps cannot be licensed by a passive subject even if it moves further to an \bar{A} -position.

- (39) *Which house was sold *t* [before we could demolish *pg*]?
based on Legate (2003:511)

Furthermore, parasitic gaps cannot be licensed from a subject position that c-commands it, whether it later moves to a legitimate position or not (*anti-c-command-condition*, see Taraldsen 1981; Chomsky 1982; Engdahl 1983; Safir 1987).

- (40) *Which spy *t* killed John before anybody could speak to *pg*? *Safir (1987:678)*

The fission approach offers a simple solution to these puzzling data. In all the above cases, the antecedent of the parasitic gap has to land in or go through the subject position Spec,TP. To do so, the antecedent needs a categorial feature in order to satisfy T's EPP property, as well as ϕ -features which T must check. When the antecedent L of a parasitic gap construction is fissioned, these features are present on both parts L₁ and L₂. On L₁ however, they are probe features which must be checked by the matching non-probe features on L₂. Consequently, if L₁ and L₂ enter into full Agree, those features of L₁ which are necessary for occupying Spec,TP, are deleted. In other words, the derivations of the above sentences crash due to a timing problem in the derivation, with L₁ and L₂ agreeing before L₁ can move to Spec,TP. The configuration is shown in (41).



Thus, we expect that if movement to Spec,TP happens prior to fusion, subjects should be able to license parasitic gaps. In fact, this prediction is confirmed by data as in (42-a).

- (42) a. a note which [unless we send back *pg*] *t* will ruin our relationship
 b. *a note which *t* will ruin our relationship [unless we send back *pg*]
Haegeman (1984)

Assuming that the adjunct clause in (42-a) precedes the base position of the subject because it is merged higher in the tree, e.g., as an adjunct to the TP, it follows that the relative pronoun *which* moves to the subject position Spec,TP before the adjunct clause is even merged and thus before *which*'s feature specification is manipulated by fusion. In (42-b), however, we have the same configuration as in (41), with the result that *which* cannot license the parasitic gap in this case.

In summary, the fission approach provides straightforward answers to the four empirical questions discussed above without invoking additional stipulations. The fission operation itself, integrated into a standard minimalist framework, makes it possible not only to give a natural and intuitive explanation for the phenomenon of parasitic gaps but is, furthermore, able to predict the properties of parasitic gaps correctly.

4. Discussion

So far, we have seen how the fission approach to parasitic gaps works and how it answers to important questions concerning parasitic gaps and their properties. In this section, I will address more general empirical and conceptual aspects of the new approach in comparison to other analyses of parasitic gaps.

4.1. Discussion of empirical issues

What seems to be so puzzling about parasitic gaps is that most of their properties involve paradoxes or asymmetries. These paradoxes and asymmetries are resolved within the fission approach under the assumption that the antecedent of a parasitic gap occurs in different instances. In other words, the two feature manipulating operations fission and fusion have the effect that the antecedent L passes through three different stages in the derivation. The first two stages proceed independently from one another as L is fissioned into L_1 and L_2 (43-a,b). The third stage is the stage after fusion, i.e., feature deletion, has applied (43-c).

- (43) L [$F_1 \dots F_n, G_1 \dots G_n$]
 a. L_1 [$*F_1* \dots *F_n*, G_1 \dots G_n$]
 b. L_2 [$F_1 \dots F_n$]
 c. L'_1 [$G_1 \dots G_n$]

We thus even expect that the properties of L differ according to the derivational stage L is in. So, whenever there are asymmetries such as the reconstruction asymmetries in section 3.2 or the island asymmetries in section 3.3, they can be traced back to the differences between the first and the second stage of L (L_1 vs. L_2).

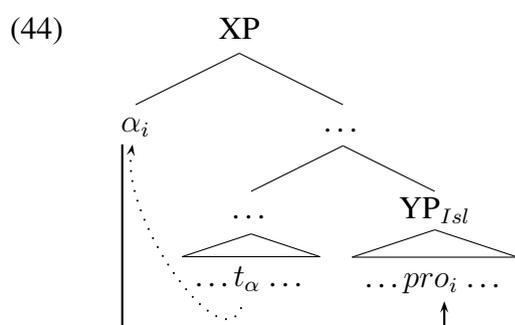
Other asymmetries between antecedents of parasitic gap constructions and antecedents of simple non-parasitic gap constructions such as the \bar{A}/A -movement asymmetry in section 3.4 go back to the fact that only in parasitic gap constructions, the antecedent suffers from a drastic feature manipulation in the derivation that takes away its status as an argument and reduces it

to a pure operator.

Thus, the asymmetries in the behavior of parasitic gaps discussed in section 3 provide strong support for the three derivational stages predicted by the fission approach.

Even though previous theories of parasitic gaps are to a certain degree empirically adequate as well, none of them is able to correctly predict all of the properties discussed in this paper. Basically, there are three types of parasitic gap analyses which have been argued for in the literature: the binding approach, the empty-operator-movement approach and the sideward movement approach.

Let us start by discussing the predictions made by the binding approach. Supporters of the binding approach claim that parasitic gaps are empty pronouns which are bound by the antecedent of the real gap (Chomsky 1982; Engdahl 1983, 1985; Cinque 1990; Postal 1993, 1994, 1998; Ouhalla 2001; Munn 2001). The configuration which shows this type of analysis is given in (44).

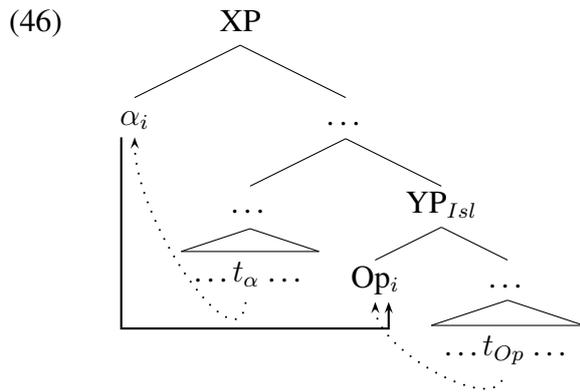


The binding approach is able to explain the reconstruction asymmetries (section 3.2) as well as the weak-island asymmetries (section 3.3): the only movement dependency is between the antecedent and the real gap. Hence, reconstruction can only be possible into the real gap and weak islands can only be crossed by the antecedent moving from the real gap position to its final position. Nevertheless, the binding approach cannot offer a principled solution to the other two puzzles discussed in section 3. First, there is no reason why an antecedent could not be able to bind a pronoun from an A-position, i.e., we expect that A-movement should license parasitic gaps, contrary to fact. Even if such configurational issues could be solved by stipulating that binding can only take place from an \bar{A} -position (e.g. Ouhalla 2001), data as in (45), repeated from (39), where the passivized subject moves further to an \bar{A} -position cannot be captured.

(45) *Which house was sold *t* [before we could demolish *pg*]?

Furthermore, the binding approach cannot solve the island paradox with parasitic gaps (cf. section 3.1) as binding is insensitive to islands in general (Chomsky 1977; Zaenen et al. 1981; Reuland 2001). For these reasons, the binding approach can be considered empirically inferior to the fission approach.

The empty-operator-movement approaches (see e.g. Contreras 1984; Kiss 1985; Chomsky 1986a; Lee 1998; Nissenbaum 2000) states that an empty operator is merged in the position of the parasitic gap which moves to a higher position where it is identified with the antecedent of the real gap; see (46).



Since this analysis involves actual movement of the operator from the parasitic gap position to a higher position, the selective island sensitivity of parasitic gaps can be explained. The highest island does not intervene between the antecedent and the parasitic gap since there is no movement out of the island. Rather, the operator lands in the left periphery of this island. Nevertheless, all other islands would have to be crossed by movement.

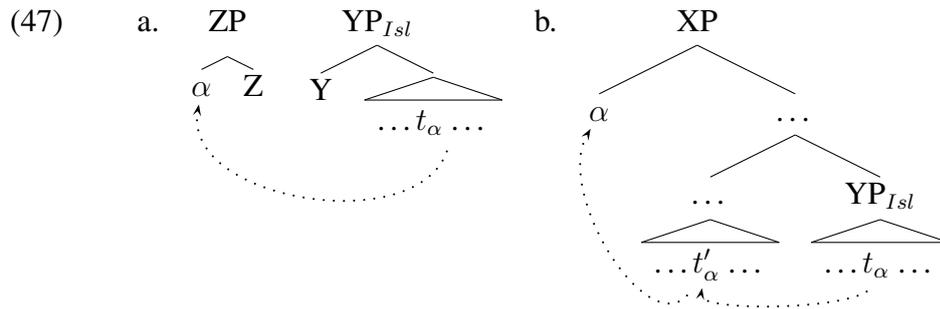
Furthermore, the asymmetries between the real and the parasitic gap may in principle be captured since both gaps have, in fact, different antecedents. If one were to assume that the empty operator does not bear [wh] or [Σ], it may be insensitive to weak islands, predicting that *wh*-islands and finite clause boundaries should not fatally intervene between the antecedent of the real gap and the parasitic gap. And since the position of the parasitic gap is occupied by an empty operator, the antecedent of the real gap cannot be reconstructed into the parasitic gap, which provides an explanation for the reconstruction asymmetries in section 3.2.

However, data as in (45) which show that subjects cannot license parasitic gaps may be more problematic. In principle, the approach could involve configurational conditions that prohibit empty operators from being identified with categories in A-positions. Nonetheless, only ad hoc stipulations may prevent an antecedent which is in an otherwise legitimate \bar{A} -position but has moved through an A-position (cf. (45)) from licensing an empty operator.¹⁹

Thus, the fission approach has an advantage over the empty-operator-movement approach since it is able to explain these data without further ado.

Finally, the sideward movement approach (Nunes 1995, 2001, 2004) suggests that the antecedent of a parasitic gap construction is base-generated in the position of the parasitic gap and then moves interarborally to the position of the real gap, from where it moves on to its final position.

¹⁹However, the main problem of the empty-operator-movement approach is that it cannot provide a principled explanation for the unexpected distribution of the empty operator. If parasitic gap constructions involved empty operator movement, we would expect that either overt operators can alternatively show up in the same position as the empty operator (similarly to the alternation between empty and overt operators in relative clauses), contrary to fact, or that empty operator movement is covert, which would render the explanation for the selective island sensitivity of parasitic gaps problematic since covert movement is known to be generally insensitive to islands (Huang 1982; Chomsky 1995).



Within the framework Nunes (2001) assumes, the sideward movement approach can capture the selective island sensitivity by imposing conditions on the timing of operations in the derivation such that sideward movement itself can only apply in very restricted contexts: it may cross exactly one island but never more than one island. The fact that subjects cannot license parasitic gaps falls out from invoking additional stipulations about the licensing of traces by heads which define intervention effects whenever a subject licenses a parasitic gap.

The major problem for the sideward movement approach is, however, asymmetries between the real and the parasitic gap. Since the sideward movement approach claims that there is no difference between these two gaps, no asymmetries of any kind should exist. In particular, as the antecedent with all its properties and possible complexity is generated in both gaps, the antecedent should (i) be able to reconstruct in both positions to the same extent²⁰ and (ii) be sensitive to weak islands no matter where they occur. Hence, the data discussed in section 3.2 and 3.3 strongly argue against the sideward movement approach.

In conclusion, we have seen that the four properties of parasitic gaps which are directly predicted by the fission approach pose severe problems for other analyses of parasitic gaps. For each of the three types of accounts discussed here, there is at least one property which cannot be explained. Thus, on empirical grounds, the fission approach is superior to other theories of parasitic gaps.

4.2. Discussion of theoretical issues

Finally, I would like to discuss theoretical aspects of the fission approach in comparison to the other three approaches. In contrast to the approaches discussed above, the fission approach is based on a syntactic operation that seems at first sight not to be needed for independent reasons. Binding, empty operator movement and sideward movement are operations which are used to derive other syntactic phenomena such as resumption, relativization or across-the-board movement respectively. Note, however, that the extent to which the fission operation can derive

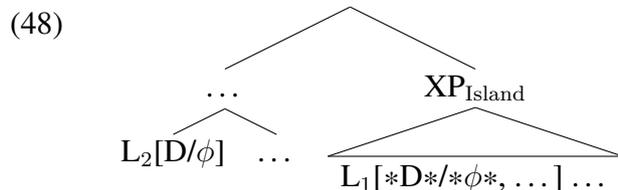
²⁰Nunes (2001) discusses data from Munn (1994) which show that reconstruction into the parasitic gap is possible when the category containing the parasitic gap precedes the real gap. Thus, he claims that reconstruction asymmetries do not pose a problem for his account. Note, however, that the sideward movement approach predicts that there should be *no* reconstruction asymmetries at all between the two gaps, contrary to fact.

- (i) a. *Which picture of herself did every boy who saw *pg* say Mary liked *t*?
 b. Which picture of himself did every boy who saw *pg* say Mary liked *t*? Munn (1994:407)

phenomena besides parasitic gaps is not explored in full depth yet.²¹ I leave this issue to further research.

Another aspect that is worth discussing concerns the issue of look-ahead. There are two potential look-ahead problems in derivations which involve fission. The first one concerns the fission operation itself. It might be argued that in order to meet the conditions on fission, the course of the derivation must be known since only then, a crash of the derivation can be detected. However, this is not the case. For fission to apply, it is sufficient to run through the numeration and count operation-triggering and non-operation-triggering features. Assuming that numerations are nothing else but a set consisting of lexical items which are in turn sets of features, a scan runs through the numeration, building possible pairs of operation-triggering and matching features independently from what will be the correct pairing in the derivation. If look-ahead is defined as access to later stages of the derivation, the prederivational scan sketched here is not look-ahead since the actual feature pairing in the derivation is immaterial for this scan, in which operation-triggering and non-operation-triggering features can be paired freely. Note, by the way, that such a prederivational scan does not increase the computational complexity of the derivation either as it has a worst-case complexity class $O(n^2)$, where n is the number of features in the numeration, just like the derivation. Since the prederivational scan as well as the derivation itself is a pairing of operation-triggering and matching features, it needs at most n^2 steps.²²

The second putative look-ahead problem concerns the question of whether it is necessary that the two parts L_1 and L_2 of a fissioned lexical item L be merged in designated positions. Put differently, one wonders what would happen if the merge positions of the two parts were reversed, putting L_2 in the position of the real gap and L_1 in the position of the parasitic gap. In this case the following scenario emerges:



In this configuration, the probe features of L_1 cannot be checked since Agree is only possible under c -command. Therefore, this derivation is excluded for independent reasons.

In conclusion, fission is a syntactic operation which needs further investigation but is conceptually and empirically appealing, since it leads to natural explanations for the properties of parasitic gaps without putting an additional computational burden on the derivation.

²¹Agbayani & Ochi (2007), e.g., discuss how fission could also be used to analyze scrambling as base generation. The present fission approach may also be suited for analyzing other phenomena such as resumption and/or headless relative clauses.

²²In fact, the actual complexity class will be lower than $O(n^2)$ due to the fact that features in the numerations are part of lexical items and that each feature can only interact in one operation.

5. *Conclusion*

The aim of this paper was to find answers to the major questions concerning parasitic gaps. I have argued that parasitic gap constructions result from a prederivational fission operation which enables an item to enter the derivation twice starting in two different positions. This operation combined with an obligatory fusion of the two parts in the derivation leads to constructions in which one antecedent can be traced back to two different base positions. Furthermore, I have shown that the fission operation integrated into a minimalist framework can explain the idiosyncratic behavior of parasitic gaps, something which other approaches to parasitic gaps are not able to do to the same extent.

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A Minimalist analysis of possessor advancement

Baker (1988) revisited

Anke Assmann, Doreen Georgi & Philipp Weisser

In this paper, we show how Baker's (1988) account of noun incorporation, which was formulated in a Government & Binding framework, can be transferred to a modern Minimalist grammar. We argue that the Minimalist theory of noun incorporation does not only have conceptual advantages over a GB analysis — since it requires a smaller number of stipulations — but also empirical ones. The crucial assumption our account is based on is that noun incorporation is triggered by a special kind of case feature on the incorporating noun. This assumption is shown to have major impacts on derivations which involve noun incorporation.

1. Introduction

Scientific progress is a double-edged sword. The adoption of new ideas and theories always carries with it the danger of losing established findings of the previous theories. Especially in syntactic theory, the principles and rules of new frameworks often lead to incompatibility with existing theories. Every theory and every analysis must be questioned whether it can be transferred and adapted to the new framework.

In this paper, we investigate whether Baker's (1988) ground-breaking analysis of incorporation can be recycled and transferred from Government & Binding Theory (GB) to a Minimalist framework. Since his account heavily relies on specific concepts and definitions of GB such as different levels of syntactic representation, a translation of his theory into a Minimalist framework faces several challenges. Nevertheless, it is important to pursue this aim since the important insights that his theory has provided for syntactic theory in general and especially for theory of grammatical function changing processes are worthwhile preserving by transferring it to a modern syntactic framework.

We argue that Baker's whole theory of noun incorporation can in fact be translated into a Minimalist framework but that, nonetheless, several adjustments are necessary. Furthermore, we show that Baker's account is not able to derive the whole agreement pattern of cases of noun incorporation in languages such as Mohawk. As we will argue, this pattern can be explained

by using our Minimalist version of his account. Thereby, we also avoid several stipulations that Baker has to make in his analysis.

The paper is structured as follows. In section 2, we shortly outline Baker's approach to incorporation and grammatical function changing processes. In section 3, we present the relevant data of cases of noun incorporation in Mohawk and show where Baker fails to derive the whole agreement pattern. Furthermore, we show that although his account is a quite elegant solution to the challenges of noun incorporation, he still needs to make several stipulations to make it work. Section 4 deals with all the problems one faces when trying to transfer Baker's GB analysis to a derivational Minimalist framework. We discuss in detail which Minimalist assumptions are problematic for the adoption of his theory and how these problems can be solved. Afterwards we present the background assumptions for our own account and go through all the derivations in detail. Furthermore, we discuss how the problems laid down in the previous sections are solved. In section 5, we address some potential problems for our analysis and open questions. Section 6 concludes.

2. Baker's account

Baker (1988) is concerned with cross-linguistic grammatical function changing processes (GFCP) which he analyses as the result of incorporation. For Baker (1988), grammatical functions (GF) are derived notions which are defined as sets of properties resulting from the interaction of GB subtheories like X-bar theory, case theory, binding theory etc. The GF of a nominal category can thus be identified by the case it bears, the structural position it occupies or by looking at whether it triggers verbal agreement or not. Hence, a change of syntactic configurations by a syntactic operation may change the properties of a nominal category and thereby its GF. Processes with such a result are called *grammatical function changing processes*. Based on Baker (1988), we define GFCP as follows:

(1) *Grammatical function changing processes:*

A (nominal) category that has a certain grammatical function F in the context of a verb with a certain morphology M in a sentence P receives another grammatical function F' in the context of a verb with a different morphology M' in a sentence P' . P and P' are thematic paraphrases.

The following active-passive-alternation from English illustrates the definition above.

- (2) a. Rover bit Linda. $F = O, M = active$
 b. Linda was bitten by Rover $F' = S, M' = passive$
Baker (1988:7)

Both sentences express the same proposition and are thus thematic paraphrases. However, the arguments *Rover* and *Linda* receive different grammatical functions in both sentences. In example (2-a), *Linda* is the direct object and in (2-b), the passivised counterpart of (2-a) — *Linda* — is the subject. *Rover*, on the other hand, is the subject of the first example but in the second example it is realised as an oblique category within a prepositional phrase. Both arguments receive

different grammatical functions in the passivised example (2-b).

The next examples from Chichewa illustrate the same point for another GFCP, namely causativisation:

(3) *Chichewa* (Baker 1988:148):¹

- a. Mtsikana ana-chit-its-a kuti mtsuko u-gw-e.
 girl AGR-do-make-ASP that waterpot AGR-fall-ASP
 ‘The girl made the waterpot fall.’ *F = S, M = non-causative*
- b. Mtsikana anau-gw-ets-a mtsuko.
 girl AGR-fall-made-ASP waterpot
 ‘The girl made the waterpot fall.’ *F' = DO, M' = causative*

In (3), both examples express the same proposition and are thus thematic paraphrases. In example (3-a), the underlined argument *mtsuko* is the subject of the embedded clause but in example (3-b), which is now monoclausal, it is the direct object of the complex verb.

The causative/non-causative alternation can be used to illustrate Baker’s account. The central assumption in Baker (1988) is that all kinds of GFCPs are a side-effect of incorporation. In the case of causativisation, Baker assumes that the verb of the embedded clause incorporates into the matrix verb. In the Chichewa examples, the stem of the embedded verb *-gw-* incorporates into the matrix verb *-its-*. The result is a monoclausal structure with *mtsuko* as a direct object.

Another example of a GFCP and the topic of this paper is a process traditionally called *possessor ascension* or *possessor advancement*² (cf. Allen & Frantz (1978); Robinson (1980); Aissen (1987); Blake (1990); Rosen (1990); Frantz et al. (1990) among many others) in noun incorporation structures.

(4) *Mohawk*:

- a. Ka-rakv ne sawatis hrao-nuhs-a?
 3N-be.white DET John.M 3M-house.N-SUF
 ‘John’s house is white.’ Baker (1988:97)
- b. Hrao-nuhs-rakv ne sawatis.
 3M-house.N-be.white DET John.M
 ‘John’s house is white.’ Baker (1988:96)

Again, both sentences are thematic paraphrases. In example (4-a), the unaccusative verb *rakv* (‘be white’) and its internal argument are distinct words and the verb shows neuter agreement (*ka-*) indicating that the head of its only argument is the neuter noun *nuhs* (‘house’). The noun *nuhs* (‘house’) is marked for agreement (*hrao-*) with its masculine possessor *sawatis* (‘John’). However, in the second example (4-b), the head noun *nuhs* has incorporated into the verb, stranding its determiner and possessor. Furthermore, the verb no longer shows neuter agreement

¹Throughout this paper, we use the following glosses and abbreviations (most of the glosses are adopted from the cited literature): 1, 2, 3 1st, 2nd, 3rd person; ABS absolutive; ACC accusative; AGR agreement morphology; ASP aspect; DET determiner; F feminine; GEN genitive; M masculine; MA Finnish MA-infinitival; N neuter; NOM nominative; O object; PRE unspecified prefix; PRT partitive; S subject; SG singular; SUF undetermined suffix; VA Finnish VA-infinitival; *e* empty category; *Poss* possessor *t* trace; φ phi-features (person, number, gender).

²In what follows, we take both terms to be completely interchangeable.

but masculine agreement (*hrao-*) since it agrees now with the possessor of its only argument. The possessor *sawatis* ('John') in (4-b) behaves like the head noun *nuhs* ('house') in (4-a) with respect to agreement: both trigger verbal agreement and can thus be said to have the GF *direct object*. That is, the possessor has undergone a GFCP and has become the direct object of the verb under noun incorporation.

Baker's (1988) aim is to develop a unified analysis for all GFCPs and to derive restrictions on the processes by the interaction of independently motivated principles of grammar. He proposes that all GFCPs are derived by incorporation which he analyses as head movement. GF changing is a side-effect of this movement. As an instance of Move α , incorporation is subject to the same constraints as other types of head movement. This derives many of the properties of GF changing (distribution of incorporation, morphological reflexes, (im)possible GFCPs, order of GFCPs, etc.). In order to understand Baker's proposal, which is rooted in the GB framework, we must briefly recapitulate some of its major background assumptions first. The syntactic model comprises four different levels of representation: D(eep)-structure, S(urface)-structure, phonological form (PF) and logical form (LF). D-structure and S-structure are related by the operation Move α . The *Projection Principle* in (5) has the effect that movement must leave a trace.

(5) *Projection Principle:*

Lexical selection properties of an item must be represented at each syntactic level of representation. Chomsky (1981:29)

The structure of syntactic trees is constrained by the X-bar schema which says that an XP must have a head which can additionally select a complement and at most one specifier:

(6) $[_{XP} (YP) [_{X'} X (ZP)]]$

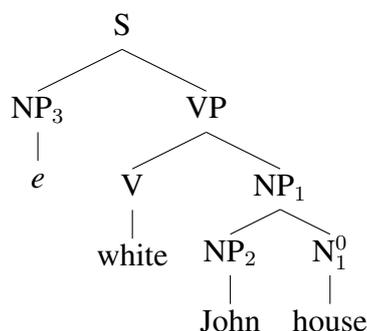
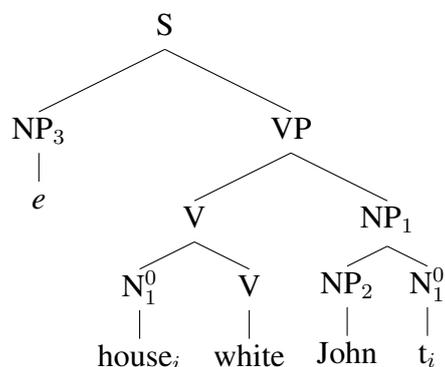
A further important assumption of Baker (1988) is the *Uniformity of Theta Assignment Hypothesis* (UTAH) in (7). It basically says that arguments bearing the same thematic roles have to be located in the same syntactic positions at D-structure.

(7) *Uniformity of Theta Assignment Hypothesis:*

Identical thematic relationships between items are represented by identical structural relationships between those items at the level of D-structure. Baker (1988:46)

With these ingredients, the GFCP possessor advancement in (4) is derived as follows: Due to the UTAH, (4-a) and (4-b) must have the same underlying structure because they are thematic phrases. Hence, (4-b) is derived from (4-a) by head movement (incorporation) of the head noun 'house' into the verb 'white' as illustrated in (8) and (9).³ In accordance with the *Projection Principle*, this movement leaves a trace in N's base position.

³A further assumption is that the subject position is already present at D-structure and filled by an empty category *e*. Movement of the complement of V to this position replaces the empty category at S-structure.

(8) *D-structure:*(9) *S-structure:*

The question is how the GFs of the nominal elements are changed. The GFs in Mohawk can be identified via verbal agreement. A prerequisite for agreement between a verbal head and an NP is that the verb governs the corresponding noun. In (8), given Baker's definition of government, V governs NP₁ and N₁⁰ but nothing else contained in NP₁, especially not the possessor (NP₂). NP₁ is a barrier for government of V into NP₁. Hence, there is only agreement between V and the head noun N₁⁰ of its complement in (8). If incorporation applies as in (9), the government relations change. If the head X of a barrier XP is moved out of XP, XP ceases to be a barrier.⁴ This consequence of incorporation, which follows from the definition of barrier and the fact that incorporation is head movement, is formulated in the *Government Transparency Corollary* (GTC).

⁴The exact definition of barrier used by Baker (1988) is given in (i).

- (i) *Barrier* (Baker 1988:56):
Let D be the smallest maximal projection containing A. Then C is a barrier between A and B if and only if C is a maximal projection that contains B and excludes A, and either:
- a. C is not selected, or
 - b. the head of C is distinct from the head of D and selects some WP equal to or containing B.
- (ii) *Selection* (Baker 1988:57):
A selects B if and only if:
- a. A assigns a theta role to B, or
 - b. A is of category C and B is its IP, or
 - c. A is of category I and B is its VP.

For the case of possessor advancement in (8) and (9), the definition in (i) says (D = VP, A = V, B = N₁⁰, C = NP₁) that NP₁ in (8) is a barrier between V and Poss because the head of NP₁ (N₁⁰) is distinct from V, i.e., no head movement has applied. Now, the definition of government in (iii) says that V does not govern Poss and, therefore, cannot assign Case to Poss assuming that Case assignment is possible only under government.

- (iii) *Government* Baker (1988:39), Chomsky (1986a):
A governs B iff A c-commands B and there is no category C such that C is a barrier between A and B.

In (9), the head of NP₁ is no longer distinct from V due to head movement. Therefore, NP₁ ceases to be a barrier and V can govern Poss.

(10) *The Government Transparency Corollary:*

A lexical category which has an item incorporated into it governs everything which the incorporated item governed in its original structural position. Baker (1988:64)

The result is that after noun incorporation (NI), V governs the possessor (NP₂) of its complement (NP₁) and hence, agreement between the two elements is possible. GFCPs thus follow elegantly from the treatment of GFCP as head movement and the independently motivated definition of government. As movement changes syntactic configurations and government is sensitive to these configurations, movement also changes government relations which in turn can give rise to new dependencies that are morphologically expressed, e.g. as φ -agreement in Mohawk. There is thus no raising or advancement of the possessor to the direct object position as in traditional descriptions of the phenomenon. Rather, the GF direct object is defined by properties like having accusative case or, in the case of Mohawk, triggering agreement on V. Thus, if the syntactic configuration changes due to movement, it is not necessarily the complement NP of V but another category, namely Poss, that requires the status of a direct object.

In this section, we have briefly sketched how Baker's account of incorporation works. Noun incorporation is implemented as head movement. The head noun moves out of the object position and adjoins to the verbal head. This kind of head movement also enables possessor ascension inasmuch as it renders the NP₁ barrier transparent for the government relation between the verb and the possessor (NP₂) contained inside NP₁. This is needed to trigger processes that result in object properties of the possessor (φ -agreement). In this way, Baker derives the cross-linguistically robust tendency that possessor ascension depends on incorporation of the respective head noun.

3. *Noun incorporation in Mohawk*3.1. *The agreement pattern*

We have already seen a part of the empirical pattern of noun incorporation in Mohawk. But let us briefly repeat the relevant data in order to give a systematic overview. In structures in which the verb selects a direct object with a possessor, the GF changing of the possessor depends on whether the head noun incorporates or not. If the head noun stays in situ (cf. (11-a)), 'possessor ascension' (verbal agreement triggered by the possessor) is *impossible*, the verb can only agree with the head noun. If the head noun incorporates into the verb (cf. (11-b)), 'possessor ascension' *must* apply, agreement between the verb and the head noun is no longer possible.

(11) *Examples with a possessor:*⁵

- a. Iʔi k-ohres ne iʔi wak-nuhs-a?
 I 1SG.S/3NO-wash DET I 1SG-house.N-SUF
 'I washed my house' Baker (1988:101)
- b. Wa-hi-ʔsereht-anvhsko
 PAST-3MS/1SG.O-car-steal
 'He stole my car' Baker (1988:98)

⁵In (11-b), the possessor is not expressed overtly in contrast to (11-a). Mohawk is an object *pro-drop* language where the direct object can be dropped if it is pronominal (Baker 1996; Markman 2009). This is further evidence that the possessor behaves like the direct object if the noun has incorporated into the verb.

Let us turn to examples without possessors. The following examples show that if there is no possessor, the verb always agrees with the head noun of its internal argument regardless of whether it incorporates or not. In (12-a), the internal argument has not incorporated and the verb agrees with it. But in (12-b) the verb also agrees with it even though the internal argument has incorporated. (13) summarises the agreement pattern of Mohawk in cases of noun incorporation.

(12) *Examples without a possessor:*

a. Yao-wir-a?a ye-nuhwe?-s ne ka-nuhs-a?
 PRE-baby-SUF 3FS/3N-like-ASP the PRE-house.N-SUF
 ‘The baby likes the house.’

b. Yao-wir-a?a ye-nuhs-nuhwe?-s
 PRE-baby-SUF 3FS/3N-house.N-like-ASP
 ‘The baby likes the house.’

Baker (1988:81f.)

(13) *Agreement pattern of Mohawk*

If NP has *no* possessor, there is *always* agreement between the verb and the head noun regardless of whether incorporation occurs or not (cf. (12)).

If NP has *a* possessor,

either the verb agrees with the head noun and the head noun with the possessor and there is no incorporation (cf. (11-a))

or the verb agrees with the possessor, the head noun *does not* agree with the possessor and the head noun is incorporated into the verb (cf. (11-b)).

The other two logically possible patterns in structures with a possessor in the NP are excluded (V-N-agreement with incorporation and V-Poss-agreement without incorporation). Put differently, the pattern can be condensed to the following formula when there is a possessor in the NP. This observation will be crucial for our analysis.

(14) *Agreement rule in Mohawk*

If the head noun incorporates it cannot agree with the possessor.

Baker (1988) can derive the fact that N-V-agreement is impossible under noun incorporation in structures with a possessor. In order to do so, he assumes that NPs have to pass a Case filter⁶ (Rouveret & Vergnaud 1980; Chomsky 1980, 1986b), i.e., in Mohawk, they must trigger agreement on a head in order to be visible at LF. Baker stipulates that incorporation, i.e. head movement, is one way to pass the Case filter. Furthermore, he implicitly assumes that V can only agree with one category — NP or Poss — and that the incorporated N cannot agree with Poss. Now, if in a structure with a possessor, the incorporated head noun would agree with V, Poss would not pass the Case Filter since it has not triggered agreement on any category. Thus, the only possibility is that the possessor agrees with the verb in structures with incorporation. In this case NP satisfies the Case Filter because its head has incorporated.

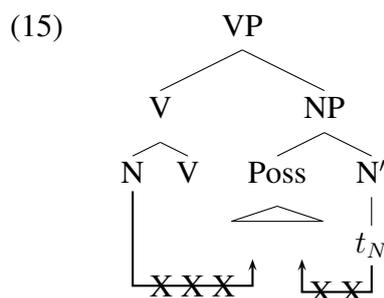
⁶The Case Filter or the Visibility Condition for NPs says that an NP is only visible on LF if it has Case (cf. Baker 1988:41).

However, since head movement is already sufficient to pass the Case Filter, Baker (1988) cannot explain why in structures without a possessor, agreement between N^0 and V is obligatory. Nevertheless, this crucial generalisation about the agreement pattern in Mohawk needs to be accounted for.

3.2. Challenges for Baker's analysis of NI in Mohawk

In the last section, we gave a summary of the noun incorporation data in Mohawk which will be the basis for our own account. But before we will start to outline our approach, we briefly discuss some of the problems and possible criticisms of Baker's analysis.

Let us begin with the critique of formal properties of his account. The first criticism is that Baker has to stipulate that neither the trace of the dislocated head noun nor the dislocated head noun itself can assign case to the possessor.⁷ If they could, the possessor would get genitive Case from the head noun and the verb would assign Case to the head noun after the head noun has incorporated. This is a pattern which is not attested in Mohawk because if the head noun incorporates, the verb must agree with the possessor or put as in (14), the noun cannot agree with the possessor. Take a look at the following tree. It shows the situation after incorporation has applied.



The question is now why neither the trace nor the head-moved element can assign genitive Case to its possessor. Basically, there is no obvious reason why this should be prevented. First of all, according to Baker's definition of government, N should be able to govern the possessor from its landing site because the NP barrier is broken up. Note further that the incorporated N and V have the same distance to the possessor since N and V c-command each other such that locality does not explain either why the incorporated N cannot assign Case to the possessor. There is also no independent reason why the trace of N should not enter into a relation with the possessor. Baker has identified these problems himself and he has given the following (stipulated) constraints:

(16) *Case Frame Preservation Principle:*

A complex X^0 of category A in a given language can have at most the maximal Case-assigning properties allowed to a morphologically simple item of category A in that language. Baker (1988:122)

(17) Traces cannot assign Case.

Baker (1988:99)

⁷In the following discussion, we follow Baker in that 'Case' stands for abstract case which can be realised language-specifically by morphological 'case', agreement marking on the Case assigner or positioning of the Case-marked phrase in relation to the Case assigner (cf. Baker 1988:115). Since in the case of Mohawk, accusative 'Case' is realised by agreement between the direct object and the verb, we use the terms Case assignment and agreement interchangeably.

The Case Frame Preservation Principle basically says that a head keeps its Case-assigning properties when another Case-assigning head adjoins to it, viz. the number of Cases that the target head assigns is not augmented. In our case that means that the verb still assigns only accusative Case even if a head noun which assigns genitive Case has incorporated into it. Hence, the Case-assigning property of N depends on its position in the syntactic structure. The second constraint ensures that the trace of a moved N does not bear the Case-assigning property of N. Whether this is plausible or not probably depends on how the Move α operation is implemented.⁸

A final stipulation Baker has to make is that head movement suffices to satisfy the Case filter. This stipulation is crucial for Baker since without it, he cannot derive the fact that agreement between V and Poss is possible if the head noun has incorporated into V. If incorporation would not satisfy the Case filter, NP would get no Case if V agrees with Poss or Poss would get no Case if V agrees with N.

As we have already indicated in the previous section, the last point of our critique concerns the point that Baker's theory can derive most of but not the whole agreement pattern in Mohawk. As far as we can see, at least for Mohawk his theory does not make the right predictions in all cases. We have seen how his approach elegantly accounts for the fact that the verb can agree with the possessor under noun incorporation: if the head noun incorporates, the NP being a barrier is no longer opaque for government from the verb. Furthermore, he can explain why V can no longer assign Case to the incorporated head noun in structures with a possessor. However, his analysis makes the prediction that N-V-agreement in structures without a possessor is at most optional.⁹

4. Analysing NI in a Minimalist framework

4.1. Problems with transferring Baker's theory to a Minimalist framework

Up to this point we have discussed the data of noun incorporation in Mohawk and Baker's approach to derive them. We have seen that his analysis heavily relies on the GB framework in which it was formulated and that it needs some stipulations to work. In this chapter, we are going to discuss in detail which parts of the analysis can be maintained and which must be adapted if one wants to transfer Baker's analysis to a Minimalist framework. In doing so, we are paving the way for our own account which will be presented afterwards.

Before laying out the problems of transferring Baker's analysis to Minimalism, it is necessary to summarise some basic assumptions of recent developments of this framework (Chomsky 1995, 2000, 2001, 2008). First of all, syntactic structure unfolds bottom-up by alternating applications of the basic operations Merge, Move and Agree. These operations are in accordance with the *Strict Cycle Condition* (Chomsky 1973) in (18) and as the derivation is generated step by step, there can be no look-ahead to items which are not merged at a certain point of the

⁸When using a Move α operation which involves actual movement of the head noun including all its features as indicated in (15) and when Case can only be assigned at S-structure, (17) can probably be derived in a quite plausible manner but under the assumption that movement involves copies (cf. the discussion in Chomsky 1981:89), (17) seems completely ad hoc.

⁹Note that if Baker stipulated that also Case assigners must pass a kind of Case Filter, i.e., they must assign their Cases, he could solve the latter problem.

derivation. All syntactic operations are feature-driven. Furthermore, the operations are guided by the *Earliness Principle* (Pesetsky 1989) which demands that an operation applies as soon as possible, i. e. as soon as the preconditions for the operation are met.

(18) *Strict Cycle Condition* (Chomsky 1973):

- a. No operation can apply to a domain dominated by a cyclic node α in such a way as to affect solely a proper subdomain of α dominated by a node β which is also a cyclic node.
- b. Every XP is a cyclic node.

A crucial difference between GB and Minimalism is that the latter has disposed with the notion of distinct syntactic levels of representation. D-structure and S-structure have amalgamated into incremental structure building in which the basic operations may freely apply and interact. According to Baker, such a framework seems incompatible with his theory of incorporation which he also understands as a good argument for the distinct levels of representation. Consider the following quotation (Baker 1988:428, emphasis added):

‘The status of D-structure [...] has been attacked from many perspectives. Lexical-Functional Grammar, Generalised Phrase Structure Grammar, and others dispense with such a level entirely, and GB theorists have explored the possibility of deriving it from S-Structure [...]. *Such approaches will be hard pressed to replicate or supersede the explanatory results of this work* in terms of lexical rules, linguistic meta-rules, or chain formation algorithms, without losing the essence and/or the elegance of the claim that there are no transformations that map syntactic structures onto other syntactic structures. *Thus, the existence and importance of D-Structure as a level of linguistic representation is reestablished by the theory of Incorporation.*’

One major advantage of a system that postulates something like Deep Structure as well as Surface Structure is that syntactic operations can be ordered by stipulating that they apply on different levels of grammar: at D-structure, S-structure or between D and S-structure.

In a Minimalist framework, there are no different levels of representation which lead to an order of operations. Hence, the order of Move and Agree (the Minimalist operations which lead to incorporation and agreement) must additionally be stipulated if Baker’s analysis is transferred one-for-one to Minimalism. In GB, movement applies between D-structure and S-structure while Case assignment is said to happen at S-structure. Thus, movement necessarily precedes Case assignment with the result that the verb can potentially agree with the possessor after the NP barrier is broken up by noun incorporation. This explanation, however, is not tenable in a Minimalist framework. Rather, in Minimalism, the relative order of most operations is regulated by the *Earliness Principle*.¹⁰ In conjunction with incremental structure-building it forces agreement between N and Poss if the latter is selected by N. The reason is that there is a stage of the derivation where N has merged with Poss and NP is projected but V has not been merged yet:

(19) [NP POSS N]

¹⁰In certain cases it is unclear how to time two operations. If, e.g., a head has to Agree with two different categories, it is unclear which Agree operation applies first such that an extrinsic ordering is necessary. In the derivations below, such situations will not occur, i.e., we can derive the empirical data without help of an extrinsic ordering.

In this configuration, Agree between N and Poss is possible and given *Earliness*, it is forced. Hence, there is no way to get Case assignment between V and Poss because Poss is already Case-marked by N, i.e. V comes too late. If N always has to agree with Poss, it makes the wrong prediction that there could be a pattern in which N agrees with the possessor, consequently the verb agrees with N and N incorporates. This is, however, not attested, cf. 3.1. Baker could avoid early agreement between N and Poss because Case assignment/agreement applies at S-Structure after incorporation, so that V and N are both possible governors of Poss. Such a postponement is impossible in Minimalism given *Earliness*. Furthermore, even if one stipulated that agreement can be postponed to a point at which V is merged, an Agree relation between N and the possessor (which should be established if N does not incorporate, cf. 3.1) is impossible because of the *Strict Cycle Condition*. If the V head has already merged and projected the verb phrase, N can no longer assign Case to its sister Poss because this operation would affect the cyclic node NP which is dominated by a projection of V. So, the core problem is that at the point when NP is generated, it is not clear whether incorporation will apply later on or not.

The main question for a Minimalist analysis is thus how the delay of Case assignment within NP can be mimicked if (i) look-ahead is impossible and if (ii) the *Earliness Principle* and the *Strict Cycle Condition* hold.

Another problem for a Minimalist analysis is that in Minimalism, all operations are feature-driven (cf. the framework of Müller 2010).¹¹ This concerns especially the incorporation movement of N to V. Baker does not explicitly speak of a trigger for this movement but within the course of his discussion, it seems that in his understanding, the phonological form of the nominal head triggers movement. If N^0 is realised by a bound affix, it is bound to move to V. In a framework that assumes a postsyntactic realisational morphology (Halle & Marantz 1993), the phonological form of a head cannot be taken as a trigger for its syntactic behaviour. Rather, the trigger must be a formal feature which triggers displacement of elements. We assume that this feature is a probe feature, represented as [$*X*$] in the example below, which triggers an Agree relation, cf. the remarks in section 4.2. Basically, there are two different possibilities where the trigger could be located, namely (i) on the attracting head V (attracting movement, cf. (20-a)) or (ii) on the moving head N (greedy movement, cf. (20-b)).

- (20) a. *Trigger on the higher head* b. *Trigger on the lower head*
- ```

graph TD
 Y["Y[*X*]"] --- XP
 Y --- X1["X"]
 XP --- X2["X"]
 XP --- NP

```

```

graph TD
 Y --- X
 Y --- XP
 X --- X2["X[*X*]"]
 X --- NP

```

Neither of these options is per se to be preferred. The second one (21-b) is closer to what Baker (1988) assumes because the relevant phonological properties that trigger incorporation in his analysis are located on the lower head. We will follow him inasmuch as we locate the trigger on the lower head, too. The reasons for this assumption will become clear when we outline our analysis. We will then also discuss the exact nature of the trigger.

<sup>11</sup>An anonymous reviewer pointed out that this assumption is not adopted in Minimalism per se. See Boeckx (2010); Chomsky (2010, 2011) for non-feature-driven approaches.

The discussion so far has shown that if Baker's analysis is to be transferred to Minimalism, there are three tasks to be fulfilled: First, the technical problems which arise due to the different background assumptions of GB and Minimalism have to be solved; second, the stipulations that Baker needed as discussed in section 3.2 should be avoided, and finally, the empirical pattern laid out in section 3.1 is to be derived entirely.

#### 4.2. Background assumptions

In this section, we present our background assumptions for the Minimalist analysis of possessor advancement. Some of the technical problems discussed in the previous sections are solved by these assumptions alone. The empirical pattern is derived in section 4.3.

As already mentioned in 4.1, we draw on the standard Minimalist assumptions that (i) there are no distinct levels of representation, instead, the structure unfolds bottom up by alternating application of the basic operations Merge, Move, and Agree, (ii) all operations are feature-driven (Merge and Move are triggered by structure-building / c-selection features [ $\bullet F \bullet$ ], Agree is triggered by probe features [ $*F*$ ], for the notation see Sternefeld (2006); Heck & Müller (2007)), and (iii) syntactic operations are in accordance with the *Strict Cycle Condition* and the *Earliness Principle*.

Since in Baker's analysis of incorporation, the notion of *Government* plays an important role for case assignment and agreement, we make use of the Minimalist operation *Agree* as defined in (21) which encompasses some of the properties of government.

- (21) *Agree* (cf. Chomsky 2000, 2001)  
between a probe P and a goal G obtains if
- a. P c-commands G
  - b. P has a feature [ $*F*$ ] and G has a matching feature F
  - c. G is the closest matching goal for P.
- and
- d. G is active due to a feature [ $\cdot M \cdot$ ] and P has a matching feature [M]
- Then [ $*F*$ ] on P gets checked and deleted and [ $\cdot M \cdot$ ] on G gets checked and deleted.

Closeness is based on asymmetric c-command between multiple potential goals:

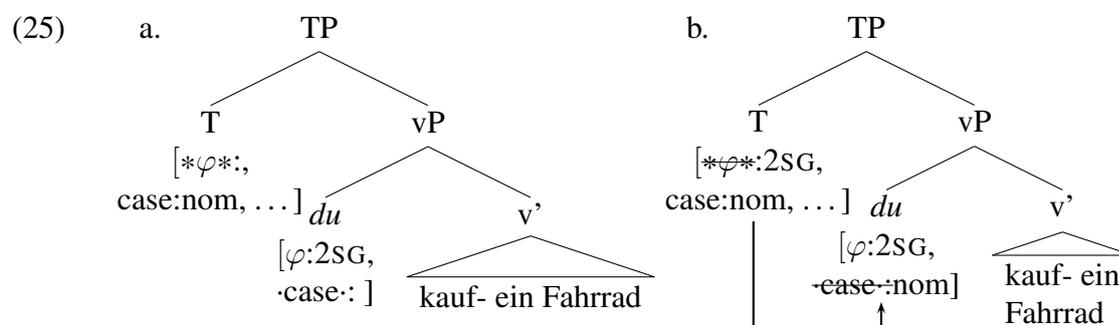
- (22) *Closeness*:  
In a configuration [P ... G<sub>1</sub> ... G<sub>2</sub>], G<sub>1</sub> is closer to P than G<sub>2</sub> if G<sub>1</sub> asymmetrically c-commands G<sub>2</sub>.

Agree is triggered by the principle of *Full Interpretation* (Chomsky 1986a; Chomsky 1995:27) which demands that all operation-triggering features (structure-building or probe features) must be checked at the end of the derivation, otherwise the structure cannot be interpreted at the interfaces.

- (23) *Full Interpretation*:  
A clause must not contain unchecked structure-building and/or probe features.

(24) provides a German sentence that exemplifies the definition of Agree in (21) for subject-verb agreement. This type of agreement is standardly analysed with a  $\varphi$ -probe on the functional head T (= P). This probe is checked by the  $\varphi$ -features of the subject in Specv (= G). The configuration fulfills all the conditions which are needed for Agree. Condition (21-a) is fulfilled since T c-commands the subject. Condition (21-b) is fulfilled because T needs to check  $\varphi$ -features while the subject has matching  $\varphi$ -features. Furthermore, the subject is the closest goal for the probe on T and it has an activating case feature [-case·] which finds a matching feature on T. Therefore, T can check its  $\varphi$ -probe and assign nominative case to the subject. The configuration is shown in (25).

(24) Du kaufst ein Fahrrad.  
 you.SG.NOM buy.2SG a bike  
 ‘You buy a bike.’



In addition to the definition in (21), we follow Heck (2010) in that the closest possible goal of a probe P on a head H is located on H itself. As Heck shows, G and P can be located on the same head if c-command is understood reflexively. This means that if there is a head H with a probe feature [ $*F*$ ] and a matching feature [F], these features enter into an Agree relation and are immediately satisfied and deleted.

(26)  $H [*F*, F] \longrightarrow H [*F*, F]$

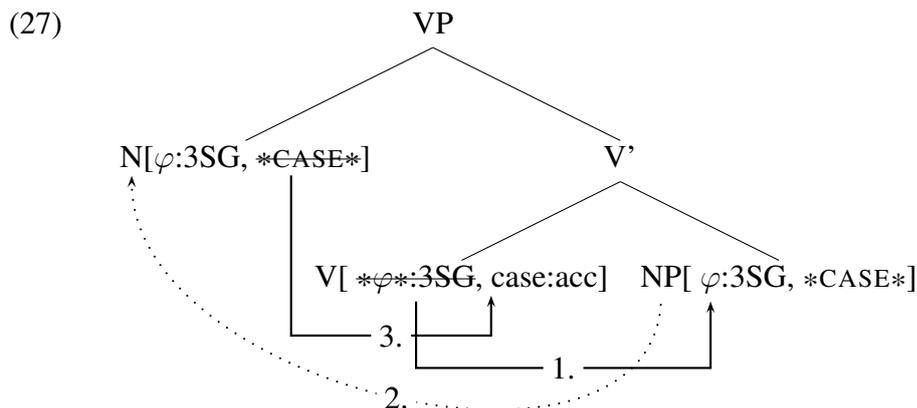
The next crucial assumption concerns the trigger of incorporation, i.e. movement of N to V.<sup>12</sup> In general, movement of an element X is triggered by the need to check an operation-triggering feature with an element Y. However, X cannot check these features in its base position and therefore has to move to a position where it c-commands Y (Fanselow 2002). For noun incorporation, we take the trigger to be a case probe feature [ $*CASE*$ ] on N, the motivation for this assumption will become clear in the discussion below. There are thus two different activating Case features [-case·] and [ $*CASE*$ ]. Note that N can have only one of them, it may never receive more than one. Like the Case feature [-case·], the Case probe feature [ $*CASE*$ ] must be checked to fulfill *Full Interpretation*. In contrast to [-case·], however, it cannot be discharged as a by-product of Agree, but must c-command a matching goal, which is located on a Case assigner. Since N with [ $*CASE*$ ] does not c-command a Case assigner from its base position (unless it is a Case as-

<sup>12</sup>Throughout this paper, we take nominal arguments to be NPs instead of DPs (arguments for DP have been suggested by Abney (1987) and are widely adopted nowadays). We also take the Case assigner for the internal argument and the element which introduces the external argument, respectively, to be V instead of v, although the latter is the standard assumption in the Minimalist literature. We do this to stay close to Baker's (1988) assumptions. A discussion of the consequences of these assumptions and those which obtain if DP and v were chosen is provided in section 5.

signer itself), the N head is forced to move to a position where it c-commands the closest Case assigner V.

Following Matushansky (2006), we assume that head movement is basically the same as phrasal movement. Thus, in contrast to Baker's approach where head movement leads to adjunction at the higher head, head movement targets a specifier of the head into which it incorporates, just like phrasal movement.<sup>13</sup> In contrast to Matushansky (2006), however, we assume that the difference between phrasal movement and head movement is not the difference between Agree and C-Selection but the location of the trigger, i.e., head movement of a head H is triggered by a feature [*\*CASE\**] on the very same head H (cf. Fanselow 2002). Due to post-syntactic rules such as morphological merger, the verbal head is later on fused with its specifier leading to a single unit which consists of a nominal and a verbal head, but this postsyntactic step is of no importance for our analysis. This means that the N head moves to a specifier of V from where it c-commands the Case feature on V and can check its Case probe [*\*CASE\**].

Since we have now laid down our basic assumption, let us go through a sample derivation of noun incorporation in Mohawk. For reasons of simplicity, let us look at a case without a possessor:



In (27), the verb selects an object which has a bundle of  $\varphi$ -features, in this case third person singular, and a probe Case feature [*\*CASE\**]. At first, the verb agrees with its object and checks the  $\varphi$ -feature probe [*\*φ\**]. If N had had a normal weak Case feature [*·case·*], the verb could have checked N's Case feature as well. But since N has a probe Case feature, it moves to the specifier of V where it checks its Case probe.<sup>14</sup>

The final assumption concerns the lexical properties of N. We have already said that N can have one of two activating Case features, [*·case·*] or [*\*CASE\**], which must be checked. In addition, N can select a possessor or not because arguments of nouns are generally optional. This is encoded by the presence vs. absence of the c-selection feature [*•N•*] for a possessor of category N. Finally, we assume that the property of N to be a Case assigner, which is necessary for Case marking NP-internal arguments, must be optional since arguments of N are optional

<sup>13</sup>We follow Matushansky (2006) in that head movement is movement to a specifier only for concreteness. An adjunction analysis à la Baker (1988) or a fusion-style analysis as in Roberts (2008, 2010) would work as well. What is indeed important for our analysis is that the trigger for incorporation is located on the incorporating element itself and c-commands the case assigner V from its landing site.

<sup>14</sup>Note that we assume that Case features on Case assigners do not have to be checked.

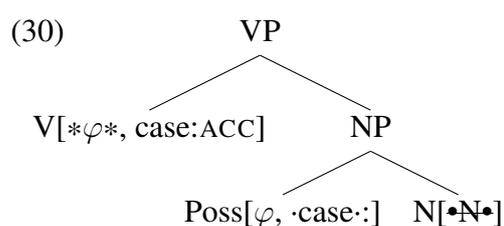
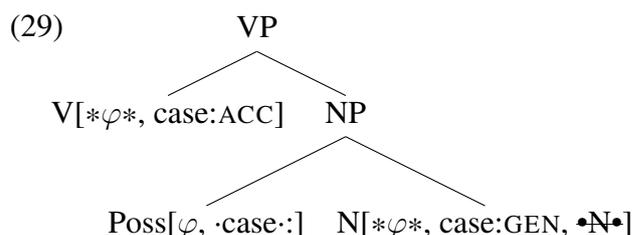
as well. If N was always a Case assigner but selected no argument, its case feature would be unchecked, and if N was never a Case assigner, its arguments would have no Case. This choice is encoded by the presence vs. absence of a Case value (in what follows this is the value GEN(itive) for the possessor) which goes hand in hand with providing a  $\varphi$ -probe [ $*\varphi*$ ] as Case assignment is defined as a by-product of Agree, cf. (21). Hence, there are three parameters which are independent of each other. This gives rise to eight different specifications of N.

(28) Possible specifications of N:

- I. N[·case·, case:GEN,  $*\varphi*$  ...]
- II. N[\*CASE\*, case:GEN,  $*\varphi*$  ...]
- III. N[·case·, ...]
- IV. N[\*CASE\*, ...]
- V. N[•N•, ·case·, ...]
- VI. N[•N•, \*CASE\*, ...]
- VII. N[•N•, ·case·, case:GEN,  $*\varphi*$  ...]
- VIII. N[•N•, \*CASE\*, case:GEN,  $*\varphi*$  ...]

As one can see from the fact that the N head has a [•N•] feature, cases (VI)-(VIII) are the ones with possessor and cases (I)-(IV) are the ones without. Cases (II), (IV), (VI) and (VIII) are the ones with a probe case feature which enables incorporation. And cases (I), (II), (VII) and (VIII) are the ones where N may assign genitive Case to its possessor.

With these background assumptions some of the problems discussed in the previous sections can automatically be solved. Let us start with the specification of N. Recall that we had to find a way to delay the assignment of genitive Case from N to Poss in some cases in order to be able to derive a configuration where V can Agree with Poss. Given the specifications of N in (28), it may be the case that N selects a possessor but does not provide a Case value for it (cases V and VI). When Poss receives no Case from N, it remains active for Case assignment from a head which is merged later on, e.g. the V head. The two trees below show the situation.



In both cases, N has a possessor but only in (29), it also has a Case-assigning genitive feature. In (29), the possessor is assigned genitive Case but in (30), it can in principle receive accusative Case assigned by the verb (depending on whether the head noun incorporates or not, cf. the derivations in section 4.3). Hence, there is no need to *postpone* Case assignment between N and the possessor (which is impossible given *Earliness*). Rather, in some cases, there is no Case assignment in the first place.

A second challenge for our analysis falls out from the assumptions about the feature specifications of N as well, and crucially, this is also the main motivation for assuming a Case feature

to trigger incorporation. Recall the empirical generalisation in (14) that if N incorporates, it cannot agree with the possessor. This is derived as follows: N can be a Case assigner or not and it can have a probe Case feature [*\*CASE\**] triggering incorporation or a Case feature [*·case·*] which is checked and valued as a by-product of Agree. In conjunction with the assumption that the goal for a probe can be located on the same head as the probe (Heck 2010), we can see that if N is a Case assigner and has a probe Case feature [*\*CASE\**], this probe Case feature is immediately satisfied by the valued Case feature [*case:GEN*] on N. Since [*\*CASE\**] is the trigger for incorporation, it follows that N which agrees with Poss, i.e., assigns genitive Case, can never incorporate, cf. the generalisation in (14) for Mohawk. This incompatibility of Case assignment and movement falls out if the movement trigger is a feature which is the counterpart of the valued Case feature, namely a probe Case feature, such that one checks the other and the checked feature cannot have an impact on the derivation. This is the empirical motivation for our assumption that the movement trigger is a Case feature.

A conceptual argument for the assumption that a Case feature triggers incorporation of a head into its case assigner is that in our view, this is a consistent extension of an already existing contrast. In some languages, long-distance case assignment is sufficient to assign Case, just like in the Finnish example in (31) where the case of the embedded object depends on whether the matrix verb is negated (only partitive case is possible) or not (accusative or partitive case possible). Case assigner and Case assignee can be separated by other elements. However, in a language like English, adjacency is a necessary condition for Case assignment (32).

(31) *Long-distance Case assignment*

- a. Pekka uskoi Merjan olevan syömässä leivän/ leipää  
 Pekka believed Merja be.VA eat.MA bread.ACC bread.PRT  
 ‘Pekka believed Merja to be eating bread.’
- b. Pekka ei uskonut Merjan olevan syömässä \*?leivän/ leipää  
 Pekka not believe Merja be.VA eat.MA bread-ACC bread-PRT  
 ‘Pekka did not believe Merja to be eating the bread.’ Brattico (2011:1055)

(32) *Case assignment under adjacency:*

- a. Poirot speaks English fluently.
- b. \*Poirot speaks fluently English. Haegeman (1994:178)

If languages differ from each other with regard to the locality domain of Case assignment, it is plausible that there is a third possible type, namely Case assignment under structural identity, i.e., within the same phonological word. These cases are generally known as cases of incorporation, as the example in (33) from Greenlandic Eskimo shows:

(33) *Case assignment under structural identity:*

- Suulut timmisartu-lior-poq  
 Søren.ABS airplane-make-3SG.S  
 ‘Søren made an airplane.’ Baker (1988:126)

To sum up, we have found a trigger for incorporation, we derived the generalisation in (14) and we found a way to ‘delay’ Case assignment to the possessor. What remains to be done is to show how the empirical pattern of agreement is derived and what stipulations of Baker (1988) can be avoided. To see how this is achieved we will go through all logically possible derivations

in detail in the next section. Recall that due to the three parameters on N (N selects a possessor or not, N is a Case assigner or not, N incorporates or not) there are eight possible specifications and thus eight possible derivations. The following table gives an overview of all eight cases and illustrates which properties are combined, compare (28). Furthermore, it is supplemented by the last column which indicates whether the specific case will result in an attested pattern (+) or not (-).<sup>15</sup>

(34) 8 cases:

|           | Poss? | [case:GEN]? | Incorp? | Attested Pattern? |
|-----------|-------|-------------|---------|-------------------|
| Case I    | -     | +           | -       | -                 |
| Case II   | -     | +           | +       | -                 |
| Case III  | -     | -           | -       | +                 |
| Case IV   | -     | -           | +       | +                 |
| Case V    | +     | -           | -       | -                 |
| Case VI   | +     | -           | +       | +                 |
| Case VII  | +     | +           | -       | +                 |
| Case VIII | +     | +           | +       | -/+               |

#### 4.3. The derivations

In the previous section, we have proposed that all empirical cases found in Mohawk can be derived by assuming different feature specifications on the head noun. We assume that the noun is specified for (i) whether it selects a possessor or not, for (ii) whether it assigns genitive Case or not and for (iii) whether it incorporates or not. By cross-classifying these three binary variables, we end up with eight possible cases. The basic idea is that all eight differently specified Ns can enter the derivation, but only some of the derivations converge, the others crash because they violate general conditions on feature checking (e.g. *Full Interpretation*) or on the application of syntactic operations (e.g. *the Strict Cycle*). The result is that the converging cases are exactly the ones which are attested patterns in Mohawk. Cases I to IV are those without a possessor, Cases V to VIII are the ones with a possessor.

##### CASE I:

In the first case, N has no possessor, it has no probe case feature [*\*CASE\**] and will thus not incorporate. However, it assigns genitive Case. In this derivation V can agree with N and assign accusative Case to it, but there is no NP which can receive the genitive Case from the head noun by  $\varphi$ -Agree with N. The derivation thus crashes because of a violation of *Full Interpretation* (cf. (23)): the  $\varphi$ -probe on N is unchecked.

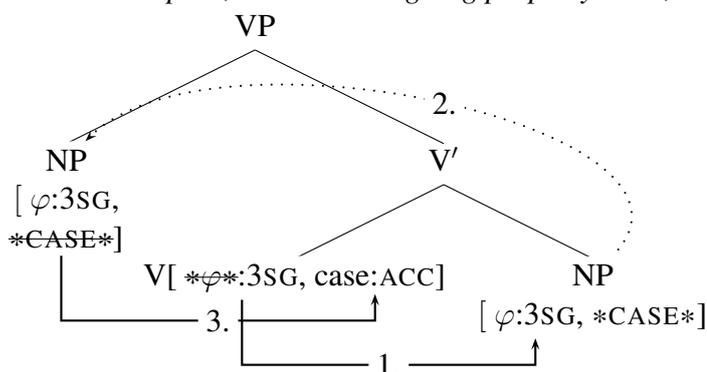
<sup>15</sup>The table in (i) implies that Case VIII is a special case here yielding a pattern that is at the same time attested and unattested. Since the feature specification combines a feature [*\*CASE\**] with a  $\varphi$ -probe, one would predict that incorporation applies together with genitive Case assignment. This pattern would be unattested. But as will become clear in the next section, only genitive Case assignment but no incorporation occurs. This pattern is in fact attested.



CASE IV:

In this case, N has no possessor, it does not assign Case but it has a probe Case features and will thus incorporate. There are two possible ways to run the derivation. In option (i), the first step is the incorporation of N into V. This derivation crashes because afterwards, V cannot agree with N and check its  $\varphi$ -probe because Agree requires that the probe c-commands the goal which is not given if N has incorporated into V and is located in SpecV. Hence, the unchecked  $[\ast\varphi\ast]$  causes a violation of *Full Interpretation*. Option (ii) is that first V and N agree whereby the  $\varphi$ -probe on V is checked. In a second step, N moves into the specifier of V where it checks its probe Case feature. This derivation converges because all probe features are checked.

(38) Case IV: no poss, no Case-assigning property on N, incorp

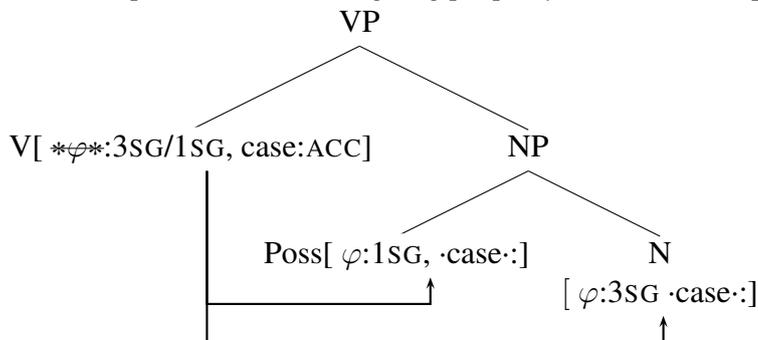


CASES I to IV instantiate all possible combinations without a possessor. What we have derived is the first part of the empirical generalisation in (13): if there is no possessor the verb agrees with the head noun regardless of whether incorporation applies or not (cf. cases III and IV).

CASE V:

N selects a possessor. However, it neither assigns Case nor does it incorporate. This derivation is bound to crash because there is only one Case assigner, namely V, but two Ns which need Case, namely the possessor and the head noun. One of the nominal elements cannot check its Case feature because V is saturated and inactive after Agree with the other nominal element. Again, *Full Interpretation* is violated by one of the two  $[\ast\varphi\ast]$ -features.

(39) \*Case V: poss, no Case-assigning property on N, no incorp:

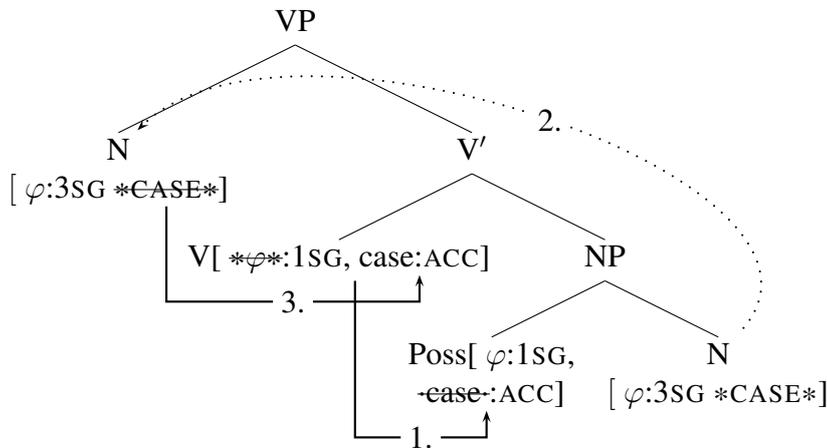


CASE VI:

N selects a possessor but does not assign Case; it has a probe Case feature, i.e. it incorporates. There are two ways to run the derivation because since N cannot Agree with Poss, both N

and Poss are possible goals for V given that none is closer to V than the other (N and Poss c-command each other, hence there is no asymmetric c-command between them and they are equally close to V, cf. (21) and (22)). In option (i), V agrees with N and N values V's  $\varphi$ -probe, N is assigned accusative Case. Afterwards, N incorporates. This derivation crashes because the possessor, being an NP, also needs a Case value via  $\varphi$ -Agree. But as N has saturated the  $\varphi$ -probe on V, the possessor cannot agree with V and the feature [-case·] of the possessor is unchecked. Option (ii) is that V agrees with the possessor which is assigned accusative Case and values the  $\varphi$ -features on V. The head noun incorporates and thereby checks its probe Case feature. The result of this derivation is the classical possessor ascension structure:<sup>17</sup>

(40) Case VI: *poss, no Case-assigning property on N, incorp*:



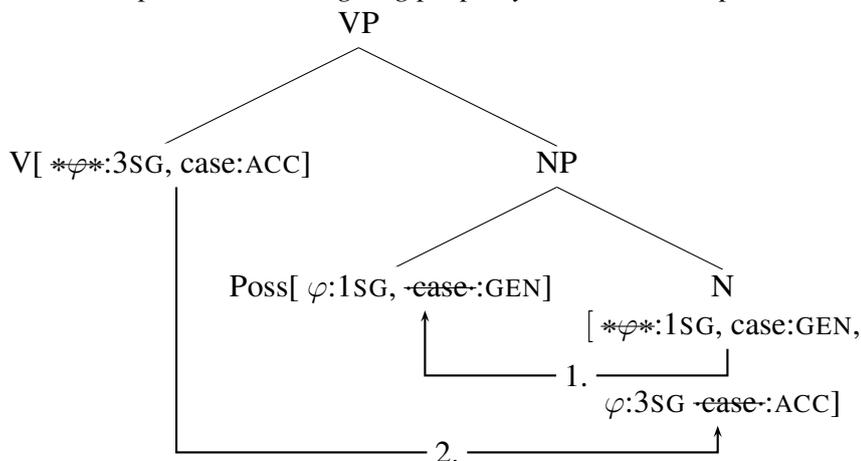
CASES V and VI only differ in the Case feature on N ([-case·] vs. [ $\text{*CASE*}$ ]), i.e., with respect to whether N incorporates or not. In both cases, V can potentially agree with the possessor because there is no NP-internal Agree between N and Poss given that N has no Case to assign. What is derived is that if the verb agrees with the possessor, the head noun *must* incorporate (Case VI) otherwise it would keep an unvalued case feature (Case V).

#### CASE VII:

In this case, N selects a possessor, it assigns Case and has no probe Case feature, i.e., it will not incorporate. This derivation converges: first, before the verb has even entered the derivation, the N head agrees with the possessor and assigns genitive Case to it, N bears the  $\varphi$ -features of the possessor. As a result, the possessor is saturated and thus inactive for further Agree so that V can only agree with N in the second step. V's  $\varphi$ -probe is checked by N and N receives accusative Case. This is the classic configuration with a possessor but without incorporation: N-Poss-Agree, V-N-Agree.

<sup>17</sup>For sake of convenience, we assume a simple NP structure where Poss is the sister of  $N^0$ . We are aware of the fact that the structure might be more complex than we have indicated in our trees, i.e., it may include further projections, but the point of the argument stays the same: if Poss is merged in a higher position and asymmetrically c-commands  $N^0$ , option (i) becomes impossible. Instead option (ii) would be the only possible derivation. See section 5 for further discussion.

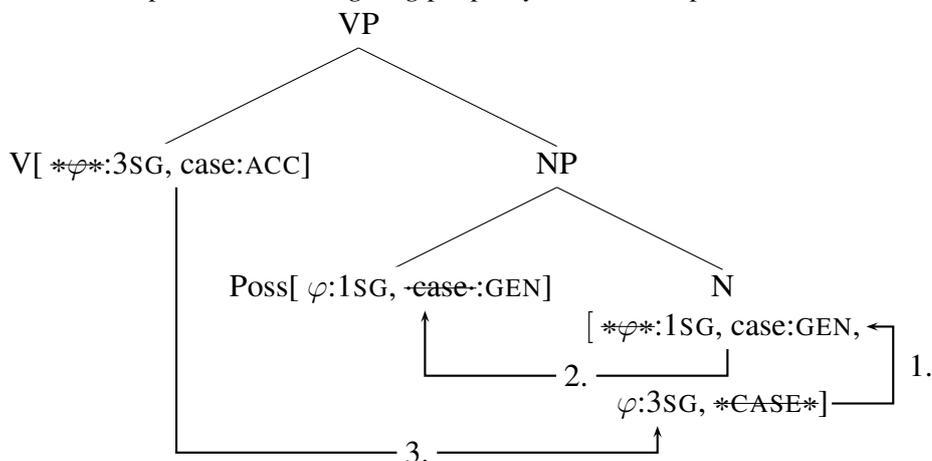
(41) Case VII: *poss*, Case-assigning property on N, no incorp:



CASE VIII:

In the final case, N selects a possessor, assigns Case and has an incorporation-triggering probe Case feature. At first sight, it seems that this derivation can converge: first, N and the possessor agree so that the latter is assigned genitive Case and N bears the  $\phi$ -features of the possessor. Then, V agrees with the remaining goal N and assigns accusative Case to it. Finally, N incorporates to check its probe Case feature. This would derive a pattern with V-N-Agree, N-Poss-Agree and incorporation. However, such a pattern is not attested; the two latter operations contradict the generalisation in (14). But note that this contradiction does indeed not arise because one important step in the derivation just sketched is missing. Recall that the closest goal for a probe can be located on the same head as the probe. This is exactly the situation for the Case probe on N. Since N is also a Case assigner, viz. provides a Case value [case:GEN], the Case probe on N is already satisfied before the derivation starts (cf. CASE II in (36)). As a result, N cannot incorporate — the trigger for this movement is already checked and deleted. After this initial step, the derivation is identical to (41). At first, N assigns genitive Case to its possessor, afterwards it agrees with V. Thus, the derivation coincides with CASE VII, the outcome looks as if there has never been a movement-triggering feature in the first place.

(42) Case VIII: *poss*, Case-assigning property on N, incorp



CASES VII and VIII only differ in the Case feature on N ([·case·] vs. [\*CASE\*]), i.e., with respect to whether N incorporates or not. What is derived is that if the V-N-Agree is forced due to the deactivation of the possessor by N-Poss-Agree, N *must not* incorporate, cf. the generalisation in (14). Incorporation is excluded because the movement-triggering feature is deactivated by the Case value N provides for the possessor and it thus never has an effect on the derivation.

At this point, it becomes clear that the converging cases cover the complete paradigm of noun incorporation and possessor ascension in Mohawk, whereas the crashing derivations are the cases which would lead to an unattested pattern. The only exception to that rule is case VIII which does not crash but whose converging outcome coincides with case VII. Although both derivations have a different input, the resulting output is identical. N-Poss-Agree and incorporation of N can never cooccur in a derivation due to the early checking relation between the two features which trigger these operations. We have thus derived the full pattern of agreement under noun incorporation in Mohawk as presented in section 3.1.

#### 4.4. *Advantages of the present analysis*

In this section, we briefly summarise the achievements of our analysis of possessor advancement.

First of all, we have shown that the problems which arise due to the different background assumptions of GB and Minimalism can be solved. We provided an account of the facts in a strictly derivational framework without multiple levels of representation, something which Baker believed to be impossible. Second, we defined a trigger for incorporation which was necessary because in Minimalism, all operations are feature-driven (cf. fn. 11). We followed Baker in that the trigger for incorporation is a property of the head noun, not of the attracting head. We have taken it to be a probe Case feature which forces the head noun to move into the specifier of its Case assigner. This allows us to derive the connection between incorporation and N-Possessor-Agree in (14). In Baker's approach, incorporated nouns do not need Case because he stipulated that incorporation is another way to satisfy the Case filter. In the present approach, incorporated Ns check their probe Case feature via incorporation. Third, the core problem, namely the postponement of Case assignment to the possessor is solved because N only *optionally* assigns Case. If N does not assign Case, the possessor can be a goal for Agree with the higher head V which is merged later. If N does assign Case, this assignment still happens as soon as possible in accordance with the *Earliness Principle*.

Furthermore, we can avoid several stipulations Baker had to make. First, we do not have to assume that traces or — their Minimalist counterpart — copies of the moved noun cannot assign Case since it falls out from the analysis that if N incorporates it cannot be a Case assigner in the first place (because the valued Case feature deletes the incorporation-triggering feature before the derivation starts). If N is not a Case assigner, then it is obvious that the lower copy / the trace of N is also not a Case assigner.

The second stipulation of Baker, the *Case Frame Preservation Principle* in (16) which states that the incorporated item loses its ability to assign Case, follows automatically in our analysis in the same way: If N incorporates, it cannot be a Case assigner in its base position and thus also not in its landing site.

Finally, we have derived the complete empirical agreement pattern of noun incorporation in Mohawk. Baker did not explicitly discuss why some cases of the pattern are not derivable in his system.

### 5. Problems and open questions

In this section, we shortly discuss possible problems and questions for the analysis of section 4.

#### *Structure of nominal phrases:*

The first discussion concerns the structure of nominal phrases. Above, we have assumed that nominal phrases are headed by N in contrast to theories that assume nominal phrases are headed by a functional head D. Such a structure would be incompatible with our analysis because in a DP structure, the Case feature would have to be located on D given that DPs are phases (cf. Svenonius 2004; Heck & Zimmermann 2004). Therefore, the feature [\*CASE\*] ceases to be a trigger of N-movement. In addition, either the interaction between the feature [\*CASE\*] and the feature [case: gen] is lost if the Case-assigning feature [case: gen] is still located on N, or wrong empirical predictions are made: instead of nouns, determiners would incorporate into verbs. This, however, is not possible as the sentence in (43) shows. Demonstratives, which are standardly analysed to be D elements, must be stranded by noun incorporation.

- (43) a. Ka-ravk thikv ka-nuhs-a?  
           3N-white that PRE-house.N-SUF  
           ‘That house is white.’  
       b. Ka-nuhs-rakv thikv.  
           3N-house.N-white that  
           ‘That house is white.’
- Baker (1988:97)

However, recent work has shown that the facts which were thought to argue for the DP hypothesis can also be derived by means of an NP structure if certain assumptions are made. See Bruening (2009); Georgi & Müller (2010) for independent arguments for an NP structure of nominal phrases.

A second putative problem for our account are theories in which possessors are selected by heads other than N. Especially if possessors do not get Case from N but from some other category, the generalisation that N does not incorporate if the possessor has genitive case seems to be lost. Note, however, that our theory predicts that N would incorporate into this head which is empirically confirmed by the data in Mohawk, where agreement with the possessor shows up as an affix at the head noun rather than as some independent particle. Thus, a more complicated structure for possessor construction is not necessarily incompatible with our approach.

#### *Argument structure:*

In standard Minimalist analyses, not V but v is the head that assigns Case to the direct object and V incorporates into v. Such a structure is compatible with our account of noun incorporation since there is at least one order of operations that leads to a converging derivation: (i) v agrees with Poss; (ii) V incorporates into v; (iii) N incorporates into V+v. Note that this order obeys

all the Minimalist assumptions made in section 4. We used a structure without *v* for the sake of simplicity.

*Incorporation in intransitive constructions:*

Empirically, the difference between unergative and unaccusative verbs concerning noun incorporation is that the only argument of unaccusative verbs can incorporate into verbs while the only argument of unergatives cannot do so (Baker 1988:82ff.). In our analysis, the only Case assigner in intransitive constructions is T — the minimalist equivalent of GB's I — which assigns nominative Case. The only argument of an intransitive verb has to incorporate into T. As far as we can see, such an incorporation should be possible for both unaccusative and unergative subjects. Therefore, the asymmetry between both kinds of intransitive constructions does not follow from our analysis. Note that Baker can derive this pattern but his solution is based on the assumptions that there is only *one* subject position, namely SpecI. Arguments in SpecI cannot incorporate into I or V since this movement would leave a trace that is not c-commanded by its antecedent (Baker 1988:83). However, if there is a subject position below I, (e.g. in theories which adopt a VP-internal subject position, cf. e.g. Kitagawa 1986; Kuroda 1988; Koopman & Sportiche 1991), the asymmetry between unergatives and unaccusatives cannot be derived in Baker's account either because nothing prevents the external argument from incorporating into I. To transfer the analysis to our Minimalist analysis, one would have to assume, that V/*v* rather than T assigns nominative Case. Thus, the generalisation about intransitive verbs is neither derived by Baker's mechanism of incorporation nor by ours. The success of the respective analyses solely depends on the existence of a low subject position.

## 6. Conclusion and outlook

The main aim of this paper was to examine whether Baker's (1988) approach to possessor advancement can be transferred to a derivational Minimalist framework that obeys the *Strict Cycle Condition* (Chomsky 1973) and the *Earliness Principle* (Pesetsky 1989). According to Baker, his approach cannot be transferred to a syntactic framework without distinct levels of syntactic representation such as GB's D-structure and S-structure. However, as far as we can see, this claim can be refuted since the approach presented in this paper is not only able to transfer the major ideas of Baker to a more modern derivational framework without distinct levels but it also derives the empirical pattern of noun incorporation in Mohawk more accurately. Of course, a few adaptations were necessary because a simple copying of Baker's mechanisms leads to several technical problems, for example the 'timing problem' which appeared since Minimalism does not allow the delay of operations such as Case assignment to a later step in the derivation. We provided solutions to these problems which are in line with standard Minimalist assumptions. In addition, the stipulations Baker has to make in order to make his account work can be avoided in the Minimalist reanalysis.

Of course, Baker's (1988) analysis of noun incorporation and possessor ascension in Mohawk was just a small part of his comprehensive approach to a big set of incorporation phenomena in the world's languages. A main aim of his theory was to relate every grammatical function changing process to a specific type of incorporation such as causativisation to verb incorporation

and applicativisation to preposition incorporation. So the question arises whether our Minimalist reanalysis of Baker's approach can in principle be transferred to these phenomena as well. We think that this should be possible given the observation that all of the categories that, according to Baker, may incorporate into the next higher verb, are also Case assigners, namely verbs, prepositions and nouns. Our analysis makes use of this fact by assuming that Case assignment and incorporation cannot cooccur and the same holds for causativisation and applicativisation. However, a few adaptations probably have to be made since verbs and prepositions are usually not Case-marked; only N is. These GFCEs definitely deserve closer investigation with respect to our analysis of noun incorporation.

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# Towards a novel analysis of *was-für-split*

Andreas Blümel

In this paper I address a number of issues related to the *was-für*-construction in German. I suggest a route to an analysis that is not construction-specific but reflects independent properties of the grammar such as phases (syntax), information structure and the postsyntactic realization of inherent case as prepositions (PF). In combination these aspects yield a more natural picture and a better understanding of certain features of this construction than do analyses which rely on syntax alone.

## 1. Introduction

The aim of this paper is to give a descriptive account of several aspects of the *was-für*-construction in German (WF from here on), including syntactic, morphological and information structural ones. I indicate directions for an analysis and provide new data that support and motivate taking this avenue. Previous analyses are discussed, and it is shown that almost none of them successfully derives some of the core properties of WF; it will turn out that those that come closest to achieving descriptive adequacy fail on other grounds, namely plausibility and predictions the data do not bear out.

A successful analysis needs to meet standards of plausibility as well as parsimony, and should employ as few stipulations (optimally none) and descriptive technology as possible. Maybe it is not surprising that the descriptively most successful analyses involve intricate structures and derivational complexity. However, richer empirical coverage is neither an aim in itself nor is it a standard of explanatory success. A more ambitious aim, rather, is a principled account that derives many of the observable properties of a construction from features of the C-I and the AP interfaces, while showing that syntax meets its demands in an optimal manner (the Strong Minimalist Thesis SMT, cf. [Chomsky 2001](#) and subsequent works). I show that despite their empirical coverage the analyses in question involve implicit assumptions that render the theory of syntax unnecessary and unwarrantably complicated. By contrast, the (rather pluralistic, seemingly non-uniform) analysis advocated here relies on independently motivated principles and theories. While the ideas presented here cannot account for the most puzzling property of

the construction, namely the (apparent or real) optionality of the split, I hope to convince the reader that many of the residual features can be explained away and derived in simple ways.

It is to be hoped that accounts that take into account interface conditions outscope previous accounts in depth but also in quality in that they are more natural, more intuitive and more comprehensive (including as many linguistic dimensions as possible, i.e. not just syntactic, but also morphological, phonetic and phonological, as well as semantic and information structural properties).

This paper is organized as follows: after describing core aspects of this construction in section 2, I present and discuss previous analyses in section 3. In section 4 I show that the theory of phases helps to understand amelioration of intervention effects and how cases of PP-embedding can be handled if we assume that prepositions are realized postsyntactically. Section 5 finally briefly concludes the paper.

## 2. Core properties of the WF construction

WF (‘what kind of’) is a construction that features a WH-element and a remainder which for expository purposes<sup>1</sup>, which I will call restriction:

(1)  $[_{Wh} \text{ was}] [_{Restriction} \text{ für ein Mantel}]$

The term restriction really denotes the restriction by the kind-component conjoined with the head noun; semantically, the WH-operator binds two variables. The predicate of the first variable is ‘kind’, and the one of the second variable is the property denoted by the indefinite DP (cf. [Pafel 1996](#)). A simplified schematic representation looks like this:

(2) WHICH x [KIND (x)  $\wedge$  COAT (x)]

The term WF-*split* expresses the fact that *was* and the restriction may optionally surface discontinuously in a number of sentential constructions such as WH-questions (3-a)/(3-b) and exclamatives (4-a)/(4-b):

- (3) a. Was hast Du für einen Mantel?  
 what have you for a coat  
 ‘What kind of coat do you have?’  
 b. Was für einen Mantel hast Du?  
 what for a coat have you
- (4) a. Was Du (doch) für einen tollen Mantel hast!  
 what you PRT for a nice coat have  
 ‘What a nice coat you have!’

<sup>1</sup>As nothing in particular hinges on this and since I am mostly concerned with “external” properties of the construction, I am not committed to an internal constituent structure here. For subtle evidence in favor of an analysis in which *was* and *für* form a complex phrasal determiner constituent to the exclusion of the indefinite article and the head noun, cf. [Leu \(2008a,b\)](#) and [Lohndal \(2010\)](#). For a contrary view, cf. [Corver \(1991\)](#) and [Pafel \(1996\)](#).

- b. Was für einen tollen Mantel Du (doch) hast!  
 what for a nice coat you PRT have

Historically, the WF-construction presumably appears no earlier than new high German (Götz Keydana, p.c.). Grimm (1984:653/654) note that sometimes WF comes with a genitive nominal, as the bare form *was* sometimes does, too (i.e. without *für*). Significantly, in almost none of the older examples does pied-piping take place, i.e. close to all examples are split, while in the more recent ones (18<sup>th</sup> century) the continuous variant does show up. This might hint at the possibility that the continuous variant WF+N as a complex WH-expression developed only by time (maybe by reanalysis of the bare simplex WH-word with a true *für*-adverb (a PP)).

In the following presentation of descriptive properties of the WF-construction I rely predominantly on observations by Pafel (1996) except where indicated.

### 2.1. Distribution

Arguments of the WF-construction exhibit the following distribution: they are nominative and accusative arguments (5), as well as oblique-case bearing (6). The oblique case must be morphologically identifiable in the lexical DP (7), for instance, *beschuldigen* ‘accuse of’ assigns genitive case to the argument, which must be morphologically transparent - the deviance of (7-a) is rescued when the WH-determiner with morphological case *welch-er* ‘which’+GEN is inserted (8)<sup>2</sup>:

- (5) a. Was für Leute lesen solche Bücher?  
 what for people read such books  
 ‘What kind of people read such books?’  
 b. Was für Bücher lesen diese Leute?  
 what for books read these books
- (6) a. Mit was für einem Typen ist die unterwegs?  
 with what for a:DAT guy:DAT is she on-her-way  
 ‘With what kind of guy is she on her way?’  
 b. Angesichts was für eines Wetters die Leute schon nicht mehr zur Arbeit gehen!  
 in-the-face of was for a:GEN weather:GEN the people already not any-more to work go  
 ‘Impressive, in light of what kind of whether people start already quitting going to work!’
- (7) a. ?\*Was für Verbrechen wird er beschuldigt?  
 what for crimes is he accused-of *beschuldigen*+GEN  
 b. ?\*Aufgrund was für Vorfälle ist er verhindert?  
 because-of what for incidents is he unavailable *aufgrund*+GEN
- (8) Was für welcher Verbrechen ...

<sup>2</sup>These cases resemble postnominal genitives discussed in Bayer et al. (2001:2/3), which must never be bare, but whose case either needs to be morphologically realized, or which can be rescued by insertion of a preposition. As they rightly note “the dependent NP needs to be functionally licensed.”

The preposition-like element *für* doesn't assign case:

- (9) Peter hat das Geschenk für einen Freund gekauft.  
P. has the present for a:ACC friend:ACC bought.  
'Peter bought the present for a friend.'
- (10) \*Mit was für einen Typen ist die unterwegs?  
With what for a:ACC guy:ACC is she on-her-way
- (11) \*Angesichts was für ein Wetter die Leute schon nicht mehr zur Arbeit gehen!  
In-the-face of was for a:ACC weather:ACC the people already not any-more to work go

Embedding under PPs is possible in German (though this is not possible in the WF-counterpart in, say, Russian (Arthur Stepanov, p.c.), a fact that needs to be accounted for):

- (12) a. Mit was für Leuten hast Du denn gerechnet?  
with what for people have you PRT reckoned  
'What kind of people did you expect?'
- b. In was für Lokale gehst Du denn gerne?  
in what for bars go you PRT pleasantly  
'What sort of pubs do you like going to?'

Within the caveat that parasitic gaps in German are somewhat controversial, *was* can license them, just like other WH-elements do:

- (13) a. Was hast Du ohne zu lesen für Bücher weggeschmissen?  
what have you without to read for books dumped  
'What kind of books did you dump without reading?'
- b. Was für Bücher hast Du ohne zu lesen weggeschmissen?

Split is allowed with a copular when the predicate is split, and objects of transitive verbs without any lexical restriction are splittable, too:

- (14) a. Was sind diese Leute für Bauarbeiter?  
what are these people for workers  
'What kind of construction workers are these people?'
- b. Was hast Du für Bücher {geschrieben/fallenlassen ... }?  
what have you for books {written/dropped...}  
'What sort of books have you written/dumped?'

Split is allowed with passivized verbs:

- (15) Was wurden dort für Romane geschrieben?  
what were there for novels written  
'What kind of novels were written there?'

Splitting of subject is restricted in terms of phonological 'weight': a bare DP-subject of a copular construction turns out to be worse:

- (16) \*Was sind für Leute Bauarbeiter?  
what are for people workers

Splitting from subjects of transitive verbs requires the presence of a sentence particle, and the same goes for subjects of unaccusative and unergative verbs:

- (17) a. Was haben ?\*(denn) für Leute deine Mutter besucht?  
what have PRT for people your mother visited  
b. Was sind ??(da) für Sachen passiert?  
what are (there) for things happened  
c. Was haben ?\*(dort) für Leute gearbeitet?  
what have (there) for people worked

Notice that the split of a subject is also possible if an accusative/dative object intervenes, indicating that what matters to improve the split is really phonological material between C and the DP which is extracted from:

- (18) a. Was haben dem Alten für Leute {geholfen/gehorcht/vertraut...}?  
what have the old for people {helped/obeyed/trusted...}  
b. Was haben dich für Leute {angerufen/besucht/beeindruckt...}?  
what have you for people {called/visited/impressed...}

A contrast obtains when split occurs from subjects of stage-level vs. individual level predicates:

- (19) a. Was sind für Bilder verfügbar?  
what are for pictures available  
b. \*Was sind für Bilder unansehnlich?  
what are for pictures unsightly

Concerning islands, no split over PP-adjuncts, negative and WH-islands:

- (20) \*Mit was hat Felix für Werkzeugen die Flasche geöffnet?  
with what has F. for tools the bottle opened
- (21) a. Was für Bücher hat niemand gelesen?  
what for books has noone read  
b. \*Was hat niemand für Bücher gelesen?  
what has noone for books read?
- (22) a. ??Was für Bücher hat Maria gefragt, wann Peter lesen wollte?  
what for books has M. asked when P. read wanted  
b. \*Was hat Maria gefragt, wann Peter für Bücher lesen wollte?  
what has M. asked when P.for books read wanted

Split is also possible when WF is embedded in (certain) PPs:

- (23) a. Über was die sich für einen Quatsch aufregen!  
 about what they REFL for a non-sense aggravate  
 ‘(Impressive,) the kind of non-sense people get aggravated about!’  
 b. An was hatten sie denn so für Preise gedacht?  
 of what have you PRT PRT for prices thought  
 ‘What kind of prices have you thought about?’  
 c. Über was der alles für Sachen bescheid weiss!  
 about what he all for things knowledgable knows  
 ‘(Impressive,) the (kinds of) things he knows!’

No split-scrambling is possible:

- (24) \*Wer hat was gestern für Leuten geholfen?  
 who has what yesterday for people helped

Interaction with quantifiers: split destroys wide scope reading of WH. Thus in the unsplit variant an ambiguity arises: the sentence can mean “tell me of everyone what kind of book s/he has read” and “tell me of the kind of book for which it is the case that everyone has read it”. This reading is destroyed if splitting crosses the universal quantifier. Thus the sentence only has the reading “tell me of everyone what kind of book s/he has read”:

- (25) a. Was für ein Buch hat jeder gelesen?  
 what for a book has everyone read WH > ∀, ∀ > WH  
 b. Was hat jeder für ein Buch gelesen?  
 what has everyone for a book read ∀ > WH, \*WH > ∀

## 2.2. Internally

While WH-pronouns require default 3RD PERS.SG. agreement (26-a), agreement is with the head noun in the WF-construction (27-a):

- (26) a. Was ist/\*sind geschehen?  
 what is/are happened  
 ‘What has happened?’  
 b. Wer ist/\*sind gekommen?  
 who is/are come  
 ‘Who came?’
- (27) a. Was für Kinder sind/\*ist gekommen?  
 what for kids are/is come  
 ‘What kind of kids came?’  
 b. Was für ein Kind ist/\*sind gekommen?  
 what for a kid is/are come  
 ‘What kind of kid came?’

The preposition-like element *für* ‘for’ occurs in other contexts and assigns accusative case. (29) shows that the case on the head noun does not come from *für* is assigned from the external element (the dative/genitive assigning prepositions in this case):

- (28) Maria hält ihn **für** einen miesen Hund  
 M. holds him for a:ACC mean:ACC dog:ACC  
 ‘Mary considers him a vicious dog.’
- (29) a. **Mit** was für einem Typen die unterwegs ist!  
 with what for a:DAT guy:DAT she on-the-way is  
 ‘What kind of guy she’s with!’  
 b. **Angesichts** was für eines Wetters die Leute schon nicht mehr zur Arbeit gehen!  
 in-the-face-of what for a:GEN whether:GEN the people already not anymore to  
 work go  
 ‘Gee, the whether people stop going to work already!’

### 3. Previous analyses

#### 3.1. Direct extraction

Corver (1991) and Pafel (1996) suggested that WF-split comes about by subextraction: *was* constitutes the DP which WH-moves, leaving behind the upper DP-segment, the adjunct of the DP, under split:

- (30) a. [<sub>DP</sub> [<sub>DP</sub> was] [<sub>PP</sub> für ein Buch]]  
 b. [<sub>DP</sub> was] ... [<sub>DP</sub> t<sub>DP</sub> [<sub>PP</sub> für ein Buch]]

A fairly direct challenge to this analysis comes from the fact that the WF-construction may be embedded in PPs *and undergo split*:

- (31) A: I didn’t expect THIS kind of people to show up at my party. -  
 a. B: Mit was hattest du denn für Leuten gerechnet?  
 with what had you PRT for people reckoned  
 ‘What kind of people did you expect?’

For the direct extraction analysis this amounts to extracting a non-constituent. Because of facts like these, alternative analyses have been suggested, and I will discuss them now.

#### 3.2. Remnant movement

In this section I discuss the claim that remnant movement RM is needed to derive WF-split. I will not be concerned with the wide range of phenomena which have been claimed to involve

RM (such as verb fronting<sup>3</sup>, negation, *only*, quantifiers,<sup>4</sup> extraction from DPs<sup>5</sup>, verb second<sup>6</sup>, restructuring<sup>7</sup>, adjectival modification<sup>8</sup>, stylistic fronting<sup>9</sup> and many others), although some of the technical points I raise might carry over to the analyses mentioned. The purpose of this discussion is thus not to refute the mechanism altogether but to show that for the WF-construction a) implausible suboperations are needed and b) wrong empirical predictions follow.

Leu (2008b) gives other constructions as possible candidates for RM derivations such as *combien* split (32-a) and *something-strange* split (32-b) in French and (Swiss) German, respectively:

- (32) a. [À combien  $t_i$ ]<sub>k</sub> tu as parlé [de photographes]<sub>i</sub>  $t_k$ ?  
to how-many you have spoken of photographers  
'How many photographers have you spoken to?'
- b. [Mit was  $t_i$ ]<sub>k</sub> hast du [schönem]<sub>i</sub>  $t_k$  angefangen?  
with what have you beautiful begun  
'What is the beautiful thing you have started with?'

Much of what I will have to say here has a bearing on these constructions and I hope the approach adopted here carries over to them. I would like to show this in some detail in future work.

### 3.2.1. PP-embedding

The crucial piece of evidence put forth by proponents of an RM-analysis comes from split of WF-phrases which are embedded under PPs (cf. Abels 2003, Leu 2008a). I.e. WF-construction may be part of a PP, allowing the restriction to be stranded (33-a)/(34-a)<sup>10</sup>:

<sup>3</sup>den Besten & Webelhuth (1987).

<sup>4</sup>Kayne (1998).

<sup>5</sup>Müller 1998.

<sup>6</sup>Müller (2004).

<sup>7</sup>Hinterhölzl (2006).

<sup>8</sup>Leu (2008a:79/86).

<sup>9</sup>Ott (2009).

<sup>10</sup>Abels (2003:290-293)) provides more examples:

- (i) A: I didn't expect THIS kind of people to show up at my party. -  
a. B: Mit was hattest du denn für Leuten gerechnet?  
with what had you PRT for people reckoned  
'What kind of people did you expect?'
- (ii) a. Über was der alles für Sachen bescheid weiss!  
about what he all for things bescheid knows  
'(Impressive), the things he is knowledgeable of!'
- b. Über was sich manche Leute nur für einen Quatsch aufregen!  
about what REFL some people only for a non-sense aggravate  
'(Impressive), the non-sense some people get aggravated about!'
- c. An was hatten sie denn so für Preise gedacht?  
about what have you PRT PRT for prices thought  
'What prices did you have in mind?'

- (33) a. Mit was kann der denn so für Geräten umgehen?  
with what can he PRT PRT for devices handle  
'What kind of devices can he handle?'  
b. Mit was für Geräten kann der denn so umgehen?  
with what for devices can he PRT PRT handle
- (34) a. Mit was der alles für Geräten umgehen kann!  
with what he all for devices handle can  
'(Impressive,) the devices he can handle!'  
b. Mit was für Geräten der alles umgehen kann!  
with what for devices he all handle can

The preposition may not be stranded:

- (35) a. \*Was kann der denn so mit für Geräten umgehen?  
what can he PRT PRT with for devices handle  
b. \*Was der alles mit für Geräten umgehen kann!  
what he all with for devices handle can

This suggests that *was* is not extracted from the DP in a straightforward fashion: if *was* pied-pipes the preposition we would not expect the restriction to be strandable, i.e. we would not expect splits. If splitting involves 'direct extraction' of *was* as shown in (36) (Abels 2003:213), we would not expect the preposition to be pied-pipable, contrary to what we get in (33); we need *was* and P to form a constituent to the exclusion of the restriction. These considerations have led Abels (2003:214/215) and Leu (2003, 2007, 2008a) to assume that WF-split does not involve direct extraction but RM (37):

- (36) *Direct Extraction*  
was<sub>i</sub> ... [<sub>DP</sub> t<sub>i</sub>[für Bücher]]
- (37) *Remnant Movement*  
a. [<sub>DP</sub>was für Bücher]  
b. [<sub>XP</sub>für Bücher]<sub>k</sub> [<sub>DP</sub>was t<sub>k</sub>]  
c. [<sub>DP</sub>was t<sub>k</sub>]<sub>i</sub> ... [<sub>XP</sub>für Bücher]<sub>k</sub> t<sub>i</sub>

With RM in place, the restriction may optionally undergo evacuation movement, allowing the remnant-PP to front independently to yield (33). Needless to say, this mechanism must be responsible for all splits, regardless of whether or not they involve prepositions or not.

There are considerable plausibility problems with this analysis. First, it is not clear what triggers the first movement step (37-b). Second, if WF-split involves RM, we expect the optional evacuation movement of the restriction to be independently available without the subsequent RM, just as the grammar of German makes scrambling independently available as a putative prerequisite for remnant VP-fronting<sup>11</sup>. That is to say even for less controversial cases of RM

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<sup>11</sup>Cf. Hinterhölzl (2006) and Ott (2010) and references therein for criticism of the classical remnant VP-topicalization analysis by den Besten & Webelhuth (1987), Müller (1998) and others.

each suboperation is independently motivated. Alternatively, it must be demonstrated that the two primitive operations RMs consists of in the case of WF-split are inextricably tied (and for some reason empirically separable in the case of verb fronting), which is everything but evident.

The question whether or not evacuation movement exists for the WF-construction can be put to test. The phenomenon may also occur in echo questions like (38-a)/(38-b)<sup>12</sup> and exclamatives like (39) (see also [Leu 2007:13](#) and [Lohndal 2010](#)) with the respective WH-element in-situ:

- (38) a. Du hast WAS FÜR GESCHICHTEN gehört?  
 you have what for stories heard  
 ‘You heard what kind of stories?!’  
 b. Du hast VON WAS FÜR EINEM VERBRECHEN gehört?  
 you have of what for a crime heard  
 ‘You heard of what kind of crime?!’
- (39) Diese Leute haben \*(sonst) was für Ideen!  
 these people have else what for ideas  
 ‘These people have all sorts of ideas!’

Note now that moving the restriction out of the DP/PP is impossible: (40-a)/(40-b)/(41):

- (40) a. \*Du hast [für Geschichten]<sub>i</sub> was t<sub>i</sub> gehört?  
 you have for stories what heard?  
 b. \*Du hast [für einem Verbrechen]<sub>i</sub> von was t<sub>i</sub> gehört?  
 you have for a crime of what heard
- (41) \*Diese Leute haben [für Ideen]<sub>i</sub> sonst was t<sub>i</sub>!  
 these people have for ideas else what

I conclude that the prerequisite for WF-split is unavailable. This makes the RM account implausible and dubious.

The RM analysis makes the following predictions: “high” nominal modifiers such as locative PPs or appositive relative clauses aRCs, which I assume are right-adjoined<sup>13</sup> to the DP, should be pied-pipable along with the remnant XP, i.e. they sit higher within the DP than the WH-word. This follows because the evacuating XP and the modifiers do not form a constituent, thus cannot both leave the DP prior to RM<sup>14</sup>:

- (42) [<sub>DP</sub>[<sub>DP</sub>was für N][aRC/PP]]

The prediction is not borne out as (43) shows:

<sup>12</sup>I use capitals to indicate stress.

<sup>13</sup>The validity of this argument hinges on whether one assumes a right-branching structure for nominal arguments [Larson & Yamakido \(2008\)](#) and/or syntactic Antisymmetry [Kayne \(1994\)](#) and subsequent work.

<sup>14</sup>It could be objected that aRC/PP strand when the lower segment of the DP is fronted after evacuation movement. However, nothing should prevent pied-piping of aRC/PP, in particular, since these cases are independently attested as shown below in (45-a).

- (43) a. \* $[_{DP}Was\ t_i\ [_{PP}aus\ Costa\ Rica]]_k\ hast\ Du\ [für\ Briefmarken\ meiner\ Schwester]_i\ t_k$   
 weggeschmissen?  
 what from CR have you for stamps my sister dumped
- b. \* $[_{DP}Mit\ was\ t_i\ [_{CP}die\ man\ ja\ zum\ Leben\ braucht]]_k\ hast\ du\ denn\ [für\ Freunden]_i$   
 $t_k\ deine\ Zeit\ verbracht?$   
 with what who one PRT for living needs have you PRT for friends your time spend

A second related prediction is that these modifiers should not be strandable along with the restriction if *was* does not take scope over them. In other words, the RM process predicts the *was*-phrase to drag along the modifier at the derivational stage (44-b):

- (44) a.  $[_{DP}[_{DP}was\ für\ Briefmarken]][_{CP}Appositive\ RC]$   
 b. *Evacuation*  
 $[_{XP}für\ Briefmarken]_i[_{DP}[_{DP}was\ t_i]][_{CP}Appositive\ RC]$   
 c. *Remnant Movement*  
 $[_{DP}[_{DP}was\ t_i]][_{CP}Appositive\ RC]]_k\ \dots\ [_{XP}für\ Briefmarken]_i\ t_k$

The following sentences (45-a)-(47) show that the expectation is not met: “high” PPs and relative clauses can remain in the middle field together with the putatively evacuating phrase. Note that the same behavior of modifiers is observed with WF-phrases embedded in PPs (47). It is thus not possible to evade the argument by saying that, for some reason, in the cases (45-a) and (46) *was* is directly extracted from the DP, not carried by RM: the behavior of modifiers extends to those very cases which motivated RM in the first place, namely (47).

- (45) a. Was für Briefmarken meiner Schwester aus Costa Rica hast Du weggeschmissen?  
 what for stamps my sister from CR have you dumped  
 ‘What kind of stamps of my sister from Costa Rica have you dumped?’
- b. Was hast Du für Briefmarken meiner Schwester aus Costa Rica weggeschmissen?
- (46) Appositive RCs
- a. Mit was für Freunden, die man ja zum leben braucht, hast Du denn deine Zeit verbracht?  
 with what for friends who one PRT for living needs have you PRT your time spend  
 ‘With what kind of friends, which as you know are vital, have you spend your time?’
- b. Mit was hast Du denn für Freunden, die man ja zum leben braucht, deine Zeit verbracht?
- (47) Mit was hast Du für Freunden, die man ja zum leben braucht, Deine Zeit verbracht?  
 with what have you for friends which PRT one for living needs your time spent

In conclusion, this discussion has shown that RM does not underly the WF-construction; the data do not warrant such relatively heavy machinery necessary, and indeed RM leads to empirical predictions that are not borne out. I will now turn to a conceivable alternative.

3.3. *Distributed deletion*

To capture the split under PP-embedding, I here discuss a conceivable alternative to RM, based on Distributed Deletion DD (Fanselow & Çavar 2002, FC). DD denotes the selective phonological realization of a subpart of a respective copy created by movement; the subpart that gets phonologically deleted in the upper copy is spelled out in the lower one. Schematically, this is represented in (48) and exemplified by split topicalization in (49):

- (48) a. ...<sub>[XP YP X]</sub> ...<sub>[XP YP X]</sub>                      *Movement creates Copies in the syntax*  
 b. ...<sub>[XP ~~YP~~ X]</sub> ...<sub>[XP YP X]</sub>                      *PF*
- (49) [<sub>DP</sub>keine Bücher] liest Maria keine [<sub>DP</sub>keine Bücher]  
 books reads Mary none  
 ‘As for books, Mary reads none.’

One reason why one could think this analytical device is particularly fit for dealing with WF-split is that it might have a handle on its optionality, something we would not expect to be part of syntax (cf. Chomsky 1995). The result of the DD analysis is that the optionality of WF-split is not rooted in the syntax at all, but is the result of a PF rule. This makes sense insofar as there is no obvious semantic difference between the split and the unsplit variant of the construction (leaving aside the available readings when interaction with quantifiers take place). According to Chomsky (1995) LF is uniform across languages. If we have the same numeration in the split and in the unsplit variant, we do not expect surface differences in the output. Given that the split and the unsplit variant are by and large synonymous, it appears plausible to assume that they involve the same numeration, especially, as their surface form is made up from the same lexical material. However, if the two variants involve the same numeration, we expect them to have the same *derivation*. This is exactly what is not the case in RM analyses: evacuation movement is a prerequisite of WF-split. In the unsplit variant evacuation movement is precisely what must *not* happen. Thus we have two different derivations. In the RM analysis the presence and the absence of evacuation movement (for the split and the non-split respectively) need independent motivation and (presumably) a functional head in the former case to trigger the prerequisite movement.

In the DD analysis, by contrast, none of this is required, because there is just a single derivation and the surface variation results from different deletion options at PF. The way the analysis could work is that the syntax indiscriminately moves a copy of the DP/PP to the left periphery of the clause. At PF the restriction is then deleted (or not). The gist of the analysis is given in (50)/(51):

- (50) a. [Was für einen Mantel] hast Du [was für einen Mantel]  
 b. [Was für einen Mantel] hast Du [~~was für einen Mantel~~]
- (51) a. [Mit was für Geräten] kann der denn so [~~mit was für Geräten~~]umgehen  
 b. [Mit was für Geräten] kann der denn so [~~mit was für Geräten~~]umgehen

Numerous authors have hinted at the possibility the DD may underly the WF-construction (cf. FC among others).

Despite the appeal this analysis might have numerous problems keep me from adopting it: first, FC assume that DD is conditioned by the following information structural conditions:

- (52) Suppose that XP bears a feature f1 that requires that XP be overtly realized in position A, and an additional feature f2 that forces XP into position B. Then XP is split up in [...] German.

It is hard to come up with features that should govern DD for the WF-construction; these would have to be stipulated, but are in no way explanatory. Moreover, adjuncts pose an immediate problem for this analysis:

- (53) a. Mit was für Werkzeugen hat Felix die Flasche geöffnet?  
with what has F. for tools the bottle opened  
'What kind of tools did Felix open the bottle with?'  
b. \*Mit was hat Felix für Werkzeugen die Flasche geöffnet?

It is unclear why in the case of adjuncts the restriction may not be deleted in the upper copy - such a condition would again have to be stipulative<sup>15</sup>.

After having that the DD too yields wrong predictions, potentially relies on stipulations and leaves open a number of questions, I will now turn to an alternative analysis that can cope with the data and makes new predictions which are correct

#### 4. The present proposal

In this section I propose to deal with those splitting cases which involve prepositions in a post-syntactic fashion. This idea (which is not new) has recently been revived and argued for on independent ground and I show that it can be fruitfully extended to the WF-case. On the syntactic side, I think that the theory of phases can help to better understand

##### 4.1. The PP-case

In order to cope with the problem mentioned I follow Ott (2011:94-98) (cf. also the references there) who suggests that "P as a post-syntactically realized morphological exponent of inherent Case" (p. 96), i.e. prepositional phrases<sup>16</sup> in German are syntactically nominal and behave in all

<sup>15</sup>Repair of island violations by phonological deletion (ellipsis) are indeed attested (cf. Bošković 2011 and references therein), but from the perspective of DD (53-b) represents a case of movement of the island (followed by DD), not movement from an island/extraction.

<sup>16</sup>Postpositions as in (i) deserve a different treatment altogether:

- (i) a. Darüber hat Peter nachgedacht.  
thereabout has P. thought  
b. Da hat Peter drüber nachgedacht.  
there has P. about thought

Certainly relevant is the fact that the prepositions' argument is adverbial.

relevant respects like DPs, realizing prepositions in the morphological component.

Ott offers a host of arguments in favor of the idea that Ps postsyntactically realize inherent case. Among them is that the locality problem of  $\theta$ -assignment can be solved (predicates select the noun phrases, not PPs), the fact that cross-linguistically prepositions in some languages are associated with inherent case in other languages, or that the inability of P-stranding in German might reduce to the stranded affix filter by Lasnik (1981) and that binding out of PPs is possible. Finally, split PP topicalization and the WH-copy construction can receive a fairly simple account, because under this analysis both cases are syntactically split DP and DP-WH-copy constructions, respectively, realizing the prepositions in the morphology.

Returning to WF, I suggest *was* is part of the DP-structure that is syntactically extracted and assigned inherent case (here, comitative case; *mit jemandem ausgehen* ‘to take someone out’):

- (54) *Syntax*
- a. [<sub>DP</sub> *was* für Leute] ausgehen
  - b. [<sub>DP[COM]</sub> *was* für Leute] ausgehen
  - c. [<sub>XP[COM]</sub> *was*] ... [<sub>DP[COM]</sub> <*was*> für Leute] ausgehen
- (55) *PF*
- Mit** *was* ... für Leuten<sub>DAT</sub>

Comitative case is realized postsyntactically with the preposition *mit* ‘with’ and dative suffix on the remainder of the DP. The impossibility of realizing the preposition adjacent to the restriction when the split takes place relates to the impossibility of P-stranding in German: *was*, being part of the nominal structure, bears inherent case just as other DP-internal material such as adjectives<sup>17</sup>. *Was*-extraction takes place in the syntax, followed by P-realization in the morphology. Realizing P with the restriction, instead of in front of *was* in Spec-C, amounts to P-stranding, which is independently out in German.

Notice that the distinction introduced here is not categorical but rather reflects a hierarchy of  $\theta$ -roles/inherent cases. The lower the  $\theta$ -role/inherent case is on the hierarchy, the more difficult extraction becomes. This is independently attested, namely from PP-extraction from DPs and thus the analysis adopted here is not an idiosyncratic case.

Under these assumptions the degraded adjunct example receives an explanation, namely that extraction of *was* is bad for whichever reason extraction from adjunct islands is bad in general:

- (56) \*?Mit *was* hast Du für einem Werkzeug die Tür geöffnet.

This analysis helps to understand why complex prepositions are disallowed under split but allowed in the unsplit variant, as (6-b) – repeated in (57) – and (58) show:

- (57) a. Angesichts *was* für eines Wetters die Leute schon nicht mehr zur Arbeit gehen!  
in-the-face of *was* for a:GEN weather:GEN the people already not any-more to work go
- b. \*?Angesichts *was* die Leute für eines Wetters schon nicht mehr zur Arbeit gehen!

<sup>17</sup>Relevant might be observations by Leu (2008a,b) from the WF-construction in Swiss German, in which the adjectival suffix-ending can attach to *für* (followed by adjectival agreement). If *was* and *für* indeed form a complex, adjectival-like unit, we expect *was* to morphologically behave like other DP-internal material.

- (58) a. Mithilfe was für welcher Werkzeuge haben sie die Tür geöffnet?  
 b. \*Mithilfe was haben sie für welcher Werkzeuge die Tür geöffnet?

Complex prepositions, being “nominal subordinators” (Ott 2011), are not inserted postsyntactically but syntactically present which is why the split is out: unlike in the a)-examples, a non-constituent is extracted in the b)-examples. Notice also, that the contrasts in (58)/(57) poses a challenge for the RM analysis in that it is unclear why *für*+N-evacuation is banned over complex preposition (or, for that matter, why fronting PPs that contain the trace of the evacuated XP is out). Similarly, under a DD-analysis one wonders which condition should govern that the relevant subpart may not get phonologically deleted to turn (57-a)/(58-a) into (57-b)/(58-b) respectively to derive the deviance of the latter examples.

I conclude that a postsyntactic realization analysis can handle the PP-data quite naturally and even makes correct predictions which are problematic for alternative approaches. I will now turn to syntactic and information structural properties of the WF-construction and suggest an analysis.

#### 4.2. (Missing) freezing effects

Fanselow (2001:413) observes that WF-split is possible from a scrambled DP:

- (59) a. Was<sub>i</sub> hätte denn [t<sub>i</sub> für Aufsätze]<sub>k</sub> selbst Hubert nicht t<sub>k</sub> rezensieren wollen?  
 what had PRT for papers even Hubert not review wanted  
 ‘What kind of papers would even Hubert not have wanted to review?’  
 b. Was<sub>i</sub> hätte denn [t<sub>i</sub> für Aufsätze]<sub>k</sub> sowieso niemand t<sub>k</sub> rezensieren wollen?

Crucially, the subject needs to be focus-marked (here by the focus particle *selbst* ‘even’). In the absence of focus, the sentence is out, a state of affairs that has been dubbed ‘freezing effects’ (cf. Müller 1998:124), abstractly represented in (60) and exemplified in (61) (from Diesing 1992:192):

- (60) a. ...α<sub>i</sub> ... [β ... t<sub>i</sub> ... ]<sub>k</sub>  
 b. \*...α<sub>i</sub> ... [β ... t<sub>i</sub> ... ]<sub>k</sub> ... t<sub>k</sub>
- (61) a. \*Was<sub>i</sub> hätte denn [t<sub>i</sub> für Aufsätze]<sub>k</sub> Hubert t<sub>k</sub> rezensieren wollen?  
 b. \*Was<sub>i</sub> hat Otto [t<sub>i</sub> für Romane]<sub>k</sub> immer t<sub>k</sub> gelesen?

Freezing effects are independently attested and quite robust, and I will assume without discussion that the restriction (60-b) is valid. The question is, of course, why these effects can be circumvented as in (59-a). I don’t think that resorting to base generation (cf. Fanselow 2001) is the proper way of meeting this challenge, because it begs the question why (61) is out. What I would like to suggest instead is that missing freezing effects and intervention effects are related: a plausible answer could be that the grammar allows extraction out of an XP plus scrambling of that XP to avoid intervention (i.e. in those cases in which extraction crosses an intervener). In other words, scrambling rescues a structure that runs into intervention otherwise. Notice that

the configuration without scrambling is just as we observed for focus<sup>18</sup>:

(62) \*??Was<sub>i</sub> hätte denn selbst Hubert {nicht/immer} [t<sub>i</sub> für Aufsätze]<sub>k</sub> rezensieren wollen?

The reasoning goes as follows (60-b) - extraction from moved/scrambled phrases - is out, which is commonly attributed to the Condition on Extraction Domain CED (cf. [Huang 1982](#)), or sometimes termed “freezing effects”<sup>19</sup>:

(63) \*was<sub>i</sub> ... [DPt<sub>i</sub> für N]<sub>k</sub> ... t<sub>k</sub>

Likewise, intervention by focussed/quantified/operator-like elements yields deviant outputs as (62) shows and as is schematized in (64):

(64) \*was<sub>i</sub> ... {foc/Op/Q} ... [DPt<sub>i</sub> für N]

What these data suggest is that the grammar exceptionally allows for cases like (63) to avoid cases like (64): what looks like movement out of a scrambled phrase is actually a repair strategy to avoid the surface configuration (64). If scrambling does not take place, intervention obtains, and thus scrambling is a way to circumvent this violation. I would like to claim that this is possible only if the scrambling operation has an “effect on outcome” in the sense of [Chomsky \(2001:34\)](#):

(65) An optional rule can apply only when necessary to yield a new outcome.

Now if the unscrambled variant and the scrambled one do not differ with regard to semantic or “surfacy” effects (such as intervention), movement is not an option. By contrast, the optional operation is sanctioned if the surface output yields - usually semantic and information structural - effects unavailable in the base. Scrambling of WH-items in multiple WH-questions (66) and intervention obviated by scrambling (67) provide further evidence in favor of this claim (from [Fanselow 2001:414](#) and [Beck & Kim 1996](#) respectively):

(66) a. ?\*Wann hat wem der Mann geholfen?  
 when has who:DAT the:NOM man helped  
 ‘When did the man help whom?’  
 b. Wann würde wem nur ein Held helfen?  
 when would who:DAT only a:NOM hero help  
 ‘When would only a hero help whom?’

(67) a. Wen<sub>i</sub> hat [t<sub>i</sub> von den Musikern]<sub>k</sub> fast jeder Student t<sub>k</sub> kennengelernt?  
 who:ACC has of the musicians nearly every student met  
 ‘Which of the musicians has almost every student met?’  
 b. \*Wen<sub>i</sub> hat fast jeder Student [t<sub>i</sub> von den Musikern] kennengelernt?

<sup>18</sup>And this holds even if the negation is factored out and replaced by a time adverbial. Remember that “interveners” differ with respect to the degree of deviance they create: [Hamlaoui \(2010:4\)](#) observes that, for example, in Japanese NPIs are the strongest interveners, and intervening quantified DPs induce a lower degree of degradedness than both NPIs and focussed elements.

<sup>19</sup>I disregard differences between these concepts here.

- c. Wen<sub>i</sub> hat Karl [t<sub>i</sub> von den Musikern]<sub>k</sub> zweimal t<sub>k</sub> getroffen?  
 who:ACC has Karl of the musicians twice met  
 ‘Which of the musicians has Karl met twice?’
- d. \*Wen<sub>i</sub> hat Karl zweimal [t<sub>i</sub> von den Musikern] getroffen?

(66) shows that scrambling of the dative WH-object is bad as long as the subject is definite and the pre-scrambled configuration and the scrambled one do not differ. In (66-b), by contrast, scrambling does yield an effect: intervention is ‘bridged’ by scrambling. The same can be observed in (67)-(67-d), where WH-movement out of a partitive phrase may not cross a quantifier, a state of affairs that is remedied if the partitive undergoes scrambling over the the quantified DP/adverb.

Here, I adopt the phase-theory (cf. Chomsky 2001 and subsequent works), which entails that WH-movement proceeds cyclically phase by phase, i.e. movement proceeds through the edges of v\*P and C<sub>P</sub>m, respectively, lest to violate the Phase Impenetrability Condition PIC:

- (68) The domain of H is not accessible to operations outside HP; only H and its *edge* are accessible to such operations.

Whether or not (64) is adhered to or not is evaluated at the C-phase (cf. Chomsky 2001:13), i.e. at the point the TP is transferred; structures that do not, crash or are predicted to degrade. Now how is it possible that the CED/the freezing principle is seemingly violated in the grammatical counterpart of (59-a)? Either the DP moves after/parallel to extraction (parallel probing); or DP-scrambling is a phonological operation that places the DP before the focussed element. In that case, *was*-extraction takes place in the syntax in conformity to the CED, i.e. split takes place with DP in-situ. DP scrambles postsyntactically/at PF to avoid (64) (Chocano 2007 gives a detailed argument that some scrambling operations in German are phonological).

Let me illustrate the derivation in more detail: at the v\*P-phase two options arise: either *was* is extracted to the v\*P-edge or the object-DP is pied-piped (no split):

- (69) a. [<sub>v\*P</sub> *was* [SU [<sub>VP</sub> [<sub>OB</sub> t<sub>was</sub> ...] t<sub>V</sub>] v\*+V]] WF-Split  
 b. [<sub>v\*P</sub> [<sub>OB</sub> *was* ...] [SU [<sub>VP</sub> t<sub>OB</sub> t<sub>V</sub>] v\*+V]] Non-WF-Split

At C the structure is evaluated (with C’s domain up to the v\*P-edge visible). As for (69-a), if SU is focussed it is clear that A’-moving *was* to Spec-C results in an intervention effect, unlike in (69-b) where no discontinuous DP is created. Consequently, the structure in (69-a) is deviant unless OB scrambles over SU (and German makes syntactic scrambling available independently). (69-b) converges in any event after WH-movement to Spec-C.

How does scrambling take place? I suggest that scrambling raises OB to the outermost Spec-v\*<sup>20</sup>, triggered by an Edge Feature EF on v\* (Chomsky 2008):

- (70) [<sub>v\*P</sub> [<sub>OB</sub> t<sub>was</sub> ...] [*was* [SU [<sub>VP</sub> t<sub>OB</sub> t<sub>V</sub>] v\*+V]]] WF-Split+OB-scrambling

Notice that EF may raise OB only if the operation has an effect on outcome, which it does.

<sup>20</sup>Presumably followed by a phonological rule such as Disl (Chomsky 2001) that displaces OB further into the left middle field to avoid defective intervention when T’s  $\phi$ -features probe for SU (for arguments that scrambling does involve this rule, cf. Chocano 2007). Presumably for the same reason *was* cannot remain in the v\*P-edge.

The derivation in (70) resembles the RM analysis previously dismissed insofar as OB may move, which contains the trace/copy of *was*. However, in my analysis this movement step is independently motivated and rationalized: if the movement does not take place, intervention effects obtain; thus the operation conforms to the effect on outcome condition.

### 5. Conclusion

In this paper I have proposed that a number of aspects of the WF-construction can be derived from independent principles of grammar and that no special provisos such as remnant movement are needed. Furthermore, I have shown that scrambling can serve as a device to obviate intervention effects, for which a phase-based analysis has been suggested.

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# Doubling in Dutch restrictive relative clauses: rethinking the Head External Analysis

Eefje Boef

In colloquial Dutch the higher and the lower clause of long-distance relative clauses (RCs) can both be introduced by a relative pronoun. I argue that these doubling data are most easily compatible with a (specific implementation of the) head *external* analysis (HEA) of RCs. I show that although head *internal* analyses (HIAs) of RCs have gained a lot of ground in recent years, they face a variety of problems that are not encountered by a HEA. I furthermore show that the most prominent argument in favor of HIAs – namely the presence of *reconstruction effects* – is not very well founded, as reconstruction without movement or copies seems to be needed anyway. This strongly suggests that reconstruction is not a full proof diagnostic for movement, and that the presence or absence of reconstruction effects in RCs thus provides inconclusive evidence to support any analysis of RCs.

## 1. Introduction

Restrictive relative clauses (henceforth RCs) have been analyzed in roughly three different ways. The traditional approach, the *head external analysis* (HEA; cf. Quine 1960; Chomsky 1977; Smits 1988; Borsley 1997 a.o.) assumes that RCs are CPs adjoined to the RC head.<sup>1</sup> Inside the RC a coindexed empty operator or relative pronoun moves to the left periphery where it is linked to the external head by means of predication – indicated through coindexing in (1).

(1) ... the picture<sub>i</sub> [<sub>CP</sub> [which<sub>i</sub>/Op<sub>i</sub>]<sub>1</sub> he likes t<sub>1</sub>] *Head External Analysis*

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<sup>1</sup>Not every version of the HEA assumes an adjunction structure. Besides the traditional adjunction hypothesis, the base-generated head hypothesis has also been combined with the hypothesis that the RC is a complement of N (cf. Fabb 1990; Platzack 2000), with the hypothesis that the RC is a complement of D (*D*-complement hypothesis; cf. Schmitt 2000; Aoun & Li 2003), or with the hypothesis that the RC (predicate) combines with the RC head (subject) in a small clause structure (Den Dikken 2006).

Alternatively, *head internal analyses* (HIAs) assume that the RC head originates in a position within the RC. Such analyses come in two flavors. The *head raising analysis* (HRA; cf. Schachter 1973; Vergnaud 1974; Kayne 1994; Zwart 2000; Bianchi 1999, 2000; De Vries 2002; Bhatt 2002 a.o.) assumes that the head noun is base-generated inside the RC and raises towards the matrix clause to become the RC head, as illustrated in (2). The *matching analysis* (MA; cf. Lees 1960, 1961; Chomsky 1965; Munn 1994; Citko 2001; Sauerland 1998, 2003; Salzmann 2006 a.o.) combines insights from both the HEA and the HRA: in addition to a RC internal head (as in a HRA), there is another representation of the RC head in a CP external position (as in a HEA). The RC internal head moves from the RC internal position to SpecCP, and under identity with the external head, PF-deletion of the RC head in SpecCP is triggered. This is illustrated in (3).

(2) ... the [<sub>CP</sub> [picture<sub>2</sub> which/Op t<sub>2</sub>]<sub>1</sub> he likes t<sub>1</sub>] *Head Raising Analysis*

(3) ... the picture [<sub>CP</sub> [which/Op picture]<sub>1</sub> he likes t<sub>1</sub>] *Matching Analysis*

This paper examines some new facts that bear on the choice between the HEA and HIAs, namely doubling of the relative pronoun in colloquial Dutch long-distance RCs. It will be shown that these data challenge HIAs of RCs – currently the default or most prominent analyses of RCs within generative linguistics – and force a reevaluation of the HEA of RCs. In the final part of this paper, I will focus on the most prominent argument against the HEA – namely, *connectivity* or *reconstruction* effects<sup>2</sup> in RCs – and try to make plausible the claim that reconstruction without movement is needed anyway.

## 2. Doubling in Dutch long-distance restrictive relative clauses

In Standard Dutch long-distance restrictive RCs the RC itself is introduced by a relative pronoun (RP) and the embedded finite declarative clause is introduced by the declarative complementizer *dat* ‘that’. This is illustrated in (4) and (5), which show subject and object relativization with a common gender antecedent (*man* ‘man’) that requires the relative pronoun *die* in Standard Dutch (as opposed to neuter singular antecedents that require *dat* ‘that’, which is identical in form to the Dutch finite declarative complementizer).

(4) Dat is de man **die** ik denk **dat** het verhaal verteld heeft.  
 that is the man RP I think that the story told has  
 ‘That is the man who I think told the story.’ [subject RC, Standard Dutch]

(5) Dat is de man **die** ik denk **dat** ze geroepen hebben.  
 that is the man RP I think that they called have  
 ‘That is the man who I think they have called.’ [object RC, Standard Dutch]

<sup>2</sup>Strictly speaking, reconstruction effects are connectivity effects (cases in which a phrase is interpreted in a position different from its surface position) that are found in *movement* configurations only – *reconstruction* (originally proposed by Chomsky 1977) being an operation that places (parts of) moved material back into its position prior to movement. However, in the remainder of this paper I will follow common practice and use the term *reconstruction effects* for all connectivity effects.

In colloquial Dutch both the RC itself as well as the lower clause can be introduced by the relative pronoun *die* (or *wie* ‘who’, cf. SAND data: Barbiers et al. 2005, and results from a large scale online questionnaire study carried out in November/December 2010 – henceforth Meertens Panel Questionnaire (MPQ) data), giving rise to *identical* doubling as illustrated in (6) and (7).<sup>3,4</sup>

- (6) Dat is de man **die** ik denk **die** het verhaal verteld heeft.  
 that is the man RP I think RP the story told has  
 ‘That is the man who I think told the story.’ [subject RC, colloquial Dutch]
- (7) Dat is de man **die** ik denk **die** ze geroepen hebben.  
 that is the man RP I think RP they called have  
 ‘That is the man who I think they have called.’ [object RC, colloquial Dutch]

I assume that the relative pronoun or relative DP successive-cyclically moves through the embedded SpecCP to the highest SpecCP,<sup>5</sup> and that doubling is the spell out of multiple copies in a movement chain à la Nunes (2004) (cf. Bošković & Nunes 2007; Barbiers, Koenen & Lekakou 2009).<sup>6</sup> Given these assumptions, a HIA of RCs together with the Copy Theory of Movement (Chomsky 1995) predicts that the RC head that is contained

<sup>3</sup>Only with object relatives can we be sure that the lower instance of *die* is a relative pronoun (true doubling) and not an agreeing variant of the complementizer (cf. Boef 2008b, 2012), i.e. *die* in the lower clause of long-distance RCs can be an agreeing complementizer only in case of subject extraction. Therefore, in the remainder of this paper I will only use long-distance *object* relatives to illustrate doubling.

<sup>4</sup>Besides *identical* doubling of the pronoun (e.g. patterns *die-die* and *wie-wie*), there are varieties of Dutch in which the RC itself as well as the lower clause can be introduced by *non-identical* pronouns (cf. SAND data, MPQ data), giving rise to *non-identical* doubling as in (i).

- (i) Dat is de man [**wie** ik denk [**die** ze geroepen hebben]].  
 that is the man who I think RP they called have  
 ‘That is the man who I think they have called.’

It is certainly beyond the scope of this paper to discuss in depth the intrinsic patterns of non-identical doubling in Dutch long-distance RCs, but see Boef (forthcoming) for a detailed overview and analysis.

<sup>5</sup>See Koopman & Sportiche (2008) for an alternative to the successive cyclic *wh*-movement analysis of long-distance RCs (but see Boef 2008a, 2012 for why this analysis cannot straightforwardly be extended to Dutch), and see Den Dikken (2009a,b) for arguments in favor of a general ban on successive cyclic *wh*-movement via SpecCP. Notice that the claim that movement to SpecCP is terminal (in RCs) is hard to reconcile with a HIA of RCs: the RC head in long-distance doubling constructions is unable to ‘escape’ from the lowest CP.

<sup>6</sup>Nunes (2004) assumes that every chain link is computed for linearization in accordance with Kayne’s (1994) *Linear Correspondence Axiom* (LCA). Taking two copies in a movement chain to count as *identical*, the LCA requires that only one copy be spelled out for linearization purposes, as an element cannot simultaneously *precede* and *follow* itself. Nunes furthermore assumes that – under specific circumstances – heads can undergo *morphological reanalysis*, which takes two terminal nodes and fuses them together into a single terminal node. Taking the LCA to not apply word internally (Chomsky 1995:337) and assuming that successive cyclic *wh*-movement (in languages that allow spell out of lower copies) proceeds by *adjunction* to an intermediate C<sup>0</sup>, the well-formedness of doubling structures is easily accounted for: the copy of the pronoun in the lower CP domain – being head-adjoined to C<sup>0</sup> – undergoes morphological reanalysis with this C<sup>0</sup>. The two heads now become a single morpheme, as a result of which the copy of the pronoun becomes invisible for the LCA and may thus be spelled out. A great advantage of Nunes’

in the copy of the relative DP in the embedded SpecCP is overtly realized in doubling contexts, *quod non* (cf. Schippers 2006). This is illustrated in (8) for a HRA of RCs as in De Vries (2002) – the same prediction holds for a *matching* analysis.<sup>7</sup> Put differently, whereas the relative pronoun may surface in more than one copy, the RC head in Dutch cannot surface in any but the highest copy.

- (8) \* ... de [<sub>CP</sub> [**man die**]<sub>1</sub> ik denk [<sub>CP</sub> [**man die**]<sub>1</sub> ze [~~man die~~]<sub>1</sub> geroepen hebben]]

The doubling data are especially problematic for the HRA of RCs, but they can in principle be accommodated by the MA of RCs when *PF-deletion under identity* not only has something to say about the copy that is adjacent to the external head, but affects all lower copies of the RC head, as abstractly illustrated in (9).

- (9) D° **RC head** [<sub>CP</sub> [**RP RC head**]<sub>1</sub> .. [<sub>CP</sub> [**RP RC head**]<sub>1</sub> .. [~~RP RC head~~]<sub>T</sub> ..  
adjusted matching analysis

Even so, I will not attempt to make the MA of RCs compatible with the doubling data for three reasons. First, the MA faces more problems than accounting in a straightforward way for the doubling data, cf. section 4. Second, the *PF deletion under identity* operation is a bit suspicious in itself, as the precise properties and workings of this deletion operation (by which the RC internal representation of the RC head gets deleted) remain unclear. Bhatt (2002:77-79) for example notes that under a MA it is unclear why the external head is pronounced and why the internal head is *obligatorily* deleted – in contrast to the *optional* nature of other kinds of ellipsis.<sup>8</sup> Furthermore, in other kinds of ellipsis constructions one phrase is pronounced, whereas both phrases are interpreted. The same does not hold for RCs: in some cases the RC head seems to be interpreted only RC internally, e.g. in case of reconstruction for idiom interpretation (*The headway [<sub>RC</sub> that John made t] was impressive.*). Third, the doubling data follow from a head *external* analysis of RCs without

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theory is that it immediately accounts for the ban on doubling with complex *wh*-phrases and for the observation that *wh*-pronouns are practically never spelled out in their thematic base position.

<sup>7</sup>Several solutions to this problem present themselves. First, one could assume an alternative to the standard Copy Theory of Movement, according to which lower copies in a movement chain are not full copies of the moved element but are reduced and lack internal structure (in the spirit of e.g. Van Koppen 2007 or Neeleman & van de Koot 2007). Interestingly, although such a solution straightforwardly accounts for the fact that the RC head never surfaces in a lower copy (as it only occurs in the highest chain link), it requires a new take on reconstruction: interpretation of a lower copy to account for reconstruction effects (*syntactic* reconstruction, see *infra*) is not possible. Under this view of copies, a HIA thus looks very similar to a HEA (w.r.t. reconstruction).

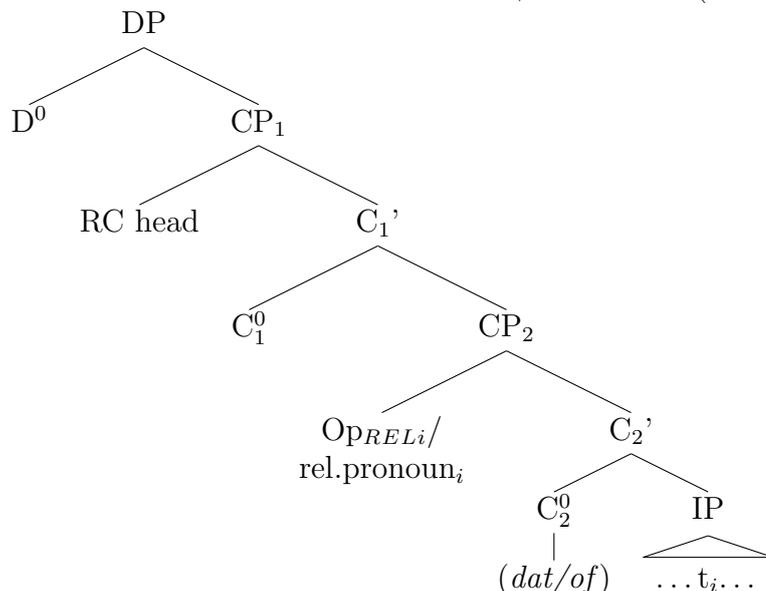
Alternatively, one could assume that the two elements in a doubling chain both originate within a single XP (cf. ‘big DP analysis’, e.g. Uriagereka 1995; Poletto & Pollock 2004; Belletti 2005 a.o.), and one of them (or both) move(s) out. However, such an analysis encounters two problems. First, the putative big XP never overtly occurs as one constituent, and second, the analysis encounters an overgeneralization problem when faced with non-identical doubling (cf. Barbiers et al. 2009; Boef forthcoming).

<sup>8</sup>Unless, as noted by Bhatt (2002:77-78), this type of deletion/ellipsis is thought of as being on a par with the type of ellipsis found in the domain of *comparative deletion*, as in (i)-(ii), cf. Kennedy (2000).

- (i) The galaxy contains more stars than the eye can see.  
(ii) The galaxy contains more **stars** than [<sub>CP</sub> [~~DP stars~~]<sub>T</sub> the eye can see [~~DP stars~~]<sub>T</sub>].



(11) structure of restrictive RCs in Dutch, cf. Schmitt (2000), Aoun & Li (2003)<sup>9</sup>



The higher CP<sub>1</sub> in (11) (or ForceP, as in Aoun & Li 2003, cf. Rizzi 1997) is related to *clause typing*: only elements that are specific for RCs (or RELATORS in the sense of Den Dikken 2006, cf. footnote 9) are allowed to occur there. The lower CP<sub>2</sub> is the layer in which *operator-variable dependencies* are created and *subordination* is expressed. Besides accounting for the doubling data, the structure in (11) accounts for the whole range of dialectal variation that is found in (the left periphery of) Dutch RCs (Boef to appear).

First, as there is no designated element (C<sub>REL</sub>) in Dutch that is responsible for clause typing in RCs (cf. Wiltschko 1998), C<sub>1</sub><sup>0</sup> is always empty in Dutch.<sup>10</sup> That is to say, the rel-

<sup>9</sup>A specific variant of this analysis has been proposed by Den Dikken (2006:chapter 5). According to his analysis of restrictive RCs (in Mandarin Chinese) D° takes a small clause complement of which the RC head is the subject and the RC itself is the predicate. This is illustrated in (i). The functional head of the small clause (the RELATOR in Den Dikken's terminology) may be realized in languages like Mandarin Chinese, as illustrated in (ii). Notice that the observation that there are languages in which the RC head and the RC itself may be separated by intervening material (the functional element *de* in the case of Mandarin Chinese) is highly problematic for the *raising* analysis of RCs à la Kayne (1994) or De Vries (2004). The structure I propose in (11) is also capable of accommodating data like (ii): the DE element may target the C<sub>1</sub><sup>0</sup> position in between the RC head and the RC itself.

(i) D° [<sub>SC</sub> [RC head] [RELATOR [<sub>CP</sub> RC ]]] [adapted from Den Dikken 2006:244]

(ii) wo mai de shu  
I buy DE book  
'the book that I bought' [Mandarin Chinese; Den Dikken 2006:240]

<sup>10</sup>The claim that C<sub>1</sub><sup>0</sup> is targeted by elements that are specific to RCs receives some additional support from the observation that there are languages that make use of relative complementizers (C<sub>REL</sub>). There is evidence that C<sub>REL</sub> in such languages does in fact target the higher CP layer: C<sub>REL</sub> can optionally be followed by the declarative complementizer – which I claim targets the lower C<sub>2</sub><sup>0</sup>. This is illustrated (i) and (ii) for Slovene and Icelandic respectively. These examples thus seem to indicate that the relative

ative pronoun or complementizer (zero-relativization is not allowed in Dutch, cf. Dekkers 1999; Barbiers et al. 2005) always directly follows the RC head in Dutch – the only dialect of Dutch that does not adhere to this generalization is Amsterdam Dutch, cf. *infra*.

Second, in colloquial Dutch embedded *wh*-questions the *wh*-phrase can be accompanied by two complementizers, giving rise to the string *wh of dat* ‘WH whether that’, as illustrated in (12) – I assume here that embedded *wh*-questions also have two CP layers (cf. Van Craenenbroeck 2004, 2010, and see *infra*). However, the structure in (11) predicts that the string *wh*-pronoun *of dat* should not be attested in RCs, as there is simply not enough space below SpecCP<sub>2</sub> (which is targeted by the relative pronoun) to fit both complementizers. This prediction is borne out: *wh of dat* is not or only very marginally attested in RCs in the Dutch speaking language area (cf. Boef to appear), as illustrated in (13). A *wh*-pronoun in a RC can thus be accompanied by only one complementizer (*of* or *dat* in C<sub>2</sub><sup>0</sup>).

- (12) Ze vroeg [<sub>CP1</sub> **wie of** [<sub>CP2</sub> **dat** het verhaal heeft verteld]].  
 she asked who whether that the story has told  
 ‘She asked who told the story.’ [colloquial Dutch]

- (13) a. Dat is de [<sub>CP1</sub> man [<sub>CP2</sub> **wie** het verhaal verteld heeft]].  
 that is the man who the story told has  
 ‘That is the man who told the story.’  
 b. Dat is de [<sub>CP1</sub> man [<sub>CP2</sub> **wie of** het verhaal verteld heeft]].  
 that is the man who whether the story told has  
 c. Dat is de [<sub>CP1</sub> man [<sub>CP2</sub> **wie dat** het verhaal verteld heeft]].  
 that is the man who that the story told has.  
 d. ?\*Dat is de [<sub>CP1</sub> man [<sub>CP2</sub> **wie of dat** het verhaal verteld heeft]].  
 that is the man who whether that the story told has

The patterns that the structure in (11) predicts to exist are given in table 1. Most predictions in this table are borne out, but some predicted patterns are unattested. I claim that these patterns are unattested on independent grounds (cf. Boef to appear). First, [Op<sub>REL</sub>] in table 1 is unattested because in all varieties of Dutch there needs to be at least one overt element in the COMP-domain of restrictive RCs (cf. *supra*). Second, the patterns [Op<sub>REL</sub> *of*] and [*die of*] in table 1 are unattested, because *of* is only licensed by

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complementizer targets a position in the left periphery that is higher than the position targeted by the declarative complementizer, in line with the proposal in (11).

- (i) človek, [<sub>CP1</sub> **ki** [<sub>CP2</sub> (**da**) pride ]]  
 the.man C<sub>REL</sub> that is.coming  
 ‘the man that is coming’ [Slovene, Hladnik 2010:14]
- (ii) manninn [<sub>CP1</sub> **sem** [<sub>CP2</sub> (**að**) kom hingað]]  
 the.man C<sub>REL</sub> that came here  
 ‘the man that came here’ [Icelandic, Boef & Franco 2010]

an (overt) *wh*-element in its specifier (an overt *wh*-phrase or an empty yes/no operator), cf. Zwart (2000); Boef (to appear).

| SpecCP <sub>1</sub> | C <sub>1</sub> <sup>0</sup> | SpecCP <sub>2</sub>     | C <sub>2</sub> <sup>0</sup> | occurrence                            |
|---------------------|-----------------------------|-------------------------|-----------------------------|---------------------------------------|
| RC head             |                             | <i>d<sub>REL</sub></i>  |                             | Standard Dutch                        |
| RC head             |                             | <i>d<sub>REL</sub></i>  | <i>dat</i>                  | Waasland Dutch (SAND data)            |
| RC head             |                             | <i>d<sub>REL</sub></i>  | <i>of</i>                   | <i>unattested</i>                     |
| RC head             |                             | <i>wh<sub>REL</sub></i> |                             | colloquial Dutch (MPQ data)           |
| RC head             |                             | <i>wh<sub>REL</sub></i> | <i>dat</i>                  | southern Dutch (SAND data)            |
| RC head             |                             | <i>wh<sub>REL</sub></i> | <i>of</i>                   | colloquial Dutch (Hoekstra 1993b:197) |
| RC head             |                             | <i>Op<sub>REL</sub></i> |                             | <i>unattested</i>                     |
| RC head             |                             | <i>Op<sub>REL</sub></i> | <i>dat</i>                  | Vlaams-Brabant (SAND data)            |
| RC head             |                             | <i>Op<sub>REL</sub></i> | <i>of</i>                   | <i>unattested</i>                     |

Table 1: Predictions of relative clause structure (11), cf. Boef (to appear)

As reported by Hoekstra (1994), Amsterdam Dutch allows a *wh*- or *d*-pronoun to be preceded by complementizer *of*, as illustrated in (14).

- (14) a. de auto **of** **waar** ik in reed  
the car whether where I in drove
- b. de vrouw **of** **die** ik gezien heb  
the woman whether RP I seen have

[Amsterdam Dutch, Hoekstra 1994:316]

The Amsterdam Dutch data can be accommodated by the structure in (11) by arguing that the element *of* in (14) is not an interrogative complementizer but rather a relative complementizer (in C<sub>1</sub><sup>0</sup>). That this analysis of *of* in Amsterdam Dutch might be on the right track is provided by the observation that it does not adhere to the generalization that interrogative *of* in Dutch can only be licensed by an (overt) *wh*-element in its specifier (cf. *supra*) – suggesting that *of* in (14) is in fact not an interrogative complementizer. Whatever the exact nature of the element *of* in (14), the Amsterdam Dutch data seem to provide evidence for a head position (C<sub>1</sub><sup>0</sup>) between the RC head and the RC itself.<sup>11</sup>

<sup>11</sup>A proviso is in order here. The status of the data in (14) is a bit unclear. These data have been tested in the MPQ and were found to occur very marginally. To the extent that they exist at all, only test sentences with the *wh*-pronoun *wat* ‘what’ – and *waar* ‘where’ in locative RCs – are attested (these sentences are illustrated in (i)-(ii)), and the geographic distribution of this phenomenon is not restricted to (the area of) Amsterdam.

- (i) Het boek **of** **wat** ik gelezen heb is mooi geschreven.  
the book whether wat I read have is beautifully written  
‘The book that I read is beautifully written.’
- (ii) Het huis **of** **waar** ik gewoond heb is verkocht.  
the house whether where I lived have is sold  
‘The house where I lived is sold.’

Finally, it is worth noting that on independent grounds, a similar structure of the left periphery as in (11) has been proposed for embedded questions in Dutch by Van Craenenbroeck (2004, 2010) (cf. Reinhart 1981; Hoekstra 1993a,b; Hoekstra & Zwart 1994; Zwart & Hoekstra 1997; Bennis 1997, 2000 a.o.). Van Craenenbroeck argues for a split CP domain in which the higher layer  $CP_1$  is related to clause typing (and optionally headed by *of*), and the lower layer  $CP_2$  is related to the creation of operator variable dependencies (and optionally headed by *dat*). Van Craenenbroeck furthermore argues that complex *wh*-phrases introduced by *welke* ‘which’ are not operators – as opposed to *wh*-pronouns or PPs containing them – and are therefore merged in  $SpecCP_1$ , whereas a coindexed empty operator moves from an IP-internal position to the lower  $SpecCP_2$  (to create an operator-variable dependency). This analysis of questions with a complex *wh*-phrase is strikingly similar to the proposed analysis of RCs. If we take the parallel between RCs and *wh*-questions further, we predict that complex *wh*-phrases introduced by *welke* do not occur in RCs because the designated position for such phrases –  $SpecCP_1$  – is already occupied by the RC head. This prediction is in fact borne out: complex *wh*-phrases introduced by *welke* are not allowed in restrictive RCs (De Vries 2004).

- (15) a. \*Ze zag een man *welke stakkerd* zijn been had gebroken.  
 she saw a man which wretch his leg had broken  
 ‘She saw a man which wretch had broken his leg.’
- b. \*Ze las een boek *welke roman* door Reve was geschreven.  
 she read a book which novel by Reve was written  
 ‘She read a book which novel was written by Reve.’ [De Vries 2004:200]

The proposed structure for restrictive RCs in (11) and the parallel with embedded *wh*-questions furthermore predicts that in RCs that do not have a RC head, the higher  $SpecCP$  position should be available for complex *wh*-elements introduced by *welke*, and DFC with *of dat* should be possible. This is exactly the pattern that we find in Dutch free relative clauses, as illustrated in (16).

- (16) a. *Welke onverlaat* zoiets doet krijgt straf.  
 which miscreant such a thing does gets punishment  
 ‘Whichever miscreant does such a thing will be punished’  
 [De Vries 2004:193]
- b. *Wie of dat* het weet mag het zeggen.  
 who whether that it knows may it say  
 ‘Whoever knows it may say it.’ [MPQ data]

#### 4. Rethinking the Head External Analysis

In this section I will argue in more detail in favor of a HEA of RCs, i.e. I will make a case for the HEA and argue against HIAs (*raising* or *matching*) of RCs. I will show that although HIAs have featured most prominently in syntactic theorizing in recent years, (my

implementation of) the HEA fares better in many respects: case mismatches, selection, and locality violations.<sup>12</sup> A detailed evaluation of the most prominent argument in favor of HIAs, namely reconstruction effects, has to await the next section.

#### 4.1. Case mismatches

Because both the *raising* analysis and the *matching* analysis of RCs take the RC head to be merged with the relative pronoun inside the RC, the case of the RC head is predicted to be compatible with its grammatical function inside the RC, and with the case of the relative pronoun. However, in languages with overt case morphology, case mismatches between the relative pronoun and the RC head are attested, as exemplified for Polish in (17) and for German in (18).<sup>13</sup>

- (17) Widziałem tego pana, [który zbił ci szybę].  
 saw.1SG the.ACC man.ACC who.NOM broke your.SG glass.ACC  
 ‘I saw the man who broke your glass.’ [Polish, Borsley 1997:638]

- (18) Wir brauchen den Politiker, der unsere Interessen vertritt.  
 we need the.ACC politician who.NOM our interests represents  
 ‘We need the politician who represents our interests.’  
 [German, Schmitt 2000:332]

Although several solutions to the case mismatch problem have been proposed for the HRA (cf. Kayne 1994; Bianchi 2000; De Vries 2002), they are all (to a greater or lesser extent) stipulative and ‘not particularly explanatory’ (Salzmann 2006:17). For the MA of RCs, the case mismatch data are less problematic because the external head is not in a chain relation with the internal head, so they can receive case separately as long as total identity of features is not required for *deletion under identity* (cf. Citko 2001). Only from a (traditional) HEA of RCs do case mismatches like (17) and (18) follow straightforwardly. Notice that for the proposed implementation of the HEA of RCs in (11), the external D<sup>0</sup>

<sup>12</sup>Internally headed RCs (or RCs that contain multiple overt heads, cf. Cinque 2010 for Italian and Latin), as illustrated in (i), have always been taken as strong evidence in favor of HRAs of RCs: they seem to display the structure before *raising*. My aim is not to argue against HIAs of RCs altogether as it might very well be the case that it is necessary to distinguish between different types of RCs, both within and across languages. Rather, my more modest aim is to make a case for the (particular implementation of the) HEA of RCs (as outlined in (11)). Accordingly, I will not be concerned with internally headed RCs in this paper.

- (i) [nuna bestya-ta ranti-shqa-n] alli bestya-m ka-rqo-n  
 man horse-ACC buy-PERF-3 good horse-EVID be-PAST-3  
 ‘The horse that the man bought was a good horse.’ [Ancash Quechua, Cole 1987:277]

<sup>13</sup>I am abstracting away from so-called *Case Attraction* phenomena – situations in which the RC head bears the same case as the relative pronoun – as case attraction only seems to be at play in free relatives and correlatives (Bhatt 2005), i.e. case attraction does not seem to occur in externally headed *restrictive* RCs – the type of RC I am concerned with.

needs to be able to interact with the specifier of its complement. Put differently, a head should be able to see the specifier of its complement. According to current minimalist assumptions this is no problem as the edge of a phase (specifier) can be reached from outside that phase (*Phase Theory* and *Phase Impenetrability (PIC)*, Chomsky 2000 *et passim*). Assuming that CP is a phase, and the RC head is on the edge of that phase (SpecCP<sub>1</sub>), the RC head is thus available for further computation after the CP is built.

A related problem for the *raising* analysis, comes from *adjectival inflection*, as pointed out by Salzmann (2006:123-124) among others. The form of adjectives in attributive position of neuter nouns (e.g. *huis* ‘house’) in Dutch depends on the form of the determiner. When the definite determiner *het* ‘the’ is used, the default *-e* appears, and when the indefinite determiner *een* ‘a(n)’ is used, the adjective appears without an (overt) agreement affix.

- (19) a.   het mooi-e   huis  
           the beautiful house  
       b.   een mooi     huis  
           a   beautiful house

As can be seen in (20), in RCs in Dutch, the form of the adjective depends on the external D, not on RC internal material. This follows from a HEA of RCs. A *raising* analysis on the other hand, incorrectly predicts that the adjective always has the default *-e* ending because the neuter RC head *huis* ‘house’ combines with the definite demonstrative relative pronoun *dat* ‘that’ inside the RC: *dat mooi-e huis* ‘that beautiful house’.

- (20) a.   het mooi-e/\*mooi huis   dat zij   gekocht hebben  
           the beautiful       house that they bought have  
       b.   een mooi/\*mooi-e huis   dat zij   gekocht hebben  
           a   beautiful       house that they bought have

#### 4.2. Selection

In contrast to what we predict on the basis of an analysis that takes relative pronouns to be determiners that take the RC head as their complement – as in a HIA of RCs – relative pronouns do not have the same selectional properties as their determiner or interrogative counterparts. This is exemplified in (21) for Dutch *die* ‘that’, and in (22) for English *who*.

- (21) a.   dat/\*die       meisje heb ik gezien  
           that.N/that.C girl.N have I seen  
       b.   het meisje dat/?die     ik gezien heb  
           the girl.N that.N/that.C I seen have
- (22) a.   the man [who I have seen]  
       b.   \*I have seen [who man]  
       c.   \*[who man] have you seen?



De Vries (2002) proposes to overcome this CED violation by assuming that the RC head moves from the complement position to the specifier position of  $DP_{REL}$  (before the  $DP_{REL}$  itself moves up to the left periphery, to avoid *countercyclicity*). According to some theories, this movement is too local (*Anti-Locality*, e.g. Grohmann 2003, Abels 2003), but what is more, De Vries (2002) still needs to assume that the formal features of the RC head move out of  $DP_{REL}$  to the external determiner (to check case). This movement operation (albeit formal feature movement), as illustrated in (25), violates the CED (cf. Salzmann 2006). Notice that CED violations are non-existent given a HEA or MA of RCs, as there is no extraction of the RC head (out of  $DP_{REL}$ ) at any point in the derivation.

(25) the+FF<sub>2</sub> [ $DP_{REL}$  man<sub>2</sub> who t<sub>2</sub>]<sub>1</sub> they have called t<sub>1</sub>

An argument against both *raising* and *matching* comes from the syntax of adpositions in German (Webelhuth 2011:26-27). “Adpositions of the *mit*-class are obligatorily prepositional if they combine with an inanimate phrasal complement and obligatorily postpositional if they combine with an inanimate pronominal complement”, as illustrated in (26).

- (26) a. Wir hatten [ $PP$  <mit> dem Anruf <\*mit>] gerechnet.  
 we have with the call with expected  
 ‘We had expected the phone call.’
- b. Wit hatten [ $PP$  <\*mit> da <mit>] gerechnet.  
 we have with it with expected  
 ‘We had expected it.’ [Webelhuth 2011:26]

Whereas interrogative clauses respect this generalization, as illustrated in (27), under a head *internal* analysis of RCs, RCs violate this generalization, as can be seen in (28): before movement, the adposition combines with an inanimate phrasal complement so we expect it to be prepositional (analogous to (26a)), but instead it is postpositional. If we were to assume a HIA of RCs (*raising* or *matching*), we would thus have to assume that a well-established constraint does not hold for RCs.

- (27) [ $PP$  <\*mit> wo <mit>] hattet ihr nicht gerechnet?  
 with what with had you not expected  
 ‘What did you not expect?’ [Webelhuth 2011:26]
- (28) Etwas Schreckliches<sub>1</sub>, [ $PP$  <\*mit> [wo t<sub>1</sub>] <mit>] wir nicht gerechnet  
 something terrible with what with we not expected  
 hatten  
 has  
 ‘something terrible that we had not expected to happen’ [Webelhuth 2011:27]

#### 4.4. Interim summary and outlook

Taking reconstruction to be the interpretation of a lower copy at LF (*syntactic reconstruction*, cf. Chomsky 1993, Fox 1999b a.o.) – and thus a diagnostic for movement –

reconstruction effects (of the RC head) in RCs have been taken to be the most important argument in favor of analyses that assume there is a representation of the external head inside the RC, i.e. head *internal* analyses of RCs. Given that the doubling constructions show reconstruction effects, we are faced with the following paradox: doubling data, case mismatches, and problems from selection and locality favor a HEA of RCs, whereas reconstruction effects challenge such an analysis. Interestingly, however, as we will see in the remainder of this paper, reconstruction without copies/movement seems to be independently needed anyway. So, reconstruction in RCs cannot be used as a proper diagnostic for movement of the head noun, and therefore, reconstruction should not be used as (the only) diagnostic for distinguishing the HEA and HIAs of RCs.

## 5. Reconstruction

### 5.1. Reconstruction in Dutch (long-distance) relative clauses

Dutch restrictive RCs show reconstruction for idiom interpretation, Principle A, variable binding, scope interpretation, and for the interpretation of adjectival modifiers, as illustrated in (29)-(33).<sup>16</sup> If possible, the reconstruction effects are illustrated in both short and long RCs, and in long relatives for both the Standard Dutch variant (*die-dat*) as well as for the doubling variant (*die-die*) – there does not seem to be any difference in reconstruction effects between these two variants.<sup>17</sup>

#### (29) reconstruction for idiom interpretation

- a. De [**streek**] die hij me **t leverde**, riep om wraak.  
 the nasty joke RP he me delivered cried for revenge  
[De Vries 2002:78]
- b. De [**streek**] die ik denk dat/die hij me **t leverde**, riep om wraak.  
 the nasty joke RP I think that/RP he me delivered cried for revenge

#### (30) reconstruction for Principle A

- a. de [verhalen over **zichzelf<sub>i</sub>**] die **Paul<sub>i</sub> t** hoorde  
 the stories about SE-SELF RP Paul heard  
 ‘the stories about himself that Paul heard’ [De Vries 2002:80]
- b. de [verhalen over **zichzelf<sub>i</sub>**] die jij dacht dat/die **Paul<sub>i</sub> t** hoorde  
 the stories about SE-SELF RP you thought that/RP Paul heard

#### (31) reconstruction for variable binding

- a. de [ouders van **zijn<sub>i</sub>** geliefde] die **iedere man<sub>i</sub>** graag **t** wil ontmoeten  
 the parents of his beloved RP every man gladly wants to.meet

<sup>16</sup>In all reconstruction examples I indicate the trace position inside the RC, but I leave undetermined what moved from that position: only the relative pronoun/operator (as in a HEA) or the RC head *plus* the relative pronoun/operator (as in a HIA).

<sup>17</sup>Many thanks to Hilda Koopman for providing me with the relevant doubling data.

- b. de [ouders van **zijn**<sub>*i*</sub> geliefde] die ik denk dat/die **iedere man**<sub>*i*</sub> graag ***t***  
 the parents of his beloved RP I think that/RP every man gladly  
 wil ontmoeten  
 wants to.meet

(32) *reconstruction for scope interpretation*

de [**band**] die **iedere student** ***t*** het beste vindt  
 the band RP every student the best finds

‘the band that every student likes best’ [ $\exists > \forall$ ;  $\forall > \exists$ , cf. Salzmann 2006:95 for German]

(33) *reconstruction for the low reading of adjectival modifiers*

de *eerste* roman die je *zei* dat/die Tolstoj *geschreven* heeft  
 the first novel RP you said that/RP Tolstoj written has

‘the first novel that you said Tolstoj has written’ [cf. Bhatt 2002:57 for English]

- a. high reading: the first novel about which you *said* that Tolstoj had written it  
 b. low reading: you said that the first novel that Tolstoj had *written* is *x*

The RC head cannot always reconstruct but sometimes must be interpreted in the matrix clause. Examples of this are given in (34)-(36), which show obligatory non-reconstruction of the external head for idiom interpretation, obligatory non-reconstruction for anaphor binding and obligatory non-reconstruction of the internal head for Principle C respectively. The latter anti-reconstruction effect is better known as the ‘lack of Principle C effect’ (see Salzmann 2006 for a detailed overview of the patterns of (the lack of) Principle C effects).<sup>18</sup>

(34) *obligatory non-reconstruction for idiom interpretation*

- a. Hij **leverde** een [**streek**] die ***t*** om wraak riep.  
 he delivered a nasty joke RP for revenge cried  
 b. Hij **leverde** een [**streek**] die jij vindt dat/die ***t*** om wraak riep.  
 he delivered a nasty joke REL.PR you find that/REL.PR for revenge cried

(35) *obligatory non-reconstruction for Principle A*

- a. **Paul**<sub>*i*</sub> haat die [rare verhalen over **zichzelf**<sub>*i*</sub>] die Marie ***t*** vertelt.  
 Paul hates those weird stories about SE-SELF RP Marie tells  
 b. **Paul**<sub>*i*</sub> haat die [rare verhalen over **zichzelf**<sub>*i*</sub>] die ik geloof dat/die Marie  
 Paul hates those weird stories about SE-SELF RP I believe that/RP Marie  
***t*** vertelt.  
 tells

<sup>18</sup>I abstract away from (obligatory non-) reconstruction for NPI licensing (but see Citko 2001). It has been argued in the literature that NPIs are generally licensed at *surface structure* (see e.g. Sternefeld 2001). If true, the attested reconstruction behavior of NPIs (in RCs) cannot be accounted for by means of (the absence or presence of) *syntactic reconstruction*.

(36) *obligatory non-reconstruction for Principle C*

- a. de [vriend van **Jan<sub>i</sub>**] die **hij<sub>i</sub>** **t** zo aardig vindt  
 the friend of Jan RP he so nice finds
- b. de [vriend van **Jan<sub>i</sub>**] die je denkt dat/die **hij<sub>i</sub>** **t** zo aardig vindt  
 the friend of Jan RP you think that/RP he so nice finds

Under the assumption that reconstruction signals movement (but see *infra*), the non-reconstruction cases in (34)-(36) suggest a HEA of RCs, whereas the reconstruction cases in (29)-(33) suggest the opposite.<sup>19</sup> The aim of the following sections is not to give a full-fledged analysis of the attested reconstruction effects, but rather to show that the presence of reconstruction effects does not necessarily signal movement.

5.2. *Reconstruction for idiom interpretation*

The fact that (some) idioms can be relativized has always been taken as a strong argument in favor of HIAs of RCs, because in order to get the idiomatic interpretation, the RC head needs to reconstruct to its base position at LF due to the *adjacency requirement* on idiom interpretation. However, Lasnik & Fiengo (1974:451) observe that, in contrast to the famous and often used VP idiom *making headway* in (37), some object NPs of VP idioms can in fact not relativize, as illustrated in (38). Under a HEA the impossibility of an idiomatic interpretation under relativization follows, but under a HIA these examples are more problematic, i.e. a HIA incorrectly predicts the sentences in (38) to be grammatical.<sup>20</sup>

<sup>19</sup>The anti-reconstruction effects in (34)-(36) are especially problematic for a *raising* analysis of RCs because under such an analysis the lowest copy will be interpreted by default, predicting reconstruction effects to arise across the board (but see Safir 1999 for an attempt to reconcile the HRA with the lack of Principle C effects by means of *Vehicle Change* (Fiengo & May 1994)). The anti-reconstruction effects are less problematic for a *matching* analysis, because within a MA there is always the option of interpreting the RC external head instead of a copy of the RC internal head (i.e. the lower copy can exceptionally delete at LF when its content is *recoverable* from the external head, cf. Munn 1994; Citko 2001).

More generally, the lack of reconstruction data might not be really problematic for HIAs as they can potentially be accounted for by assuming that in RCs (in contrast to questions) reconstruction is *not* the default (Marcel den Dikken p.c.), i.e. there is only reconstruction when it is forced for some reason (e.g. for idiom interpretation (29) or variable binding (31)). That this line of reasoning is on the right track is evidenced by (i)-(ii) which show that Principle C effects re-emerge when reconstruction of the RC head is forced for some other reason: for the interpretation of an idiom in (i) and for variable binding in (ii), cf. Munn (1994); Sauerland (1998); Citko (2001).

(i) \*The [*headway on Mary<sub>i</sub>'s project*] **she<sub>i</sub>** had *made t* pleased the boss.

(ii) \*The [letters by **John<sub>i</sub>** to *her<sub>j</sub>*] that **he<sub>i</sub>** told *every girl<sub>j</sub>* to burn **t** were published.

[Sauerland 1998:71]

<sup>20</sup>De Vries (2002) distinguishes between ‘real’ idioms, which are established holistically and of which the meaning cannot be determined by the literal meaning of the component parts (*semantic idioms*), and *collocations*, most of which involve a semantically bleached/light verb, like *take a dive/swim/shower*, *make progress/headway*. Only the latter, but not the former type of collocation can *in principle* be split across a relative construction. According to De Vries (2002:79) this is obvious “since it is not possible to relate two meanings at once to the head noun: an idiomatic one in the relative and a literal (or ‘decomposed’) one in

- (37) The headway that we made was sufficient.  
 (38) a. \*The heed that we paid to that warning was slight.  
 b. \*The attention that we paid to the lecture was careful.

When we now consider the grammaticality of the examples in (39) in which the idiom has been *passivized*, the ungrammaticality of the sentences in (38) becomes even more puzzling: a HIA predicts the same outcome in both types of sentences as both sentence types are derived by movement of the object NP. A HEA on the other hand actually predicts this pattern: only in the case of passivization have the RC head and the verb originated as one constituent and can they get the idiomatic interpretation. In RCs, however, the RC head and the verb have never been a constituent and the idiomatic interpretation under relativization is correctly predicted to be out.

- (39) a. Heed was paid to our warning.  
 b. Attention was paid to our problems.

### 5.3. Reconstruction for scope interpretation

A good alternative to *syntactic* reconstruction to account for scope interpretation is *semantic* reconstruction, i.e. the interpretation of scope inversion by means of semantic methods, cf. Cresti (1995); Rullmann (1995); Sternefeld (2001) amongst others. An often mentioned argument in favor of *syntactic* reconstruction and against *semantic* approaches to reconstruction is the unification of Binding Reconstruction and Scope Reconstruction (e.g. Romero 1997; Fox 1999a), as illustrated in (40). These examples show that whenever there is reconstruction for binding (40a), there is reconstruction for scope (the existential can get narrow scope), but when there is no reconstruction for binding (40b), the narrow scope interpretation of the existential is not available.

- (40) a. [A student of **his<sub>i</sub>**] seems to **David<sub>i</sub>** **t** to be at the party. [*seem*>∃; ∃>*seem*]  
 b. [A student of **David<sub>i</sub>**'s] seems to **him<sub>i</sub>** **t** to be at the party.  
 [*\*seem*>∃; ∃>*seem*]

Cecchetto (2001) shows that Italian *Clitic Left Dislocation* (CLLD) with a dislocated PP provides evidence against the unification of Binding Reconstruction and Scope Reconstruction. (41) shows that there is Binding Reconstruction of the dislocated PP (i.e. *pro* cannot refer to *Gianni* due to a Principle C violation) but that same PP cannot reconstruct for Scope (i.e. there is no corresponding narrow scope reading of the existential). Thus, Fox (1999a)'s argument in favor of *syntactic* and against *semantic* approaches to reconstruction does not stand. Consequently, scope reconstruction cannot provide a case for either *syntactic* or *semantic* reconstruction.

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the matrix." It is important to note that we are not dealing with real semantic idioms in the case of (38), and that strings like *pay slight heed to* and *pay careful attention* are perfectly fine (with the idiomatic interpretation). The sentences in (38) thus cannot be ruled out on other grounds than relativization of the idiom (see main text).

- (41) In una casa di Gianni<sub>i</sub> pro<sub>j</sub> ci ha ospitato ogni ragazzo.  
 in a house of Gianni (he) there has hosted every boy  
 ‘In a house of Gianni every boy was hosted.’ [ $\exists > \forall$ ;  $*\forall > \exists$ , Cecchetto 2001:2]

#### 5.4. Reconstruction for the low reading of adjectival modifiers

Bhatt (2002) argues that *syntactic* reconstruction of the RC head and its modifiers accounts for the possible *low* reading of the adjectival modifier. However, Heycock (2005) shows that this account of the low reading of the adjectival modifier “overgenerates massively”. Not all adjectival modifiers allow for a low reading, and more importantly, the low readings of adjectival modifiers are not always generated by virtue of reconstruction, i.e. similar readings may arise in the absence of a RC, as is illustrated for an evaluative adjective in (42).<sup>21</sup> More specifically, the judgment in (42a) that the books are *prachtig* ‘wonderful’ can be ascribed to the speaker or to Jan (*low* reading), but for the apparent low reading no RC is required, as illustrated in (42b).

- (42) a. de *prachtige* boeken die Jan zei dat Piet heeft geschreven  
 the wonderful books RP Jan said that Piet has written  
 ‘the wonderful books that Jan said that Piet has written’  
 b. Jan gaf altijd op over de boeken die Piet heeft geschreven. Maar ik heb  
 Jan gave always on about the books RP Piet has written but I have  
 die *prachtige* boeken gelezen en ze zijn compleet waardeloos.  
 those wonderful books read and they are completely worthless  
 ‘Jan was always going on about the books that Piet has written. But I’ve read  
 those wonderful books and they’re completely worthless.’  
 [translated from English examples (6) and (7) in Heycock 2005:362]

The low reading of (some) adjectival modifiers thus provides inconclusive evidence to support any analysis of RCs.

#### 5.5. Reconstruction for Principle A

Constructions in which an anaphor contained in the RC head is bound by an antecedent inside the RC have been taken as robust evidence for *syntactic* reconstruction of the RC head and thus for HIAs of RCs. However, in RCs there can also be binding for Principle A without a copy being present in the c-command domain of the antecedent, as illustrated in (43).

- (43) ? de [mislukking van **zichzelf**<sub>i</sub>] die **t hem**<sub>i</sub> beroemd heeft gemaakt.  
 the failure of SE-SELF RP him famous had made

<sup>21</sup>It is furthermore unclear if the adjective originates within the RC in the first place (cf. section 4.1).

More generally, binding for Principle A without *syntactic* reconstruction is attested in other constructions as well, as illustrated for left dislocation in (44) and for topicalization in (45)<sup>22</sup>. Both sets of examples show that *syntactic* reconstruction of the fronted constituent would lead to selectional problems, thus suggesting that this constituent is base-generated in the left periphery instead of being moved there.

- (44) a. [Elkaar<sub>i</sub> helpen] dat           doen **ze**<sub>i</sub> hier niet **t**.  
 each other help   TOPIC PR. do   they here not  
 ‘Help each other, they don’t do that here.’  
 b. \***Ze**<sub>i</sub> doen hier niet [elkaar<sub>i</sub> helpen].  
 they do   here not each other help  
 ‘They don’t help each other here.’ [Hoekstra 1999:65]
- (45) a. [Elkaar<sub>i</sub> kussen] hebben **zij**<sub>i</sub> nooit geprobeerd.  
 each other kiss   have   they never tried  
 b. \***Zij**<sub>i</sub> hebben nooit [elkaar<sub>i</sub> kussen] geprobeerd.  
 they have   never each other kiss   tried  
 c. **Zij**<sub>i</sub> hebben nooit geprobeerd [elkaar<sub>i</sub> te kussen].  
 they have   never tried           each other to kiss  
 d. ?\* [Elkaar<sub>i</sub> te kussen] hebben **zij**<sub>i</sub> nooit geprobeerd.  
 each other to kiss   have   they never tried

### 5.6. Reconstruction for variable binding

The example in (46), as reported by Sharvit (1999), shows that in RCs there can be variable binding in the absence of c-command. That is to say, in order for the quantifier *every man* in (46) to c-command and bind the variable *him*, it would have to move out of the RC, thereby violating the local character of QR and the Complex NP Constraint (Ross 1967). It thus seems impossible that the binding relation in (46) is established by means of *syntactic* reconstruction.

- (46) The [woman] [<sub>RC</sub> that **every man**<sub>i</sub> invited **t**] thanked **him**<sub>i</sub>.  
 [Sharvit 1999, as cited in Salzmann 2006:55]

More generally, variable binding without *syntactic* reconstruction occurs in other constructions as well, e.g. in left dislocation structures (47)-(48), pseudoclefts (50), and *tough*-movement constructions (51).

On the basis of the Dutch left dislocation structure in (47), Van Craenenbroeck (2004) shows that we need reconstruction without movement. That is, in order for the pronoun *zijn* ‘his’ in the left dislocated constituent to be bound by the quantifier *iedere taalkundige* ‘every linguist’ it would need to reconstruct, but crucially it cannot reconstruct because the left dislocated element is a PP whereas the reconstruction position is not. Similarly,

<sup>22</sup>Thanks to Marcel den Dikken p.c. for drawing my attention to examples like these.

Guilliot & Malkawi (2007) observe that – given the uncontroversial assumption that movement out of strong islands is blocked – the fact that we do find reconstruction effects in adjunct islands (with resumption), as illustrated for the French left dislocation structure in (48), shows that reconstruction cannot be a proper diagnostic for movement.

- (47) Naar **zijn**<sub>i</sub> promotie, daar kijkt **iedere taalkundige**<sub>i</sub> naar **t** uit.  
 to his defense there looks every linguist to out  
 ‘Every linguist looks forward to his defense.’ [Van Craenenbroeck 2004:48]

- (48) [La photo de **sa**<sub>i</sub> classe]<sub>j</sub>, tu es fâché [<sub>ADJUNCT</sub> parce que **chaque prof**<sub>i</sub> l<sub>j</sub>’a déchiré].  
 ‘The picture of his class, you’re furious because each teacher tore it.’  
 [French, Guilliot & Malkawi 2007:118]

Other convincing examples of reconstruction effects without movement or c-command are illustrated by specificational pseudoclefts (cf. Sharvit 1999; Cecchetto 2001). These are sentences in which a *wh*-phrase is equated with a constituent that corresponds to the gap in the *wh*-phrase (Cecchetto 2001:3), as illustrated by the sentence in (49).

- (49) [Wat Jan kocht **t**] was een boek.  
 what John bought was a book

Although it has been proposed in the literature that the pivot constituent – *een boek* ‘a book’ in (49) – and the gap in the *wh*-phrase are related by syntactic movement, Cecchetto (2001) convincingly argues that this is highly problematic. Movement of the pivot from a position in the *wh*-phrase to its surface position has several weird properties: it is a case of lowering movement, and it is movement from a *wh*-island. Assuming then that there is no movement relation between the pivot and the gap in the *wh*-phrase,<sup>23</sup> we see that – contrary to what we expect when reconstruction signals movement – specificational pseudoclefts do show reconstruction effects (50a), i.e. the pivot seems to be interpreted in the position of the gap in the *wh*-phrase. The bound variable reading in (50a) most likely does not result from LF scoping the quantifier to a position in which it c-commands the pronoun, as this movement would violate the local character of QR and it would move the quantifier out of a *wh*-island (cf. Cecchetto 2001:8). We thus seem to have another case of reconstruction without movement or c-command.

- (50) a. [Wat **elke generaal**<sub>i</sub> verdedigde **t**] was **zijn**<sub>i</sub> bataljon.  
 what every general defended was his battalion  
 b. **Elke generaal**<sub>i</sub> verdedigde **zijn**<sub>i</sub> bataljon.  
 every general defended his battalion.  
 [translated from example (29) in Cecchetto 2001]

<sup>23</sup>See Den Dikken, Meinunger & Wilder (2000) for an analysis of specificational pseudoclefts (SPCs) that does not assume movement of the pivot constituent from a position inside the *wh*-phrase, yet does account for reconstruction effects by means of *syntactic* reconstruction (through *ellipsis*). As the authors note themselves, it remains to be seen whether or not such a *syntactic* reconstruction analysis can account for the attested reconstruction effects in *all* types of SPCs.

As pointed out to me by Marcel den Dikken, also *tough*-movement constructions seem to provide a case in point. Although we do find reconstruction effects in *tough*-movement constructions, as illustrated for variable binding in (51), there is arguably no *syntactic* reconstruction in *tough*-movement constructions as the surface subject is not subject to the restrictions of the lower predicate (52) (*to believe* does not select *for to* infinitives (Wilder 1991)).<sup>24</sup>

(51) **His**<sub>*i*</sub> car is tough for **every man**<sub>*i*</sub> to have to part with.

- (52) a. [For him to be top of the class] is hard to believe.  
 b. \*It is hard to believe [for him to be top of the class].

### 5.7. Interim summary

In this section I tried to make plausible the claim that reconstruction without movement is needed anyway, i.e. not all reconstruction effects can get a strictly syntactic account: we need some sort of semantic reconstruction mechanism as well (cf. Cresti 1995; Rullmann 1995; Sternefeld 2001; Cecchetto 2005). At this point it is unclear whether semantic accounts of reconstruction can adequately account for the whole range of reconstruction effects in RCs (besides scope reconstruction and reconstruction for variable binding). Independently of whether or not the reconstruction effects in RCs can be accounted for by semantics, the facts above show that *syntactic* reconstruction cannot be the only way to account for reconstruction effects. Put differently, reconstruction is not a proper diagnostic for movement and it thus cannot be used for distinguishing HIAs from the HEA of RCs.

### 6. Summary and conclusion

Starting from the observation that doubling of the relative pronoun in colloquial Dutch long-distance RCs is most easily compatible with a head *external* analysis of RCs, the main goal of this paper was to make a case for the HEA of RCs. I tried to show that although head *internal* analyses have gained a lot of ground in recent years, choosing between a HEA and HIAs is certainly not a trivial matter. Besides doubling in RCs, there are other properties of RCs that seem to argue in favor of a HEA of RCs, namely case mismatches between the RC head and the relative pronoun, selectional differences between the relative pronoun and its determiner or interrogative counterpart, and locality constraint violations. *Reconstruction* effects in RCs, on the other hand, have always been taken to strongly argue *against* a HEA of RCs. That is, assuming reconstruction effects in RCs to be the result of the activation of a lower copy at LF (*syntactic* reconstruction), the presence of an (additional) RC head within the RC – as in a HIA – is needed to accommodate such reconstruction effects. I showed that it is well established that reconstruction without

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<sup>24</sup>But see Salzmann (2006:271ff.) for an account of *tough*-movement under a HIA of RCs.

movement is needed anyway, in RCs as well as in other configurations, e.g. left dislocation structures and pseudoclefts. This strongly suggests that reconstruction is not a full proof diagnostic for movement, and that it thus should not be used as (the only) diagnostic for distinguishing between the HEA and HIAs of RCs.

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# Discourse-linking and long-distance syntactic dependency formation in real-time

Oliver Boxell

A self-paced reading experiment examined the processing of long-distance *wh*-dependencies. Some *wh*-dependencies were D(iscourse)-linked (i.e. involved a lexically-specified *wh*-phrase like *which horse*) and others involved a non D-linked *wh*-phrase like *who*. Both kinds of *wh*-phrase show evidence of being represented at available intermediate positions within the long-distance dependencies. It is argued that this is inconsistent with Pesetsky (1987) whose hypothesis claimed that D-linked dependencies are formed via binding, and as such are predicted to be able to bypass intermediate reactivations. At points in the time-course where the *potential* for the violation of dependency-formation constraints becomes apparent, a D-linked antecedent seems to benefit the parse. This motivated the idea that the reduction in constraint-sensitivity which D-linking seems to elicit could be the result of time-locked “stabiliser” effects during moments of complex processing. Finally, the data may indicate a behavioural difference between intermediate and verbal antecedent reactivation during processing.

## 1. Introduction: The descriptive and theoretical background

### 1.1. The mechanics of *wh*-dependencies

Transformational syntactic frameworks like Principles and Parameters (Chomsky 1981) and Minimalist Program (Chomsky 1995) use combinations of basic phrase-structure rules and transformations to represent the sentences of human language. The surface-structure of certain clauses is formed by moving a *wh*-word (e.g. *who*) from a base-generated (or deep-structure) position. An empty-category trace or copy of the moved constituent remains in that base-generated position such that the surface and deep structure positions are linked, forming a so-called syntactic-dependency or “chain”. In particular, the following clause-types *can* feature *wh*-movement (with correspondingly-numbered examples below): (1) *wh*-questions, (2) relative clauses and (3) complement clauses.

(1) Who did Mary love ~~who~~?  
▲—————↓

(2) This is the girl who John loved *who*.



(3) The King wondered who he should buy a castle for *who*.



Non-transformational frameworks also propose *wh*-dependency formations. For example, Head-driven Phrase Structure Grammar (Pollard & Sag 1994) posits a “slash-feature” which represents the fronted *wh*-phrase and is passed from a head to its dependent(s).

Furthermore, *wh*-dependency formation appears to occur successive-cyclically. That is, by way of obeying locality constraints, it occurs in small step-wise operations. If a dependency forms across more than one clause, it is thought to unfold using within-clause steps. As it does so, Chomskyan syntacticians would posit the existence of intermediate empty category copies or traces of the antecedent at each intervening CP boundary as in (4).

(4) The manager wondered [CP **who** [C the secretary claimed [CP **who** [C that the new salesman had pleased **who**]]]].

Most non-transformational syntacticians also posit intermediate representations of a *wh*-antecedent when its dependency spans more than one clause. In particular, there is broad agreement that clause-boundaries (i.e. intervening CP structures within dependencies) host intermediate antecedent representations. Successive-cyclic dependency-formation has accumulated a variety of observational evidence, see e.g., Thornton (1995), McCloskey (2000, 2002) and Felser (2004).

### 1.2. Constraints on *wh*-dependency formation

“Islands” (Ross 1967) are constraints on *wh*-dependency formation which define domains within which a fronted *wh*-phrase may not be grammatically associated. The *wh*-island works in harmony with the locality constraints which drive successive-cyclicality, stating that if one *wh*-phrase is occupying an intermediate CP site within a long-distance dependency, any other *wh*-phrases with base-generated positions below that intermediate CP cannot engage in any *wh*-dependency formation since successive-cyclicality could not be accommodated. This is illustrated in (5a).

(5) (a) \* [CP **Whom** [C did the doctor wonder [CP **what** [C he should send **what** to **whom**]]]]?



(b) The doctor wondered what he should send to whom.

In (5a), the *wh*-island is caused by *what* appearing at the intermediate CP, making it impossible for *whom* to set-up a dependency in a way which obeys the locality constraints which drive successive-cyclic dependency-formation. The result is therefore ungrammatical. We can be sure it is the *whom*-dependency which causes this ungrammaticality because when

*whom* is left *in-situ* (i.e. it does not participate in any *wh*-dependency formation) the result is (5b) which is grammatical.

### 1.3. An amendment to the mechanics of *wh*-dependencies: discourse-linking

It seems that *which*-N(oun) forms (e.g. *which man* and *which book*) have some quite unique properties when contrasted with basic *who* or *what* forms. Pesetsky (1987) terms *which*-N forms “Discourse-linked” (hereafter D-linked) and simple *who* type forms as being non D-linked. D-linked forms are so-called because they have lexical specificity through the N they carry, which limits the set of possible referents for the *wh*-expression to those which may be extrapolated from the discourse-context in which the construction is located. It seems that when the *wh*-phrase is D-linked, the grammaticality of an island violation is ameliorated.

Table 1 gives non D-linked examples of some islands and their D-linked counterparts. Note that the non D-linked island violations are ungrammatical, while the grammaticality of the same violations is significantly ameliorated where the *wh*-expression is D-linked.

| Island constraint | Non D-linked version                                | D-linked version                                         |
|-------------------|-----------------------------------------------------|----------------------------------------------------------|
| <i>Wh</i> -island | *Whom did the doctor wonder what he should send to? | Which lady did the doctor wonder what he should send to? |
| Adjunct island    | *When did you buy a cake from Mr. Bun on?           | Which Tuesday did you buy a cake from Mr. Bun on?        |
| Conjunct island   | *What did you eat some cakes and drink?             | Which coke did you eat some cakes and drink?             |

Table 1: (Non) D-linked examples of island violations

Pesetsky (1987) offers a formal account for why D-linked *wh*-dependencies might not be (as) obedient to island constraints. Baker (1970) proposed that *wh*-dependencies may be formed by *wh*-phrases (or rather some “Q operator” in the CP of relevant clause-types) taking scope over underlying constituents via unselective binding. Note that dependencies formed by binding are not thought to unfold successive-cyclically and so extend across any intervening CP structures in one single operation:

(6) [CP Q<sub>i</sub> **Which lady** did the doctor wonder [CP what he should send to ~~*which lady*~~<sub>i</sub>]?

Pesetsky’s claim specifies that *D-linked wh-phrases only* may (optionally) bind their underlying positions in this way. Since islands are conceived as constraints on *wh*-movement, the decreased sensitivity of D-linked dependencies to them may be explained by the fact that they are not formed via movement in the first place. More specifically, since *wh*-islands are essentially created by a violation of successive-cyclicity, which is a feature of *wh*-movement, it makes sense that D-linking would not be sensitive to such a constraint if its dependency formation results from binding which need not unfold in multiple steps. Non D-linked dependencies are sensitive to island constraints, and Pesetsky therefore assumes they are indeed formed via movement. In a bid to maintain framework-neutrality, I re-stipulate Pesetsky’s hypothesis:

- (7) D-linked *wh*-dependencies are set-up (in any formal framework) via a single **one-step binding-type** operation. Non D-linked *wh*-dependencies may be treated via ordinary **(multiple-step) movement-type or slash-pathway type** analyses (when extending across multiple clauses).

#### 1.4. The prediction generated by the theory

Pesetsky (1987) offers a formal account based on mechanical differences between D-linked and non D-linked *wh*-dependencies in which the former bind and the latter move. This account arises out of the behavioural differences between the two distinct dependency types. Namely, D-linked dependencies are less sensitive to certain constraints which are associated with movement relative to non D-linked dependencies. The question now becomes whether or not Pesetsky's exact formalism is the correct account of these behavioural differences.

Since theoretical syntactic-formalisms attempt to represent grammatical knowledge, which in turn are thought to influence online instantiations of syntax during processing, there should be some psychological-reality to Pesetsky's hypothesis if it is indeed an accurate account. The current research will adopt a method from the psycholinguistic sentence-processing literature which has been used with success to find evidence of intermediate representations of an antecedent in long-distance (multiple-clause) *wh*-dependencies. The current study includes a D-linking manipulation, leading to a straightforward prediction if Pesetsky (1987) is correct: Psycholinguistic evidence of intermediate representations of the antecedent in long-distance *wh*-dependency formation should be restricted to non D-linked *wh*-dependencies since only these involve multiple-steps. No such evidence should be found for D-linked dependencies since they are formed in a single (binding) step.

### 2. The experimental record

#### 2.1. Processing *wh*-dependencies

The psychological reality of *wh*-dependency formation has been well ascertained from collections of data which demonstrate, in real-time, the mental reactivation of fronted *wh*-antecedents at the underlying position with which they have association. Much of this work has been done using the self-paced reading method (Just *et al.* 1982) in which experimental participants read through a sentence word-by-word on a computer screen, using a pacing button to call up each successive segment. The computer records the reading-time for each segment, the length of which is associated with the difficulty of the processing-work for the corresponding item(s).

Crain & Fodor (1985) used this method to compare the processing of a *wh*-question with that of a "yes-no" question, as illustrated in (14).

- (8) (a) *Wh*-question: What did the little girls ask us to sing those French songs for?  
 (b) Yes/no question: Did the little girls ask us to sing those French songs for any reason?

The segment following the first subcategorising verb encountered (*ask*) was occupied by an object (*us*) in both sentence-types. A so-called filled-gap effect was elicited for the *wh*-question at this site, but not for the "yes-no" question. This is where the parser appears to posit the object site as a gap which may be filled by a reactivation of the fronted *wh*-filler but then has to revise this analysis on discovering that the site is already filled. Such reanalysis

increases the demand on the processor, leading to the increased reading time known as the filled-gap effect. This effect was not observed for the “yes-no” control since there is no *wh*-dependency to be set-up in this condition.

Gaps (and thus filled-gap effects) seem, then, to occur in an argument position. They may correspond to the empty-categories (copies or traces) of Chomskyan grammar where a phonetically-null representation of the antecedent occupies its underlying argument position. Many other studies provide similar real-time processing evidence for antecedent-reactivation in *wh*-movement (e.g. Swinney *et al.* 1988; Frazier & Clifton 1989; Nicol & Swinney 1989; Nicol, Fodor & Swinney 1994; Chen *et al.* 2002 and others). Such evidence could support The Active Filler Hypothesis (Clifton & Frazier 1989) which suggests the antecedent of a dependency triggers an on-line search-strategy which posits potential gap-sites until one is found whereupon the antecedent is reactivated, filling the gap. However, many of the studies use a head-initial language, namely English, to demonstrate the reconstruction of the fronted constituent at an underlying position. Since the subcategorising verb precedes the hypothetical empty-categories in most sentences tested, there is an alternative explanation for these data. This is the so-called Direct Association Hypothesis (Pickering & Barry 1991) which assumes that a fronted antecedent is directly associated with the subcategoriser as part of that subcategoriser’s argument structure without relying on an actual gap. Thus, reactivation effects observed at or directly after the subcategoriser may result from this direct-association. In support of this, Boland *et al.* (1995) found that implausible antecedent-subcategoriser associations were identified at the verb position itself, suggesting the dependency had been completed on the verb rather than being delayed until a subsequent gap.

While it seems evidence of reactivating a fronted-constituent may be accounted for with either the Active Filler or Direct Association hypotheses, some effort has been made to dissociate the two. Nicol (1993) and Roberts *et al.* (2007) found evidence of antecedent reactivation at the second-object position in a sentence with a ditransitive verb. The effect observed was therefore not immediately adjacent to the subcategoriser, but was where a gap or empty-category would be posited later in the sentence. Additionally, studies on verb-final languages have shown reactivation effects at posited gap-sites which occur before the subcategoriser is encountered (e.g. German: Clahsen & Featherston 1999; Japanese: Nakano, Felser & Clahsen 2002). These data are inconsistent with Direct Association and are predicted by the Active Filler Hypothesis. In the event, however, it may be that further research is required to tease apart the different theories of dependency-formation during on-line processing.

## 2.2. Successive-cyclicity in real-time

While the reactivation of fronted constituents at their base-generated or verbal positions has been firmly established in the literature, little attention has been given to identifying intermediate activations of an antecedent during long-distance dependency parsing. One early attempt was Frazier & Clifton (1989) who compared real-time dependency formation across a single clause with that of across two clauses. Reading times for the latter were indicative of a significant increase in complexity, which the authors have suggested may be attributable to the costs of intermediate antecedent reactivation at the intervening clause boundary (i.e. successive-cyclicity). More recently, Gibson & Warren (1999, 2004) measured reading-times for *wh*-dependencies with an intervening CP structure and for ones with an intervening structure which was not a CP using self-paced reading. The materials are illustrated in (15):

- (9) (a) The manager [CP **who** the consultant claimed [ **CP** ~~*who*~~ that the new proposal had pleased ~~*who*~~]] will hire five workers tomorrow.  
 (b) The manager [CP **who** the consultant's claim about the new proposal had pleased ~~*who*~~] will hire five workers tomorrow.

The rationale was that only (9a) accommodates an intermediate representation of the antecedent. The relative clause contains the verb *claimed* which selects for a complement clause, i.e. **CP**. This critically provides the position for an intermediate representation of the antecedent. The verb is nominalised in (9b) to make the construct-genitive argument *the consultant's claim about the new proposal*. Consequently, an intermediate representation of the antecedent is not accommodated. The materials also included constructions without *wh*-dependencies, but which were otherwise the same.

Reading times were found to be significantly quicker at the critical verb *pleased* for dependencies which had an intervening CP (9a) relative to those without an intervening CP (9b). No such effects were found for the minimal-pair counterpart conditions with no *wh*-dependencies. Additionally, the reading times of the complementiser *that* were longer in the condition involving a *wh*-dependency relative to its minimal pair without one. Since this is the region where the intermediate representation of the antecedent is predicted to become activated, this effect may be attributable to the processing cost of such activation. However, this effect did not reach significance. Overall, these results seem to support the predictions which the presence of a mediating representation of the *wh*-phrase would make. Namely, intermediate reactivation of the antecedent facilitates its integration at the subcategoriser by boosting its prominence, and that the intermediate reactivation itself carries with it an instantiation processing cost.

This finding - and the whole notion of successive-cyclicity for that matter - is consistent with the Dependency Locality Theory (Gibson 1998, 2000). This theory stipulates that sentence processing complexity can be generated by any intervening elements (particularly newly introduced discourse-entities) within a dependency since they can reduce the activation of the dependency's antecedent. Reactivating the antecedent at intermediate positions within long-distance dependencies therefore reduces the amount of intervening material and likewise the processing complexity for the dependency overall. Note also that ending a clause seems to involve "wrap-up" processes which may be costly for the processor (e.g. Kluender & Kutas 1993), while starting a new one entails making a new set of argument-structure predictions which need to be held in working-memory (Gibson 2000). Intermediate representations of an antecedent at a clause-boundary would, then, feasibly serve to alleviate the processing difficulty of an already complex structure. Furthermore, it would make intuitive sense to assume that breaking a long-distance dependency into smaller subsections with intermediate reactivations would be less taxing on working-memory than holding the first activation of the antecedent continuously until the subcategoriser is reached.

The findings of Gibson & Warren (1999, 2004) have been replicated in a study by Marinis *et al.* (2005). These researchers compared the native and non-native processing of similar materials, also using self-paced reading. Native speakers behaved exactly as they had in the Gibson & Warren study, with long-distance *wh*-dependencies which include an intervening CP facilitating a faster reading-time at the subcategoriser compared to dependencies of the same length but without an intervening CP. Non-native participants with a range of language backgrounds did not show evidence of representing the antecedent at

intermediate positions, whether or not their native language was thought to include successive-cyclicity (compare Dekydtspotter & Miller 2009). The lack of intermediate representations of the antecedent did not impede non-native speakers' ability to accurately comprehend the sentences tested, supporting the idea that second-language processing instantiates less detailed syntax, possibly relying instead on other kinds of information (e.g. discourse, semantics and pragmatics) for comprehension (see Clahsen & Felser 2006a, 2006b).

Similar materials to Gibson & Warren (1999, 2004) were again appropriated by Finn, Kim & Piñango (2010). In this experiment, native English speakers did a cross-modal lexical decision task. Unlike the previous research, no evidence is found for intermediate reactivations of the antecedent. The authors argue that these data show that intermediate "gaps" have a different real-time status from those at argument positions, or even that they are evidence against the existence of psychologically-real intermediate representations of the antecedent. However, note that this latter conclusion is based on a null-result. Not finding evidence of a given phenomenon does not entail that it can never be found or that it doesn't exist. Indeed, cross-modal priming relies on semantic information at the reactivation site, which is not necessarily present at intermediate positions since they do not involve many of the semantic characteristics of argument positions (e.g. thematic assignment and semantic integration with the subcategoriser). Thus, intermediate representations may be purely structural, and if they are, cross-modal priming effects would not be predicted. If intermediate reactivation is purely structural, the evidence reviewed in this section may resolve a problem identified by Fodor (1995) in which reactivation effects (at the verb) could rely purely on correctly linking a dislocated constituent with its verb semantically, making it difficult to isolate whether or not structural reactivation is actually psychologically real.

### 2.3. Discourse-linking

Although the status of successive-cyclicity in D-linked dependency formation and the time-course of D-linking amelioration effects have, to my knowledge, never been examined before, other aspects of its processing have been. Radó (1998) reports that, in a self-paced reading experiment, *wh*-questions were read faster when the antecedent was D-linked and associated with the subject position of a complement clause compared to when the antecedent was non D-linked and/or associated with another position. Radó suggests that D-linked antecedents are associated with the subject position more readily than non D-linked ones since the subject position is the default topic position. Since the D-linked discourse entities could be integrated into the conceptual structure early in the time-course, they could form natural associations with parts of the sentence associated with such key conceptual roles.

Similarly, Frazier & Clifton (2002) examined the possibility that the processor posits a discourse-referent for a D-linked antecedent early in the parse, by at least the end of the clause in which its surface-position is located. They hypothesised that if this were true, a D-linked antecedent should be considered by the parser as a referent for a personal pronoun in a following subordinate clause more frequently than a non D-linked alternative. (10) illustrates the materials tested:

- (10) {**Which guy/Who**} did Sam send a rifle to ~~which guy/who~~ [when he was threatened]?

The results did indeed show that *he* in the adverbial clause co-refers to *which guy* more frequently than to *Sam*, but this pattern was not found when the *wh*-phrase used was *who*. The authors argued that there is no grammatical explanation for this, and so the results would appear to be a feature of the processing of D-linked antecedents which differs from the processing of non D-linked ones. Namely, D-linked *wh*-phrases seem to be represented early-on in the conceptual structure, giving them a certain discourse-prominence which makes them particularly salient antecedents for definite pronouns occurring in subsequent clauses. An alternative explanation for these data, however, is that there is a simple feature (e.g. gender) matching between the D-linked antecedent and the pronoun without the need to invoke the early discourse-instantiation hypothesis. Diaconescu & Goodluck (2004) conducted a replication of this study with Romanian speakers, Romanian being a language which includes null-pronouns. The null-pronouns were found to attract a D-linked antecedent interpretation just as the overt ones had in Frazier & Clifton (2002), with no possibility of feature-matching explaining the results.

While the above studies seem to show that lexical specificity bolsters reactivation for D-linked antecedents at certain conceptually-important positions, evidence from Shapiro *et al.* (1999) seems to suggest that reactivating D-linked antecedents per se taxes the processor more than non D-linked reactivation. A cross-modal priming task revealed that while priming effects were observed for non D-linked antecedents at the subcategoriser or gap-site, they were not present for D-linked ones until a significant period after that. This delay in D-linked antecedent reactivation may be attributable to the additional specified lexical information which must be reconstructed at the underlying position. Furthermore, Shapiro (2000) and de Vincenzi (1996) have further demonstrated that accessing D-linked information during *wh*-dependency formation is costly for the processor. Piñango *et al.* (2001), Piñango & Burkhardt (2005) and Schumacher *et al.* (2010) also show that this is true for dependencies which link reflexive pronouns with their antecedents, whereby non co-argument reflexives (which are considered D-linked) represent a heavier processing burden than co-argument reflexives (which are considered non D-linked).

Further, work by Donkers *et al.* (unpublished) suggests that the notion that D-linked reactivation may be more burdensome than non D-linked equivalents may be refined. They demonstrate that non D-linked and hypernym D-linked (i.e. D-linking with more generic superordinate terms as in *which person*) dependencies caused less processing-difficulty than hyponym D-linking (i.e. D-linking with more specific terms as in *which nurse*). The authors suggest the processing difficulty for the more specific D-linking is caused by increased restriction of the set of possible referents for the antecedent. Indeed, Goodluck *et al.* (2008) found a similar patterning for the overall comprehension of hyp(er)nym D-linking, and they suggested that more specific D-linking may stimulate (more detailed) visualisation of the referent which causes increased processing complexity for the dependency of which it is a part. They tested Broca's aphasic patients and subsequently found similar patterns in child processing as well (see Goodluck 2010).

In sum, it seems there are two main observations to be drawn from the literature on the processing of D-linked *wh*-dependencies: (1) a D-linked antecedent is more readily reactivated with parts of a sentence with key conceptual roles, presumably due to its early-established discourse-prominence; (2) there seems to be a hierarchy of dependency formation difficulty in which non D-linked ones are the easiest, hypernym D-linked ones are harder and hyponym D-linked ones are most difficult.

### 3. The present study

The present study is an attempt to examine the psychological reality of the claim made by Pesetsky (1987) that non D-linked *wh*-dependencies are formed via conventional means (e.g. transformational movement or slash-pathways) while D-linked ones can be formed by unselective binding.

#### 3.1. Materials and predictions

##### 3.1.1. Self-paced reading task

The main task is based on that of Gibson & Warren (1999, 2004). The premise of the design relies on the fact that antecedent reactivation at the subcategoriser or subsequent gap-site should be easier to do when the antecedent has been recently activated via an intermediate representation relative to when there is no such intermediate representation. This is because the intermediate representation boosts the antecedent's mental activation. In a self-paced reading context, this should manifest itself in faster reading times at the critical verb (or gap) region where there has been a local (intermediate) activation of the antecedent, and longer reading times at that region when there has not been.

Each participant saw a total of 79 sentences: 3 of these were practice items, 20 were critical items and 56 were fillers. The fillers were included in a bid to prevent participants from acquiring any default response strategies, while the practice items were used to ensure participants fully understood the task before experimental measurements were taken. The critical items were created with the conditions [+/- D-linking] and [+/- An intervening CP structure]:

- (11) (a) **- D-LINKING; + INTERMEDIATE REPRESENTATION**  
 The manager wondered **who** the secretary claimed [CP] ~~who~~ that the new salesman had pleased ~~who~~ in the meeting.
- (b) **- D-LINKING; - INTERMEDIATE REPRESENTATION**  
 The manager wondered **who** the secretary's claim about the new salesman had pleased ~~who~~ in the meeting.
- (c) **+D-LINKING; + INTERMEDIATE REPRESENTATION**  
 The manager wondered **which gentleman** the secretary claimed [CP] ~~which gentleman~~ that the new salesman had pleased ~~which gentleman~~ in the meeting.
- (d) **+D-LINKING; -INTERMEDIATE REPRESENTATION**  
 The manager wondered **which gentleman** the secretary's claim about the new salesman had pleased ~~which gentleman~~ in the meeting.

The present materials only include *wh*-dependencies (+/- D-linked) and foregoes the use of control conditions with no *wh*-dependencies. Several previous studies (e.g. Gibson & Warren 1999, 2004 and Marinis *et al.* 2005) have already established that the effects being searched for at the critical subcategoriser are specific to constructions which include *wh*-dependency formation, suggesting that other differences between the conditions (e.g. differences in regions preceding the critical region) cannot explain the predicted results. The materials include a *wh*-filler which heads a complement clause which is selected for by the subcategorisation frame of the main verb (*wondered*). This *wh*-filler is either D-linked (*which*

*gentleman*) or not (*who*). The ensuing dependency then proceeds until the critical subcategoriser (*pleased*) where the antecedent will be reactivated. The intervening structure, however, either includes an intermediate CP by virtue of another verb which selects for a complement clause (*claimed*), or it does not include an intermediate CP by virtue of that verb having been nominalised (*the secretary's claim about the new salesman*). The conditions with the intermediate CP should be able to accommodate an intermediate reactivation of the *wh*-phrase, while the ones without should not have the syntactic space to do so according to most formal theories. Pesetsky (1987) claimed that D-linked dependencies can be formed in a way which should bypass such intermediate reactivation. Therefore, it is predicted that reading-times at the critical subcategoriser (*pleased*) should be facilitated by a local representation of the antecedent only for the non D-linked dependencies. Additionally, increased reading-times at the intervening CP might only be predicted for non D-linked antecedents since only these should be reactivating there, incurring a processing cost in so doing.

In a bid to prevent participants from positing a reactivation of the antecedent as the direct object of the verb in the higher clause (i.e. *claimed*) in the [+Intermediate representation] conditions, all the verbs used in this position were biased for taking a sentential complement according to Garnsey, Pearlmutter, Myers & Lotocky (1997). The materials used in this study were actually adapted from Marinis *et al.* (2005) who additionally tested a further six verbs for such biases and these were also used.

Marinis *et al.* (2005) note that the materials in Gibson & Warren (1999) contain an asymmetry between the conditions with *wh*-dependencies compared to those without since one contained more words than the other and was thus potentially a more complex construction to parse. The critical conditions in this experiment have *wh*-dependencies with 8 word segments intervening between the *wh*-filler and critical subcategoriser. As such, the fronted *wh*-phrase was always presented as a single-segment in the word-by-word self-paced reading task, whether or not it was D-linked (and thus contained two words) or was non D-linked (and thus contained one word). All other segments for the critical items were presented as single words. To ensure that multi-word D-linked segments did not become especially salient to participants, the filler items included 16 sentences with non D-linked multi-word segments, and 16 others which included D-linked antecedents which were split over two single segments. After each critical item a “yes/no” comprehension question was asked to ensure participants had fully comprehended the sentence. Among the 56 fillers there were examples of D-linked and non D-linked *wh*-dependencies (with and without intervening CP structures) without comprehension questions, and other sentence-types with them, to ensure their presence did not alert participants to the significance of *wh*-dependencies, types of intervening structure and D-linking. The frequency of fronted *wh*-phrases and critical subcategorisers have been controlled by ensuring that all had fewer than 5000 “hits” on the British National Corpus. Finally, note that all of the materials are tensed since it has been shown (e.g. Boxell 2009, unpublished) that untensed clauses may ameliorate *wh*-dependency formation in contexts which may be otherwise difficult to process, including long-distances such as these materials use.

Four presentation lists were created which contained one version of each critical sentence (i.e. one of the four critical conditions above). One (and only one) version of each of the twenty critical sentences was therefore present in each list. The four experimental conditions were consequently equally represented in each list such that every participant saw the same number of items for each condition. Each of the four lists was read by an equal number of participants.

### 3.1.2. Plausibility-norming questionnaire

Whilst every effort was made to ensure that, other than the critical manipulations, the critical sentences were identical across conditions, there remains an asymmetry. The subject of the critical subcategoriser differs between the [+Intermediate Representation] and [-Intermediate Representation] conditions. In (11a) and (11c) the subject which must be integrated with *pleased* is *the new salesman* while in (11b) and (11d) it is *the secretary's claim about the new salesman*. It is possible that, across the materials, there may be instances where integrating one version of the subject may be easier than the other if it is more plausible to do so. This in itself should not pose much of an issue since the same plausibility discrepancy would exist for both D-linked and non D-linked materials. However, in the case of the D-linked sentences specifically, this difference in the verb's subject may make the lexically-specified *wh*-phrase a more or less plausible object. For purely illustrative purposes, using (11c) and (11d), there may be some materials in which the equivalent of *the new salesman* pleasing a gentleman may be more plausible than a *secretary's claim about the new salesman* doing so. See (14) in Section 3.4.1 for an experimental item for which such a difference was indeed found. Plausibility differences can have an effect on processing difficulty, and thus reading-time measurements (e.g. Gibson & Pearlmutter 1998). To control for this possible discrepancy, an offline questionnaire was disseminated to the participants after they had completed the online task. The critical items were simplifications of the materials, including the same intervening structural difference (i.e. +/- Intervening CP) but with no *wh*-dependencies. Thus, the lexical item which had been fronted as part of the D-linked *wh*-dependencies in the online materials was now presented as the direct object of the critical verb, but the discrepancy in the subject is still present as illustrated in (12):

- (12) (a) The secretary claimed that the new salesman had pleased the gentleman.  
 (b) The secretary's claim about the new salesman had pleased the gentleman.

Two lists were created of which each participant only saw one. One version or the other of each of the twenty critical sentences was present in each list such that each participant only saw one version of any given sentence and each condition was equally represented across the materials. Participants were asked to rate each sentence on a 1-10 scale, where 1 was the least well-formed and meaningful and 10 was the most. 40 fillers were also added to the questionnaire which consisted of a variety of sentences which had considerable range in the acceptability of their form and meaning.

### 3.1.3. Working-memory test

As stated in Section 2.2., it is possible that successive-cyclicity is of benefit to working-memory. Since the experimental hypothesis concerns testing for such successive-cyclicity in real-time, it makes sense to screen participants' working-memory capabilities since the presence, absence or even reliance on intermediate representations of an antecedent could have been linked to such capabilities as opposed to any other linguistically-determined reasons.

The task was based on Daneman & Carpenter (1980). Participants were required to read through sentences written on cards one by one, turning the cards over as they did. Following each sentence, they had to decide whether it was grammatical or not by placing a tick or cross on an answer sheet. This ensured participants read each sentence in full and did

not focus purely on memorising the last word of each sentence (as they were also required to do). After a block of several sentences, participants would then be asked to recall the final word of each of the sentences just read. The blocks consisted of two, three, four and five sentences and were tested incrementally in this order. There were three blocks at each of these levels before moving on to the next. In short, the task examines participants' ability to hold words in memory while processing further sentences.

### 3.2. Participants

40 native English speakers (mean age: 23; range: 18-25) were recruited from the student community of the University of Essex and surrounding area. 23 participants were female, all participants were right-handed, and all but 3 were monolingual. All participants reported that they had never been officially diagnosed with any language or general cognitive disorders or learning disabilities; neither did they suspect they had any such problems.

### 3.3. Procedure

The self-paced reading task was administered using a non-cumulative word-by-word set-up (Just *et al.* 1982) on the DMDX software package (Forster & Forster 2003). Participants used a pacing button to read through the materials segment-by-segment as quickly as they could, revealing the next segment and removing the previous one as they did. The experimental trials were segmented into parts as is illustrated in (13).

(13) + | The | manager | wondered | {who/which gentleman} | the | {secretary/secretary's} |  
 1 2 3 4 5 6 7  
 {claimed/claim} | {that/about} | the | new | salesman | had | pleased | in | the | meeting.  
 8 9 10 11 12 13 14 15 16 17

The computer recorded the reading time for each segment, on the premise that higher reading times for a segment (or its spill-over region thereafter) correspond to higher processing difficulty for that segment. Following every critical item and half of the fillers, a “yes-no” comprehension question was asked to ensure the preceding sentences were being processed and thus comprehended correctly. Participants responded to these questions using separate “yes-no” buttons. Half of the questions had a correct “yes” answer while the other half had a “no” one, the distribution of which was randomised across materials. At the start of the self-paced reading task, on-screen instructions and three practice items were presented to ensure participants had correctly understood the task. Following this, participants were instructed to press the spacebar to begin the actual trials. They could ask the researcher task-clarification questions before doing so. They were offered a break every twenty items to prevent lethargy from affecting performance, pressing the spacebar again when they were ready to recommence trials. The stimuli were presented on a grey screen using black Arial (24pt) font for the sentences and Times New Roman (24pt) for the comprehension questions. Text was presented in the centre of the screen, and each item was preceded by a cross (“+”) in the centre of the screen to focus participants' eyes and attention. Following the self-paced reading task, participants next completed the working-memory task and finished with the off-line questionnaire. A short break was offered between each task, with sessions lasting no longer than one hour overall.

### 3.4. Results

#### 3.4.1. Working-memory and plausibility norming

All participants scored between 83.33% - 100% (mean: 94.32%, SD: 1.84%) for correctly recalling memorised words in the working-memory task. As such, all participants are considered to have a high-span working memory. Furthermore, the (percentage) median of participants' scores was used to split the 40 participants into two groups: the participants with scores below the median (i.e. the lower scores) were one group, while the ones above the median (i.e. the higher scores) were the other. A 2x4 ANOVA comparing the two groups' average performances at each of the four block levels was carried out, showing no significant differences between the groups in their ability to recall target words:  $F(1, 38) = .995, p > .05$ . In sum, we can be reasonably confident that there are no significant variations in working-memory capacity among the participants tested. Since intermediate representations are likely to benefit working-memory, one may argue that if bypassing them is possible in any parsers at all, it is more likely to be in ones with access to a high-span working-memory. As such, the chance of finding supportive evidence for Pesetsky's (1987) thesis is most likely maximised in participants of this type.

Regarding the plausibility-norming questionnaire, each of the 20 items were analysed individually. The participants' ratings for the [+/- Intermediate Representation] conditions for each item on the 1-10 scale were individually compared by *t*-test. Only the comparison for item 12 was statistically significant:  $t(39) = 21.299, p < .01$ . This item is reproduced here as (14), and ratings for (14a) averaged 9 while for (14b) they averaged 3. This suggests that integrating *charity* as object of the verb *attacked* is more plausible when the subject of that verb is *the TV journalist* compared to when it is *the minister's statement about the TV journalist*.

- (14) (a) The minister stated that the TV journalist had attacked the charity.  
 (b) The minister's statement about the TV journalist had attacked the charity.

Since this plausibility difference could explain any reading-time or comprehension-question response accuracy differences between the D-linked structures with and without an intermediate CP, all data for item 12 were excluded from any further analysis. In sum, we may conclude that plausibility differences for integrating a fronted D-linked *wh*-phrase with its subcategoriser where the subject of that subcategoriser differs as per the [+/- Intermediate Representation] manipulation do not account for any observed differences in the remaining data.

#### 3.4.2. Comprehension-question response accuracy

The mean percentages of correctly answered comprehension questions are given in Table 2 by experimental condition.

| Intermediate CP structure | Non D-linked <i>Wh</i> -dependencies | D-Linked <i>Wh</i> -dependencies |
|---------------------------|--------------------------------------|----------------------------------|
| +                         | 94.43%                               | 89.98%                           |
| -                         | 91.11%                               | 92.16%                           |

Table 2: Average correctly answered comprehension-questions (%)

2x2 participants and items ANOVAs comparing +/- D-linking conditions and +/- Intermediate CP structures did not yield any significant differences. Thus, participants seem to be equally good at answering these questions irrespective of the experimental manipulations. This is indicative of equally accurate overall comprehension of the sentences across the materials.

### 3.4.3. Reading times

The following data analysis is based on participants' residual reading times. These times are the participants' actual reading-times minus their predicted reading time as calculated by a regression equation. Such equations used all of a particular participant's data for words of specified lengths to estimate (all-other-things-being-equal) the reading time for a word of a particular length for that particular participant. Thus, residual reading times are relativised along two dimensions: (a) for the participant in question; (b) for the word-length of each segment. Therefore, differences in generic participant reading-speed on the one hand, and word-lengths across the materials on the other, are neutralised by the adjustments which the use of residual reading times provide.

The two particular segments which are of importance in attempting to identify the presence or absence of an intermediate representation of an antecedent are nine and fourteen. Recall the materials were segmented as indicated in (13), repeated here as (15). Segment nine is that in which either *that* or *about* is located. Since *that* indicates the commencement of the CP complement of *claimed* it is thought that, if an intermediate representation is activated at the CP boundary, the processing costs involved in doing so should result in an increased reading time here. This would not be expected for *about* since this does not correspond to a CP boundary.

- (15) The | manager | wondered | {who/which gentleman} | the | {secretary/secretary's} |  
 {claimed/claim} | {that/about} | the | new | salesman | had | pleased | in | the |  
 meeting.

Segment fourteen is the verb with which the fronted *wh*-phrase is associated, in the above example this is *pleased*. The fronted *wh*-phrase should be reactivated at this subcategoriser by way of completing its dependency. However, the conditions in which such *wh*-dependencies have an intervening CP have a posited intermediate activation of the antecedent which the ones without the intervening CP do not. It is predicted that a local representation of the antecedent at the intervening CP should speed up the subsequent reactivation at the subcategoriser since the antecedent would already be somewhat "active" in the mind. Thus, reading times at the subcategoriser, as the reactivation is instantiating, should be faster for the conditions with an intervening CP relative to the ones without. Of course, with respect to the predictions for both segments nine and fourteen, the hypothesis must be refined with respect to Pesetsky (1987). If these data are to be supportive of this theory, in which D-linked *wh*-dependencies do not involve intermediate representations of the antecedent, evidence of such intermediate representations should be restricted to non D-linked *wh*-dependencies.

Only reading time data for sentences for which participants correctly answered the comprehension question were included in the following analysis. Residual reading times greater than 1000ms were also removed from the data included in the analysis, affecting 0.28% of the data. Recall also that all data pertaining to item twelve were excluded from analysis on the grounds set out above in Section 3.4.1. affecting an additional 5% of the data.

Figure 1 displays the mean residual reading times (across all 40 participants) for all the remaining data for each segment.

As the graph in Figure 1 demonstrates, average residual reading times for non-critical segments seem numerically similar for all conditions. The variation among the reading times for each condition seems to be mainly located in segments nine and fourteen (i.e. the critical segments) and the regions immediately following them (i.e. segments ten and fifteen). As such, the following statistical analysis focuses on these segments.

In segment nine, *that* in the sentences with the intervening CP was read slower than *about* in the sentences without the intervening CP. As such, the reading time difference between the conditions with the intervening CP compared to those without the intervening CP was significant according to the participants analysis,  $F_1(1, 38) = 21.433$ ,  $p < .001$ , although it fell short of significance in the items analysis,  $F_2(1, 17) = .638$ ,  $p > .05$ . Additionally, segment nine is read faster when the antecedent of the *wh*-dependency is D-linked relative to the condition in which it is not. This is true for both the sentence types with and without an intervening CP, and yields an overall significance of D-linking for segment nine,  $F_1(1, 38) = 445.763$ ,  $p < .001$ ;  $F_2(1, 17) = 14.661$ ,  $p = .005$ .

According to the participants analysis there is also a significant interaction between +/- intervening CP structures and +/-D-linking,  $F_1(1, 38) = 50.736$ ,  $p < .001$ , but such interaction is not significant in the items analysis,  $F_2(1, 17) = 1.511$ ,  $p > .05$ . Planned comparisons reveal the faster reading time at segment nine for the D-linked constructions with an intervening CP is significantly different from the non D-linked constructions with an intervening CP in the participants analysis,  $t_1(38) = 10.603$ ,  $p < .001$ , and marginally significant in the items analysis,  $t_2(17) = 2.082$ ,  $p = .076$ . Similarly, the comparison of the +/- D-linked constructions without an intervening CP yields a significant difference at segment nine, with the D-linked one again being read faster than the non D-linked one,  $t_1(38) = 14.427$ ,  $p < .001$ ;  $t_2(17) = 2.470$ ,  $p < .05$ .

The same model of statistical analyses was used for segment ten. Since it immediately follows segment nine, the numerical differences found here may include statistically significant “spill-over” effects from what has just occurred before it. Indeed, the slower reading times for the [+Intervening CP] condition continues to be statistically significant from the faster [-Intervening CP] ones in the participants but not the items analysis,  $F_1(1, 38) = 5.620$ ,  $p < .05$ ;  $F_2(1, 17) = .121$ ,  $p > .05$ . As with segment nine, the D-linked conditions are read faster than the non D-linked ones when the intervening construction does not include a CP but this effect drops away when it does. As such, the effect of D-linking is only significant for the participants analysis,  $F_1(1, 38) = 6.735$ ,  $p < .05$ ;  $F_2(1, 17) = .892$ ,  $p > .05$ . In this segment, there was no significant interaction between +/- intervening CP structures and D-linking,  $F_1(1, 38) = .989$ ,  $p > .05$ ;  $F_2(1, 17) = 1.019$ ,  $p > .05$ . Planned comparisons reveal that the faster reading time for the D-linked condition with an intervening CP relative to the non D-linked condition with an intervening CP retains significance in the participants analysis but not the items analysis,  $t(38) = 3.216$ ,  $p < .05$ ;  $t(17) = -.673$ ,  $p > .05$ . The faster reading time for D-linked constructions relative to non D-linked ones without intervening CP structures retains its significance from segment nine,  $t(38) = 12.435$ ,  $p < .001$ ;  $t(17) = 2.006$ ,  $p < .05$ . In sum, the statistical effects found in segment ten follow a similar broad pattern as segment nine but with some dropping off as the numerical differences among the conditions reduces. By the time segment eleven is reached almost all of the numerical and statistical differences between the experimental conditions have disappeared.

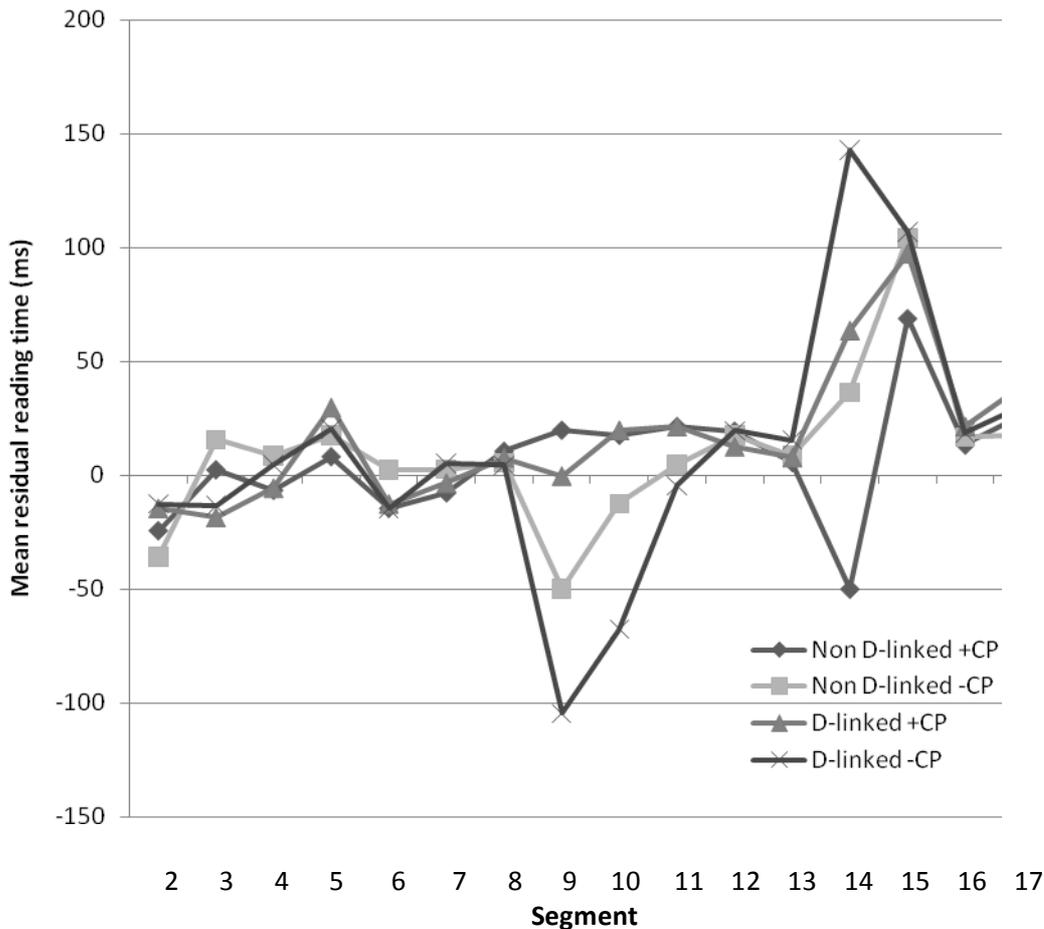


Figure 1: Mean residual reading times (ms)

The main critical segment is fourteen. This is the subcategoriser (e.g. *pleased*) with which the fronted *wh*-constituent is associated, and thus should yield a reactivation thereof. Recall that a localised representation of the antecedent at an intermediate CP is thought to ease this reactivation process, making for shorter reading times at the subcategoriser relative to conditions where no such intermediate CP is accommodated (see Gibson & Warren 1999, 2004; Marinis *et al.* 2005). Overall, constructions with an intermediate CP were read significantly faster at this segment compared to those without,  $F_1(1, 38) = 39.471$ ,  $p < .001$ ;  $F_2(1, 17) = 14.819$ ,  $p = .005$ . There was also a significant difference between the reading times of those subcategorisers which terminate a D-linked dependency relative to those which are non D-linked, with D-linked ones being read slower than non D-linked ones,  $F_1(1, 38) = 432.214$ ,  $p < .001$ ;  $F_2(1, 17) = 144.757$ ,  $p < .001$ . The interaction between the intervening structure effect and the D-linking effect was, however, not significant,  $F_1(1, 38) = .588$ ,  $p > .05$ ;  $F_2(1, 17) = .221$ ,  $p > .05$ .

Planned comparisons compared reading times at the critical subcategoriser for structures with an intervening CP and those without an intervening CP, firstly when those structures were not D-linked and secondly when they were D-linked. As expected, following Gibson & Warren (1999, 2004) and Marinis *et al.*'s (2005) findings, the shorter reading time of the subcategoriser when preceded by an intermediate CP structure compared to when preceded by a structure without an intermediate CP was indeed significant when those structures were not D-linked,  $t_1(39) = -21.326$ ,  $p < .001$ ;  $t_2(18) = -10.432$ ,  $p < .001$ .

Particularly pertinent with respect to Pesetsky's (1987) hypothesis is whether this difference also holds where the constructions were D-linked. Once again the reading times for the subcategoriser were significantly shorter when preceded by an intermediate CP structure relative to when preceded by a structure without an intermediate CP,  $t_1(39) = -9.303$ ,  $p < .001$ ;  $t_2(18) = -6.108$ ,  $p < .005$ .

As Figure 1 shows, many of the conditions "peak" in their reading time lengths in segment fifteen, with the only exception being the condition with a dependency which is D-linked without an intervening CP which took the longest to process at segment fourteen. This may suggest that at least for the other conditions, for which reading times were quicker at the subcategoriser, some of the antecedent reactivation processing may spill-over into segment fifteen, creating the increase in reading time seen there. The main effect of the difference between intervening structure (+/- CP) can be found in the participants analysis only in this segment,  $F_1(1, 38) = 4.190$ ,  $p < .05$ , as is also the case for the main effect of D-linking,  $F_1(1, 38) = 7.767$ ,  $p < .01$ . It would seem that this residual statistical significance which spills-over from segment fourteen is driven by the non D-linked structure with an intermediate CP continuing to be read faster than the segment fifteen of any of the other conditions. Indeed, the only significant result from the planned comparisons for this segment was the participants analysis comparing the non D-linked structures with and without an intermediate CP,  $t_1(39) = -2.645$ ,  $p = .012$ . Segment fifteen reading times generally, then, appear to have already converged, losing most of the distinctive effects they may have had previously. Of course, the main point to draw from segment fifteen and furthermore segments sixteen and seventeen (as seen in Figure 1) is that the effects seen at the critical subcategoriser in segment fourteen rapidly disappear and residual reading times for the subsequent segments return to a "normal" pace, wherein the differences between the experimental conditions are not significant.

#### 4. Discussion and conclusions

##### 4.1. Pesetsky's hypothesis

The data collected for segment fourteen (i.e. the critical subcategoriser) indicate that both non D-linked and D-linked dependency formation includes intermediate representations of the antecedent at CP clause boundaries. This can be interpreted from the significantly faster reading times at the subcategoriser for conditions with an intermediate CP compared to those without. The intermediate CP accommodates an intermediate representation of the antecedent (i.e. most formalisms agree such structures have the "syntactic space" for such representations) while structures without the intermediate CP do not. The rationale was that localised activation of an antecedent (at the intermediate CP) will boost its prominence in the parse, facilitating faster reactivation of that same antecedent at the subcategoriser. This would not be possible for constructions which do not include intermediate representations, and would yield slower reading times at the subcategoriser.

That this difference is found as much for the D-linked as the non D-linked dependencies is particularly problematic for Pesetsky (1987). Recall that this hypothesis states that the ameliorative effect of D-linking on island constraint violations is attributable to the fact that it should be possible for D-linked dependencies to form in a binding-type operation rather than a Chomskyan "movement" (or non-transformational "slash-pathway") style of dependency formation. This is because constraints of this type, it was reasoned, specifically apply to "movement". This experiment examined long-distance dependency formation because, in this environment, the nature of binding-type and the nature of movement and slash-pathway type dependencies differ in a particularly crucial way: the former unfolds in a

single operation which can span multiple clauses, while the latter are predicted to require intermediate reactivation at clause-boundaries by way of unfolding successive-cyclically. Thus, if Pesetsky (1987) were correct, D-linked long-distance dependency formation should not be affected by whether or not the intervening structure of that dependency accommodates an intermediate representation. The significantly faster reading times for D-linked antecedent reactivation at the subcategoriser when the preceding structure contained an intermediate CP relative to when it did not, however, suggests D-linked *wh*-dependencies are affected by intervening structure in the same way non D-linked dependencies are. In turn, this indicates D-linked dependencies are not formed by single-step binding but instead follow the non D-linked dependencies (which show the same difference) in using a multiple-step movement or slash-pathway form of dependency in which antecedent reactivation at the subcategoriser can benefit from localised representations at an intervening CP.

Recall that the data from segment nine may also bear on Pesetsky's hypothesis in as much as the instantiation of an intermediate representation in this segment - at least in the conditions which accommodate it - may yield longer reading times than those where such instantiations are not possible. Indeed, constructions with intermediate CP structures were read significantly slower than those without. However, this difference must be treated carefully. Segment nine in the [+Intermediate CP] conditions was *that* while in [-Intermediate CP] it was *about*. Thus, the difference observed here could result from the fact that they are different words from different word classes with different frequencies and other properties. Furthermore, and perhaps more significantly, *that* marks the start of a new clause while *about* does not. As many studies (e.g. Kluender & Kutas 1993) have shown, "wrap-up" procedures at the end of one clause can incur additional processing costs, while the predictions the parser may make at the start of a new clause about the structure to come may also consume processing resources (see Gibson 2000). Any or all of these factors could explain the increased reading time for the conditions with an intermediate CP, without necessarily invoking the issue of intermediate representation instantiation costs at all.

In a bid to combat such confounds for interpreting segment nine data, planned comparisons examined the two intervening CP conditions (+/- D-linked) and the two conditions without an intervening CP (+/- D-linked). The non D-linked constructions with an intervening CP were read significantly slower than their D-linked counterparts. It is unlikely, however, that this is caused by setting-up an intermediate representation of the antecedent in the non D-linked condition while not doing so in the D-linked condition. This is because the comparison of the two conditions without an intervening CP also yielded a similarly significant difference, and neither of these latter conditions can accommodate an intermediate representation of the antecedent in any case. Thus, the difference must be explicable in some other way which does not involve intermediate representation instantiation at all. Rather, the effect of D-linking itself would seem to drive the differences between both pairs of conditions. An explanation is offered in Section 4.2.

In sum, it seems that the increased reading times found for constructions with an intervening CP cannot necessarily be attributed to setting-up an intermediate representation and the difference between the two conditions with intervening CPs cannot necessarily be attributed to one setting-up an intermediate representation while the other does not. Thus, while data were collected for segment nine with the intention of using them to comment on the presence or absence of intermediate antecedent representations, it would seem they cannot contribute to that particular discussion with sufficient clarity. Instead, we must rely on the discussion of segment fourteen above. On that basis, then, it would seem these data are not consistent with the predictions generated from Pesetsky (1987).

#### 4.2 D-linking: A “processing stabiliser”

If the discussion in Section 4.1. is correct, then two key questions remain unanswered. Firstly, if Pesetsky’s (1987) account of the ameliorative effects of D-linking appears to be inconsistent with these data, then what does cause said amelioration of constraints like islands? Secondly, why is segment nine read significantly quicker during the computation of D-linked dependencies whether or not that segment constitutes an intervening CP structure? What follows is one possible unified answer for both of these questions.

As Figure 1 illustrates, there is an effect of D-linking in segment nine, both for dependencies with an intervening CP and for those without. The effect is driven by the fact that the segment is read faster when the antecedent of the dependency is D-linked. Why should this be? The answer may reside in the fact that segment nine, in all of the critical materials, could very well represent a moment of *potential* complexity. Imagine if, while the parser is still searching for a reactivation or gap-filling site for the *wh*-filler, one of the two following scenarios occurred: (1) on encountering the structure with an intermediate CP, the intermediate CP position was occupied by another *wh*-phrase; (2) on encountering the structure without an intermediate CP (which instead has a complex DP subject), the object of the preposition *about* becomes a vacant gap position. (22a) illustrates the first of these scenarios and (22b) the second:

- (16) (a) \*?The manager wondered **which gentleman** the secretary claimed [CP **who who** had pleased ~~**which gentleman**~~] in the meeting.  
 (b) \*?The manager wondered **which gentleman** the secretary’s claim about ~~**which gentleman**~~ had pleased in the meeting.

In short, both of the scenarios are island constraint violations – (16a) is a *wh*-island violation and (16b) is a complex subject island violation<sup>1</sup>. Segment nine occurs at the moment for *potential* island creation since it is either *that*, marking the intermediate CP which could have created a *wh*-island had it been occupied, or *about* which could have created a subject island had its object position been vacant. Furthermore, since these constructions have an on-going *wh*-dependency in formation, segment nine actually represents a moment of *potential* island violation. An awareness of the potential for the parse to crash at this point would likely carry a processing cost. Additionally, because *that* marks a new clause boundary, recall that there seems to be inherent processing costs associated with ending one clause and beginning a new one, also making segment nine (in the relevant condition) a likely moment of processing difficulty.

We might posit an albeit speculative hypothesis in which the faster reading times for D-linked dependencies at the time-locked moment of parsing difficulty is linked to the amelioration effects of D-linking on those very same complexities, i.e. islands and clause-boundary processing<sup>2</sup>. Indeed, just as electrophysiological responses can be observed for “wrap-up” processes at clause boundaries (Kluender & Kutas 1993), the parser seems aware

<sup>1</sup> Of course, since these are D-linked dependencies, the violation of these island constraints may seem more acceptable than would otherwise have been the case.

<sup>2</sup> Note that Boxell (2009) found an amelioration effect of D-linking for *wh*-dependencies which included a clause-boundary and were entirely grammatical relative to ones which were also grammatical but were only single-clauses in an offline questionnaire. Furthermore, it has been generally established in the literature that long-distance dependencies can involve increased processing costs relative to short distance ones (see, e.g., Phillips *et al.* 2005).

of island violation there as well. McKinnon & Osterhout (1996) found ERP effects at the moment in which a *wh*-island boundary was parsed while a *wh*-filler had not yet been reactivated at an underlying position. Since this real-time sensitivity to the syntactic complexities themselves is so acute, it might seem plausible to suppose that sensitivity to features which can ameliorate those same phenomena can be equally time-locked to the relevant moment of the parse.

As discussed in Section 2.3., D-linking clearly includes an increased degree of lexical specificity for a *wh*-dependency's antecedent, which becomes prominent in the discourse-structure of a sentence early in the time-course of its processing (Radó 1998; Frazier & Clifton 2002; and Diaconescu & Goodluck 2004). It might be hypothesised that it is this property which "stabilises" the parse. I define a "stabiliser" as any property of language which adjusts the scope of the discourse-conceptual structure related to a parse which subsequently makes the successful completion of that parse, namely deducing its overall meaning, more likely. The parse may be thought of as possessing increased levels of "stability" when such properties occur since the processor may be able to rely more heavily on this discourse-conceptual structure as an information source to complete the parse, enabling it to be (at least to some extent) desensitised to a range of constraints and difficulties which may have otherwise been problematic, maybe even causing the parse to crash. That is, the early-instantiated pragmatic and/or semantic properties of the D-linked antecedent, and the resultant plausibility implications for the way in which the dependency may feasibly unfold could very well be a sufficient "stabiliser" to permit an avoidance or ignorance of the island constraint *as and when* its boundary is encountered. Having a D-linked antecedent means the possibilities for how the parse may feasibly proceed are restricted by the parts of the discourse-structure which are constructed early in the parse, and as such the main target of sentence comprehension processing, namely deducing the intended meaning of the input dependency (i.e. *who* did *what* to *whom*) is now simplified by virtue of having been partially completed. The parsing of the dependency can now only proceed in a way which is compatible with the plausibility cues which may be extrapolated from that partially completed discourse-structure. Thus, the deductive power of the parser for establishing how the dependency should be formed and ultimately what meaning should be extracted from it is boosted. Clearly, if meaning is transparently deducible from the structure, the relevance of any constraints which may have otherwise had an effect on it (e.g. islands) may be diminished.

In short, it could be this "stabilising" which yields the ameliorative effect of D-linking, and this may have an observable psychological reality at critical moments of complexity in the parse in which sensitivity to (potential) complexities is reduced, meaning parsing may continue to proceed in a timely fashion. This is what may be observable in segment nine. The data in Figure 1 may even lead us to assert that reading times can actually speed up at such a critical moment in the parse during D-linked dependency formation. Maybe this is a bid to literally "jump-over", "speed-past" or "avoid" the location of a possible syntactic constraint violation with which the parser already knows it need not be concerned.

The data from segment fourteen may support the idea that the lexical properties of a D-linked antecedent are indeed transmitted across the entire *wh*-dependency. That is, these properties seem to be held in working-memory and are reconstructed at the underlying reactivation position at the subcategoriser. This would explain the main effect of D-linking found in segment fourteen, whereby the D-linked conditions were read more slowly than their non D-linked counterpart conditions. The lexical specificity of D-linked antecedents may cause increased reading times at the underlying subcategoriser since their semantic and

pragmatic properties would have to be reconstructed, and the plausibility of its integration with the subcategoriser and its subject would need evaluating in addition to which lexical access processes may also be needed. This is a finding which converges with that of Shapiro *et al.* (1999), who found delayed cross-modal priming effects for D-linked antecedents at underlying gap positions relative to non D-linked controls, among others (see Section 2.3.).

There is, however, a crucial caveat to this “stabiliser” hypothesis. As mentioned above, it is currently only a mere hypothetical speculation. Since it was not the hypothesis under investigation in the present study, there was no control in which there was a segment nine equivalent which was not a *potential* island or complexity. Such a condition would be a prerequisite to attempt to show that D-linking “stabiliser” effects are indeed time-locked specifically to moments where problems or difficulties like (potential) islands are encountered by the parser. In short, a great deal of further research is required in order to pursue the “stabiliser” hypothesis of D-linking. This first pass at such an idea, however, allows us to posit a feasible explanation of the main effect of D-linking found in segment nine on the one hand, and a feasible explanation for how and why D-linking has the ameliorative properties that it does, and even a time-course for those properties, on the other.

The “stabiliser” hypothesis, if correct, may suggest that the ameliorative properties of D-linking may be explained by its processing rather than by relying on a formal syntactic account like Pesetsky (1987) at all. However, it may worth noting that there are alternative formal accounts which may explain the properties of D-linking without resorting to (unselective) binding. Pesetsky (2000), for example, posits that D-linked *wh*-phrases may (optionally) use feature movement to satisfy locality constraints like Superiority (Chomsky 1973) or Attract Closest (Richards 1997) while the surface word string itself continues to give the appearance of a Superiority violation. See Shields (2008) for a similar formal account, and Van Craenenbroeck (2004, 2010) which suggests complex *wh*-phrases may have successive-cyclic empty-operator movement. In sum, it would seem that while the present paper suggests Pesetsky (1987) may not be an adequate theory of D-linking, further research is required to examine the other theories of both performance and competence which may be.

#### 4.3 Different types of antecedent reactivation

There would seem to be a distinction between the two main effects of D-linking found in the present study. At segment nine, it has been suggested that the lexical properties of D-linked dependencies may stabilise the possible complexities found there as an explanation for the faster reading times for the D-linked conditions relative to their non D-linked counterparts. At segment fourteen, the need to reconstruct those lexical properties at the subcategoriser have been cited as an explanation for why reading times are slower for the D-linked conditions. If both of these interpretations are indeed correct, along with the indications found (in segment fourteen) that D-linked dependencies do include antecedent reactivation at the intermediate CP, then the type of reactivation found at the intermediate position is likely to be different from that found at the underlying subcategoriser. Full reactivation of a D-linked antecedent at its underlying verb - lexical specificity included - causes a slowing of reading time to below that of the non D-linked conditions. The D-linking effect found at segment nine, which is inclusive of, but not exclusive to, intermediate reactivations of the antecedent includes faster reading times of the D-linked conditions relative to the non D-linked ones. Thus, if full reactivation of the lexical specificity causes a slowing of the reactivation of the D-linked antecedent at the verb, it would seem that full lexical reactivation is unlikely to be occurring at the intermediate position. Any amelioration of (potential) complexities found at segment

nine which may be caused by the lexical specificity of a D-linked antecedent as suggested in my “stabiliser” hypothesis is presumably driven by the lexical information which is held in the background working-memory involved with forming any (D-linked) *wh*-dependency per se, rather than being associated with a specific reconstruction of the antecedent at this position. This would be consistent with the fact that the segment nine D-linking effect is entirely independent of whether or not an intermediate representation of the antecedent is present, or indeed possible.

In sum, then, it would seem that antecedent reactivation at intermediate positions within a *wh*-dependency is distinct from that at the underlying subcategoriser position, particularly with respect to the reconstruction of lexical information. This finding potentially bears on several other debates in the sentence processing literature. As suggested in Section 2.2., the inability of Finn, Kim & Piñango (2010) to find evidence of intermediate representations of an antecedent using cross-modal priming could be because those intermediate gaps are purely structural, not involving the semantic content on which cross-modal priming depends. The dissociation between intermediate and subcategoriser gaps found in the present study with respect to lexical content could support the notion that the intermediate reactivation of an antecedent is indeed lacking in the lexical-semantic information which would drive a cross-modal priming effect. Similarly, in Section 2.2., it was suggested that if evidence could be found to show that intermediate reactivation is purely structural (and devoid of semantic information) it could help to resolve a problem identified by Fodor (1995). That is, since antecedent reactivation (at the verb) could rely purely on correctly linking a dislocated constituent with its verb semantically, it is difficult to isolate whether or not structural reactivation exists during real-time processing. While the pre-existing literature’s support for successive-cyclicity goes some way in isolating an occasion where antecedent reactivation is inherently less able to rely on the semantic content of the verb, the present study’s D-linking manipulation may isolate an actual behavioural difference between the nature of intermediate and verbal reactivation during parsing. Namely, the lexical-semantic content of an antecedent seems to be selectively reactivated at the verb and not at intermediate positions. Finally, online evidence of successive-cyclic dependency formation supports a strong version of the Active Filler Strategy (Clifton & Frazier 1989). Under this principle of on-line dependency formation, an active *wh*-word (or filler) triggers a search for the nearest potential reactivation site (or “gap”) which can be filled by a representation of the antecedent. Long-distance dependencies, then, can include intermediate gap-filling so as to divide up the formation into several shorter parts. Direct Association (Pickering & Barry 1991) posits a linking of the fronted antecedent directly with its subcategoriser and so it does not account for intermediate reactivations. Furthermore, Direct Association may rely more on the conceptual links between the antecedent and its underlying position, which would clearly not account for purely structural intermediate reactivation.

#### 4.4. Concluding remarks

The present study set out with the intention of searching for the psychological reality of some predictions made by a formal account of D-linking, namely that its *wh*-dependencies can form via (unselective) binding (Pesetsky 1987). This would have explained why such dependencies are less sensitive to “movement” constraints like islands. However, at clause-boundaries, D-linked antecedents behaved like non D-linked ones and were reactivated. This was evidenced by the fact that antecedent-subcategoriser integration was faster in constructions with an

intervening CP, facilitating a mediating representation of the antecedent, compared to constructions without an intervening CP. Intermediate antecedent representations are thought to speed up subsequent subcategoriser reactivation since they boost the prominence of the argument in the parse, and reduce the working memory cost of the dependency formation. Since intermediate representations are a feature of movement-type dependency formation, but not of binding, it would seem that Pesetsky's (1987) account is inconsistent with these findings. While other formal accounts of D-linking have been put forward (e.g. Pesetsky 2000), the segment nine data of this study has motivated the (speculative) hypothesis that the early-discourse instantiation which D-linking provides, and has often been alluded to as the source of its amelioration effects (Radó 1998; Frazier & Clifton 2002; Diaconescu & Goodluck 2004), may in fact have specific time-locked effects. That is, when the processor encounters a moment in which constraint violation is a possibility and/or other processing complexities may be present, a D-linked dependency is "stabilised" by virtue of having more of its overall discourse-conceptual structure already assembled. It will be interesting to see if such stabiliser effects are indeed unique to moments of potential complexity and if they can be linked to the amelioration of constraint violations. Finally, this study has provided potential evidence of the psycholinguistic distinctiveness of intermediate gaps from their subcategoriser counterparts in that it is likely that only the latter have lexical content.

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# Pronominal ordering in Pngawan Atayal

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As in many languages, personal pronouns in Pngawan Atayal are usually clitics. If two such pronouns co-occur in a clause, they form a cluster with strict ordering relative to each other. This study deals with two problems: how personal pronouns are ordered and, if two pronouns co-occur, what the restrictions are.

First, some background about the language is given, including its inventory of personal pronouns. Next, the cluster-internal and -external ordering are reported, and the four combination types are divided into whether or not there are two overt pronominal forms in the clitic cluster. An Optimality-theoretic analysis is then proposed.

## 1. Introduction

Atayal is an Austronesian language of northern Taiwan. Pngawan (spoken in Qin'ai Village, Ren'ai Township, Nantou County) is a subdialect of C'uli', which is one of the subgroups of Atayal (Li 1981/2004:625). With Seediq, Atayal forms a primary subgroup of Austronesian (Blust 1999:45–46, citing Li 1981/[2004]). Out of an ethnic population of about a thousand, less than one third speak Pngawan (Huang 2006:205). Table 1 is the pronominal inventory.<sup>1</sup>

| Case<br>Person/Number | Nominative    | Genitive       | Locative              | Neutral      |
|-----------------------|---------------|----------------|-----------------------|--------------|
| 1SG                   | = <b>tsu</b>  | = <u>mu</u>    | <i>kinan ~ kinanʔ</i> | <i>ku.iŋ</i> |
| EXCL1PL               | = <b>min</b>  | = <u>min</u>   | <i>tsaminan</i>       | <i>tsami</i> |
| INCL1PL               | = <b>taʔ</b>  | = <u>taʔ</u>   | <i>itan</i>           | <i>itaʔ</i>  |
| 2SG                   | = <b>suʔ</b>  | = <u>suʔ</u>   | <i>sinan ~ sinanʔ</i> | <i>isuʔ</i>  |
| 2PL                   | = <b>mamu</b> | = <u>mamu</u>  | <i>tsimunan</i>       | <i>tsimu</i> |
| 3SG                   | —             | = <u>niʔ</u>   | <i>hijan</i>          | <i>hijaʔ</i> |
| 3PL                   | —             | = <u>nahaʔ</u> | <i>lahan</i>          | <i>lahaʔ</i> |

Table 1. Personal pronouns (Huang 2006:236; my transcription of /ɹ/)

<sup>1</sup> In the Austronesianist tradition, the case label GEN(itive) is used for both possessors within a nominal expression—e.g., twice in (8) below—and the Actor of certain voices (including the two voices exemplified in this paper), whereas NOM(inative) encodes the Undergoer in the same voices. Other abbreviations and symbols in this paper are as follows: BV, beneficiary voice; EXCL(usive); LV, locative voice; NEG(ation); OCP, Obligatory Contour Principle; OT, Optimality Theory; PL(ural); SG, singular. Transcription is phonemic, using IPA notation.

Free forms appear in italics; NOM, in bold type; and GEN, underlined.<sup>2</sup> The pronominal inventory also includes seven portmanteaux listed separately in table 2 below.

I define the following terms used in this paper: (i) the label CLITIC represents personal pronouns that encode NOM and GEN, and both are preceded by an equal sign; (ii) the clitic CLUSTER is defined as everything between the curly braces, which means everything in clitic position; (iii) CO-OCCURRENCE refers to two overt clausemate forms, but portmanteaux are excluded from this definition because they are single forms; (iv) a COMBINATION refers to any pair of person/number feature sets (including portmanteaux), regardless of whether both pronouns are in the clitic cluster. The following is an example, where an equal sign is attached to each clitic; and there are two pronominal forms in the cluster.<sup>3</sup>

- (1) pawas-an {=**tsu**      =naha?} haŋ.  
 sing-LV    {=NOM.1SG=GEN.3PL} temporarily  
 ‘They would sing to me.’ (Huang 2006:208)

In (1), the verb is the host (clause-initial element); in most other examples below — all but (7) — either NEG or an auxiliary boundary is the host. An auxiliary or NEG allows the lexical verb to serve as a boundary between the clitics and any remaining free elements in the clause.

## 2. *Pronominal co-occurrences within the clitic cluster*

There are two ways for pronominal forms to co-occur in the clitic cluster. In every overt cluster, the order follows a person hierarchy: first > second > third (formalized in section 4 below as ME-1ST » YOU-1ST). All seven such combinations are listed as follows.

- (2) a. ʔaɪat        {=**tsu**                =mamu} bahij-an.  
 NEG.IRR        {=NOM.1SG        =GEN.2PL} hit-LV  
 ‘Don’t hit me.’ (cf. \*{=mamu=**tsu**})  
 b. ʔaɪat        {=**min**                =mamu} bahij-an.  
 NEG.IRR        {=NOM.EXCL1PL =GEN.2PL} hit-LV  
 ‘Don’t hit us.’ (cf. \*{=mamu=**min**})
- (3) a. ʔaɪat        {=**tsu**                =naha?} bahij-an.  
 NEG.IRR        {=NOM.1SG        =GEN.3PL} hit-LV  
 ‘They didn’t hit me.’ (cf. \*{=naha?=**tsu**})  
 b. ʔaɪat        {=**min**                =naha?} bahij-an.  
 NEG.IRR        {=NOM.EXCL1PL =GEN.3PL} hit-LV  
 ‘They didn’t hit us.’ (cf. \*{=naha?=**min**})
- (4) ʔaɪat        {=**ta?**                =naha?} bahij-an.  
 NEG.IRR {=NOM.INCL1PL =GEN.3PL} hit-LV  
 ‘They didn’t hit us.’ (cf. \*{=naha?=**ta?**})

<sup>2</sup> Shih’s table (2008:24) differs from Huang’s (2006:236) as to the presence of the final [ʔ] in some forms. I have confirmed that Huang’s (2006:236) transcription of [ʔ] is correct and use it without further comment below.

<sup>3</sup> To my knowledge, the sentence in (1) is the only example of co-occurring pronouns in the Plngawan literature. Two examples from the literature involving portmanteaux are listed in (7) and (8) below.

- (5) a. ?ajət        {=**su?**        =**naha?**}    bahij-an.  
          NEG.IRR    {=NOM.2SG    =GEN.3PL}    hit-LV  
          ‘They didn’t hit you.’ (cf. \*{=**naha?**=**su?**})  
       b. ?ajət        {=**mamu**       =**naha?**}    bahij-an.  
          NEG.IRR    {=NOM.2PL    =GEN.3PL}    hit-LV  
          ‘They didn’t hit you.’ (cf. \*{=**naha?**=**mamu**})

In each of the examples so far, a NOM-case clitic encoding the Undergoer precedes a GEN-case clitic encoding the Actor and both pronouns are clitic forms.<sup>4</sup>

The second type of pronominal co-occurrence involves a phenomenon called DISFORMATION: when two pronouns co-occur, the latter one is replaced with a free form of the same person and number (Peng & Billings 2008). In Pngawan only an Undergoer pronoun, if it is not as person-prominent (using the definition in the opening paragraph of this section) as the Actor pronoun, appears not in its normal clitic-NOM form but rather in a (free) case-NEUTRAL form. Thus, if the GEN.1SG Actor =*mu* co-occurs with a 2PL Undergoer, the latter pronoun is not the (bound) NOM.2PL =*mamu* but rather the (free) NEUTRAL.2PL *tsimu*. Aside from =*mu tsimu* in (6a), =*min tsimu* ‘=GEN.1PL NEUTRAL.2PL’ is attested in (6b).

- (6) a. ?ajət        {=*mu*        *tsimu*}        bahij-an.  
          NEG.IRR    {=GEN.1SG    NEUTRAL.2PL}    hit-LV  
          ‘I didn’t hit you.’ (cf. \*{=*mu*=*mamu*}, \*{=*mamu*=*mu*}, \*{*tsimu*=*mu*})  
       b. ?ajət        {=*min*        *tsimu*}        bahij-an.  
          NEG.IRR    {=GEN.EXCL1PL NEUTRAL.2PL}    hit-LV  
          ‘We didn’t hit you.’ (cf. \*{=*min*=*mamu*}, \*{=*mamu*=*min*}, \*{*tsimu*=*min*})

Only the preceding nine overt co-occurrences within a clitic cluster are found. The next section discusses combinations involving only a single pronominal form in the clitic cluster.

### 3. Additional pronominal combinations

There are two additional ways for pairs of pronominal-feature sets to combine in a clause: seven portmanteaux, where two sets of features combine in a single form, and two additional combinations, where only one of the two pronouns is in clitic position. Both of the strategies in this section are ways to get around certain co-occurrence restrictions.

To begin, a pronominal PORTMANTEAU is two sets of persons/numbers fused into a single form. The two sentential examples from the literature on Pngawan are as follows.

- (7) ... si-pawas {=*misu?*}.  
          BV-sing    {=1SG>2SG}  
          ‘I will sing for you.’ (Shih 2008:65)

<sup>4</sup> Van Valin (2005:53–67) discusses two macroroles, the Actor and Undergoer, which combine individual thematic roles (such as Agent, Experiencer, or Patient). As such, though the Agent and Patient are invariably the Actor and Undergoer, respectively, the converse is not true. For instance, the Experiencer can also serve as the Actor or Undergoer. These macroroles are particularly useful in the treatment of Austronesian languages.

- (8) wajaɪ    {=tsiniʔ}        pakatsik-an ɹaruluʔ=niʔ    mama=mu.  
 PRF        {=3SG>1SG}    lend-LV    car=GEN.3SG    uncle=GEN.1SG  
 ‘My uncle lent me his car.’

(Huang 2006:209; my portmanteau analysis of /=tsiniʔ/ and /ɹ/ transcription)

All seven portmanteaux are also tabulated in table 2 and exemplified in (9) through (13).

|             |         |            |
|-------------|---------|------------|
| 2SG>1SG     | =sakuʔ  | (10)       |
| 3SG>1SG     | =tsiniʔ | (8), (11a) |
| 3SG>EXCL1PL | =miniʔ  | (11b)      |
| 3SG>INCL1PL | =taniʔ  | (12)       |
| 1SG>2SG     | =misuʔ  | (7), (9)   |
| 3SG>2SG     | =siniʔ  | (13a)      |
| 3SG>2PL     | =maniʔ  | (13b)      |

Table 2. Pronominal portmanteaux (Shih 2008:24; Huang’s transcription of /ʔ/)

- (9) ʔaɹat        {=misuʔ}        bahij-an.  
 NEG.IRR    {=1SG>2SG}    hit-LV  
 ‘I didn’t hit you.’  
 (cf. \*{=mu=suʔ}, \*{=suʔ =mu})
- (10) ʔaɹat        {=sakuʔ}        bahij-an.  
 NEG.IRR    {=2SG>1SG}    hit-LV  
 ‘Don’t hit me.’  
 (cf. \*{=suʔ=tsu}, \*{=tsu=suʔ})
- (11) a. ʔaɹat        {=tsiniʔ}        bahij-an.  
 NEG.IRR    {=3SG>1SG}    hit-LV  
 ‘He didn’t hit me.’  
 (cf. \*{=niʔ=tsu}, \*{=tsu=niʔ})  
 b. ʔaɹat        {=miniʔ}        bahij-an.  
 NEG.IRR    {=3SG>EXCL1PL}    hit-LV  
 ‘He didn’t hit us.’  
 (cf. \*{=niʔ=min}, \*{=min=niʔ})
- (12) ʔaɹat        {=taniʔ}        bahij-an.  
 NEG.IRR    {=3SG>INCL1PL}    hit-LV  
 ‘He didn’t hit us.’  
 (cf. \*{=niʔ=taʔ}, \*{=taʔ=niʔ})
- (13) a. ʔaɹat        {=siniʔ}        bahij-an.  
 NEG.IRR    {=3SG>2SG}    hit-LV  
 ‘He didn’t hit you.’  
 (cf. \*{=niʔ=suʔ}, \*{=suʔ=niʔ})  
 b. ʔaɹat        {=maniʔ}        bahij-an.  
 NEG.IRR    {=3SG>2PL}    hit-LV  
 ‘He didn’t hit you.’  
 (cf. \*{=niʔ=mamu}, \*{=mamu=niʔ})

Since a portmanteau is a single form, the cluster does not have any internal ordering.

The last type of combination is of particular interest. If both clitic paradigms attest monosyllabic forms for the given combinations of persons/numbers, then neither disformation

nor a portmanteau occurs. In other words, when two monosyllabic forms would otherwise co-occur, only a *free* form preceded by NOM-marking /kaʔ/ — i.e., a free form in free position — is used to encode the Undergoer. For example, in (14) GEN.EXCL1PL =min does not co-occur with the NOM.2PL =suʔ; neither \*=min=suʔ nor \*=suʔ=min is attested. Rather, =min ... kaʔ isuʔ is used, where /kaʔ/ marks NOM (on various free forms, mainly nouns) and isuʔ is the case-NEUTRAL free form.

- (14) ʔarat            {=min}                    bahij-an kaʔ    isuʔ.  
 NEG.IRR        {=GEN.EXCL1PL} hit-LV            NOM NEUTRAL.2SG  
 ‘We didn’t hit you.’            (\*{=min=suʔ}, \*{=suʔ=min}, \*{=min isuʔ}, \*{isuʔ=min})

Compared to (6a–b) above, where two pronominal forms co-occur in clitic position, in (14) one of the pronouns is not in clitic position, as diagnosed by (i) its position after the lexical verb and (ii) the use of /kaʔ/, which invariably precedes free forms. Huang (2006) and Shih (2008) list numerous examples with /kaʔ/.

Unlike all of (1) through (6) and (14) above, in (15) the pronoun that is less person-prominent is adjacent to the host. However, as in (6a–b) and (14), it is the GEN-case Actor pronoun that is host-adjacent, with the other pronoun realized as a free form.

- (15) ʔarat            {=suʔ}                    bahij-an kaʔ    tsami.  
 NEG.IRR        {=GEN.2SG} hit-LV            NOM NEUTRAL.EXCL1PL  
 ‘Don’t hit us.’                    (\*{=suʔ=min}, \*{=min=suʔ}, \*{=min tsami}, \*{tsami=min})

From these data, we see that if the pronoun is a clitic, it has to be attached to the clause’s first element; in other words, the clitic cluster is in Wackernagel position.<sup>5</sup> The host can be the lexical verb — in (1), (7), and (8) — or NEG — in (2) through (6) and (9) through (15).

#### 4. Optimality-theoretic analysis

Constraints in the literature relevant to pronominal ordering in this paper are defined first. Then, tableaux show how the constraints are used. The constraints given are used to deal with the four pronominal-combination types in Plngawan presented in sections 2 and 3 above.

Grammatical person can be a factor affecting the cluster-internal ordering of the pronouns:

- (16) Person constraints        (Chen & Hung 2007, cited in Hung & Billings 2009/2010:11–12)  
 a. ME-1ST: A [+me] pronoun is first in the cluster.  
 b. YOU-1ST: A [+you] pronoun is first in the cluster.

Peng & Billings (2008:193), verifying Post & Gardner’s account (1992:xx) of Binukid (Austronesian, southern Philippines), show that in a cluster a [+me] pronoun goes first and if

<sup>5</sup> Peng & Billings (2008) clarify two kinds of clitic position (where X stands for a potential nonverbal host):

a. [X + cluster + X + verb ...] The pronoun is unambiguously in Wackernagel (or post-initial) position.

b. [X + X + cluster + verb ...] The pronoun is unambiguously verb-adjacent.

In this paper’s data, however, the clitic cluster is located in the position [X + cluster + verb ...]. Because the clitic cluster is right after the first element X and immediately precedes the lexical verb, it is not clear which external-ordering Plngawan belongs to. In addition, there are two subtypes of Wackernagel position: 2*W* (after the first word) and 2*D* (after the first daughter). These were discovered in the late twentieth century (Hale 1973; Browne 1974; Halpern 1992/1995; Anderson 1993 — all cited in Li 2010:54). This issue awaits further research.

both pronouns of a cluster have a [-me] feature, then the [+you] pronoun goes first.<sup>6</sup> Li (2010) also uses grammatical-person constraints to describe cluster-internal ordering of clitic pronouns in Isbukun Bunun (Austronesian, spoken in southern Taiwan).

Yet another kind of co-occurrence restriction is formalized in (17), where only one clitic form gets to be next to its host. As it were, even if a pronominal cluster survives the person constraints in (16a–b), if two clitic forms are employed, then it violates AL-CL-L.

- (17) Alignment constraint (based on Woolford 2003)  
AL-CL-L: The left edge of a clitic must be aligned with the right edge of the host.

In (18a) NOM.1SG =*tsu* does not appear first in the cluster, violating ME-1ST. However, the same pronoun does appear first in (18b), satisfying ME-1ST there. By contrast, GEN.2PL =*mamu* satisfies YOU-1ST in (18a) but violates YOU-1ST in (18b). If two clitics compete for the same host, the latter one — i.e., NOM.1SG =*tsu* in (18a), and GEN.2PL =*mamu* in (18b) — will not be left-aligned, entailing a violation of AL-CL-L. Tableau (18) illustrates the first type of pronominal combination (discussed above in §2), which basically shows that grammatical person is involved in the ordering when two pronominal clitics co-occur in the cluster.

| (18) LV;<br>Actor [-me, +you, +pl];<br>Undergoer [+me, -you, -pl]. | cf. (2a) | O-O-σ | OCP-1σ | ME-1ST | YOU-1ST | AL-CL-L | *STRONG | *WEAK |
|--------------------------------------------------------------------|----------|-------|--------|--------|---------|---------|---------|-------|
| a. {= <i>mamu</i> = <i>tsu</i> }<br>{=GEN.2PL =NOM.1SG}            |          |       |        | *.1    |         | *       |         |       |
| → b. {= <i>tsu</i> = <i>mamu</i> }<br>{=NOM.1SG =GEN.2PL}          |          |       |        |        | *       | *       |         |       |

Tableau (18) also demonstrates that ME-1ST » YOU-1ST.

Next, a family of constraints favoring lighter realization of pronoun features is introduced.<sup>7</sup>

- (19) Constraints that prefer minimal structure  
(Kaufman 2010, adapting Cardinaletti & Starke 1999)
- \*STRONG: Prohibits a free form in free position.
  - \*WEAK: Prohibits a free form in clitic position.
  - \*CLITIC: Prohibits a clitic form in clitic position.

Furthermore, \*STRONG » \*WEAK » \*CLITIC is a markedness subhierarchy (combining ideas from Bonet 1994 and Cardinaletti & Starke 1999).

<sup>6</sup> Other studies utilizing [+me] and [+you] include Peng & Billings (2008) and Li (2010). These two binary features go back to McKaughan, who uses [+hearer] and [+speaker] (along with [+pl]) to distinguish, in each pronominal paradigm of Maranao, the eight forms from each other (1959, building on Thomas 1995). That language attests two inclusive forms: one for just the speaker and one addressee and the other for these two people plus one or more others. Such an eight-pronoun system has been dubbed a minimal-augmented (as opposed to SG-PL) person/number system (Corbett 2000:166–169; Siewierska 2004:84–87). An alternative set of person features used by Panagiotidis (2002:18, citing Halle 1997:429) consists of [+Author in Speech Event] (equivalent to [+me]) along with [+Participant in Speech Event] that includes both first and second person. Li (2010:38) uses a conjunctive local tie of ME-1ST and YOU-1ST to do the work of [+Participant in Speech Event]. An Optimality-theoretic study of person-based pronominal ordering is Gerlach's treatment of French (2002:172).

<sup>7</sup> Because it appears at the bottom of the hierarchy, the constraint in (19c) is not listed in any tableaux below.

If the Actor/GEN pronoun is cluster-initial, then a clitic-NOM pronoun is not used to encode the Undergoer. Instead, a form (with the same person/number) from the case-NEUTRAL *free* paradigm is used for the Undergoer, as in tableau (20). In OT terms, disforming a NOM-clitic form into a free form in clitic position, in (20b), violates \*WEAK in order to satisfy AL-CL-L. Using the same free pronoun preceded by the NOM marker /kaʔ/ in nonclitic position (i.e., after the verb in a negated clause), in (20c), violates the \*STRONG constraint. The optimum candidate in tableau (20) shows the second type of pronominal combination: disformation.

| (20) LV;<br>Actor [+me, -you, -pl];<br>Undergoer [-me, +you, +pl].          | cf. (6a) | O-O-σ | OCP-1σ | ME-1ST | YOU-1ST | AL-CL-L | *STRONG | *WEAK |
|-----------------------------------------------------------------------------|----------|-------|--------|--------|---------|---------|---------|-------|
| a. {= <u>mu</u> = <b>mamu</b> }<br>{=GEN.1SG =NOM.2PL}                      |          |       |        |        | *       | *.      |         |       |
| → b. {= <u>mu</u> <i>tsimu</i> }<br>{=GEN.1SG NEUTRAL.2PL}                  |          |       |        |        | *       |         |         | *     |
| c. {= <u>mu</u> } ... <b>kaʔ</b> <i>tsimu</i><br>{=GEN.1SG} NOM NEUTRAL.2PL |          |       |        |        | *       |         | *.      |       |

Tableau (20) demonstrates that {AL-CL-L, \*STRONG} » \*WEAK.

| (21) LV;<br>Actor [-me, -you, +pl];<br>Undergoer [-me, +you, +pl]. | cf. (5b) | O-O-σ | OCP-1σ | ME-1ST | YOU-1ST | AL-CL-L | *STRONG | *WEAK |
|--------------------------------------------------------------------|----------|-------|--------|--------|---------|---------|---------|-------|
| → a. {= <b>mamu</b> = <u>nahaʔ</u> }<br>{=NOM.2PL =GEN.3PL}        |          |       |        | *      |         | *       |         |       |
| b. {= <u>nahaʔ</u> <i>tsimu</i> }<br>{=GEN.3PL NEUTRAL.2PL}        |          |       |        | *      | *.      |         |         | *     |

Tableau (21), building on the comparison of (20b) to (20a), shows that You-1ST » AL-CL-L.

Only in two pronominal combinations, where monosyllabic forms would otherwise be found for each, two additional constraints (based loosely on the literature) apply in Pngawan:

(22) Phonological constraints

- a. O-O-σ: Prohibits the use of a free form in clitic position if the clitic and free forms of the same pronoun differ in syllabic parity.
- b. OCP-1σ: Prohibits consecutive monosyllabic pronominal forms in a clitic cluster.

The output form if a pronoun is the only clitic — e.g., if the Actor is encoded by a noun (not exemplified here), then the 2PL Undergoer is expressed as NOM =*mamu* — is compared to the output form if the same pronoun is in a cluster — e.g., NEUTRAL.2PL *tsimu* in (21) — in terms of the numbers of syllables. Because NOM.2PL =*mamu* and NEUTRAL.2PL *tsimu* are both disyllabic, there is no O-O-σ violation in (21b) above. By contrast, in (23c–d) NOM.EXCL1PL =*min* differs in syllable parity from NEUTRAL.EXCL1PL *tsami*, and NOM.2SG =*suʔ* has a different number of syllables from NEUTRAL.2SG *isuʔ* in (24c–d), both violating O-O-σ.

| (23) LV;<br>Actor [-me, +you, -pl];<br>Undergoer [+me, -you, +pl].                  | cf. (15) | O-O- $\sigma$ | OCP-1 $\sigma$ | ME-1ST | YOU-1ST | AL-CL-L | *STRONG | *WEAK |
|-------------------------------------------------------------------------------------|----------|---------------|----------------|--------|---------|---------|---------|-------|
| a. {= <u>su?</u><br>={GEN.2SG = <u>min</u><br>=NOM.EXCL1PL}                         |          |               | *!             | *      |         | *       |         |       |
| b. {= <u>min</u><br>={NOM.EXCL1PL = <u>su?</u><br>=GEN.2SG}                         |          |               | *!             |        | *       | *       |         |       |
| c. {= <u>su?</u><br>={GEN.2SG <i>tsami</i><br>NEUTRAL.EXCL1PL}                      |          | *!            |                | *      |         |         |         | *     |
| d. { <i>tsami</i><br>{NEUTRAL.EXCL1PL = <u>su?</u><br>=GEN.2SG}                     |          | *!            |                |        | *       | *       |         | *     |
| → e. {= <u>su?</u><br>={GEN.2SG} ... <b>ka?</b> <i>tsami</i><br>NOM NEUTRAL.EXCL1PL |          |               |                | *      |         |         | *       |       |

| (24) LV;<br>Actor [+me, -you, +pl];<br>Undergoer [-me, +you, -pl].                 | cf. (14) | O-O- $\sigma$ | OCP-1 $\sigma$ | ME-1ST | YOU-1ST | AL-CL-L | *STRONG | *WEAK |
|------------------------------------------------------------------------------------|----------|---------------|----------------|--------|---------|---------|---------|-------|
| a. {= <u>min</u><br>={GEN.EXCL1PL = <u>su?</u><br>=NOM.2SG}                        |          |               | *!             |        | *       | *       |         |       |
| b. {= <u>su?</u><br>={NOM.2SG = <u>min</u><br>=GEN.EXCL1PL}                        |          |               | *!             | *      |         | *       |         |       |
| c. {= <u>min</u><br>={GEN.EXCL1PL <i>isu?</i><br>NEUTRAL.2SG}                      |          | *!            |                |        | *       |         |         | *     |
| d. { <i>isu?</i><br>{NEUTRAL.2SG = <u>min</u><br>=GEN.EXCL1PL}                     |          | *!            |                | *      |         | *       |         | *     |
| → e. {= <u>min</u><br>={GEN.EXCL1PL} ... <b>ka?</b> <i>isu?</i><br>NOM NEUTRAL.2SG |          |               |                |        | *       |         | *       |       |

The adjacent clitics above in (18a–b), (20a), and (21a) each *satisfy* OCP-1 $\sigma$ ; by contrast, the clusters in (23a–b) and (24a–b) each *violate* this constraint. The optima, in (23e) and (24e), though each involving a strong *form*, do not require a contrastive *reading*.<sup>8</sup> This is identical in the relevant respects to Bonet’s Spanish data (1994:43). No co-occurrence of monosyllabic pronouns is found in Pngawan because OCP-1 $\sigma$  is ranked above \*STRONG. (My O-O- $\sigma$  and OCP-1 $\sigma$  together are analogous to Bonet’s Person-Case Constraint in this respect.) The optima in tableaux (23) and (24) each show the third type of the pronominal combination: only the GEN clitic pronoun within the cluster, with the NOM/Undergoer lying outside of it.<sup>9</sup>

The last type of pronominal combination is portmanteaux. Only one tableau is used to show how this type of combination beats out other pronominal-combination types.

<sup>8</sup> If a referent is already a topic in the discourse, then the way to encode this entity is as a clitic pronoun. However, in Pngawan, the free pronoun’s function is as neither a new topic nor contrastively focused (because of O-O- $\sigma$  or OCP-1 $\sigma$ ). The free form has to be used in order not to violate these two undominated constraints.

<sup>9</sup> If there were a candidate {=min ... ni? *isu?* in (23), due to ME-1ST » YOU-1ST, this candidate would be incorrectly predicted. (Segmentally homophonous to the GEN.3SG clitic pronoun, ni? is the GEN marker here.) To solve this problem, a \*STRONG-ACTOR constraint, prohibiting a free-form Actor outside the clitic cluster, is used. Similarly, the candidate {=su? ... ni? *tsami* in (24) would violate both \*STRONG-ACTOR and ME-1ST. For the data to be generated correctly, \*STRONG-ACTOR must dominate ME-1ST. (Incidentally, \*STRONG-ACTOR » \*STRONG comprises a markedness subhierarchy.) In this paper, I do not show \*STRONG-ACTOR in the tableaux.

| (25) LV;<br>Actor [-me, +you, -pl];<br>Undergoer [+me, -you, -pl].                             | cf. (10) | O-O-σ | OCP-1σ | ME-1ST | YOU-1ST | AL-CL-L | *STRONG | *WEAK |
|------------------------------------------------------------------------------------------------|----------|-------|--------|--------|---------|---------|---------|-------|
| a. {= <u>su?</u> = <b>tsu</b> }<br>{=GEN.2SG        =NOM.1SG}                                  |          |       | *!     | *      |         | *       |         |       |
| b. {= <b>tsu</b> = <u>su?</u> }<br>{=NOM.1SG        GEN.2SG}                                   |          |       | *!     |        | *       | *       |         |       |
| c. {= <u>su?</u> <i>ku.iŋ</i> }<br>{=GEN.2SG        NEUTRAL.1SG}                               |          | *!    |        | *      |         |         |         | *     |
| d. { <i>ku.iŋ</i> = <u>su?</u> }<br>{NEUTRAL.1SG    =GEN.2SG}                                  |          | *!    |        |        | *       | *       |         | *     |
| e. {= <u>su?</u> }            ... <b>ka?</b> <i>ku.iŋ</i><br>{=GEN.2SG}        NOM NEUTRAL.1SG |          |       |        | *!     |         |         | *       |       |
| → f. {= <u>saku?</u> }<br>{=2SG>1SG}                                                           |          |       |        |        |         |         |         |       |

In this tableau /=saku?/ ‘2SG>1SG’ satisfies both ME-1ST and YOU-1ST. As such, /=saku?/ harmonically bounds the other five candidates.<sup>10</sup> The same holds for the other portmanteaux (tableaux not shown). Thus, portmanteaux are not probative in ranking these constraints.

This section has analyzed four pronominal-combination types in Pngawan Atayal: (i) seven normal, two-clitic clusters; (ii) two clusters, each with one clitic-Actor form and a disformed Undergoer pronoun (a free form in clitic position); (iii) seven portmanteaux, and (iv) two more co-occurrences where the GEN/Actor pronoun is a clitic but the Undergoer is a free pronoun (not in clitic position). The final ranking of the other combinations is as follows.

(26) {O-O-σ, OCP-1σ} » {{ME-1ST » YOU-1ST » AL-CL-L}, \*STRONG} » \*WEAK » \*CLITIC

The highest two constraints — O-O-σ and OCP-1σ — rule out clusters based on the syllabic weight of one or both pronouns. Any surviving clusters are then assessed by the grammatical-person constraints ME-1ST and YOU-1ST, selecting clusters beginning with the more person-prominent pronoun in the hierarchy. Next, AL-CL-L rules out clusters with two clitic forms, because only one of these pronouns can be host-adjacent. Finally, any surviving combinations are subject to a markedness subhierarchy — \*STRONG » \*WEAK » \*CLITIC — that favors less structure in encoding pronouns, though \*STRONG is not ranked relative to either AL-CL-L or the person constraints. (Additional and more complete tableaux are listed below in appendix 1.) In addition to these constraints, the existence of several portmanteaux in the Pngawan lexicon allows no overt co-occurrence in some combinations because a single form encoding both sets of pronominal features harmonically bounds any two overt pronoun forms.

### 5. Conclusion

Several factors are relevant to the ordering of pronominal clitics in Pngawan Atayal: the number of syllables (compared with other forms in two ways), a grammatical-person

<sup>10</sup> The only constraint discussed so far that a portmanteau in (25f) would violate is \*CLITIC, in (19c) above, and only once, whereas (25b–c) each violate \*CLITIC twice (because each clitic form constitutes a violation of this constraint). Considering that the GEN-case pronoun invariably encodes the Actor, all pronominal combinations violate \*CLITIC at least once. Portmanteaux may also fare better on lexical-economy constraints.

hierarchy, whether a pronoun is a clitic or free, and whether it is within the clitic cluster. All of these factors are assessed using several Optimality-theoretic constraints.

There are four pronominal-combination types: seven normal two-clitic clusters, two clusters with one clitic-Actor form and a disformed Undergoer pronoun (i.e., a free form in clitic position), seven portmanteaux, and two more co-occurrences where the GEN/Actor pronoun is a clitic but the NOM/Undergoer pronoun is a free form (not in clitic position). A table summarizing the pronominal combinations appears in Appendix 2.

Issues remaining to be resolved include the following. To begin, PIngawan has a much larger inventory of portmanteaux than the other Atayalic languages. The inventory of potential hosts, as well as the positioning of the clitic cluster relative to multiple or complex hosts also remains to be investigated. Finally, the use of strong forms (free pronouns not in clitic position) to encode new topics and contrastive focus deserves further investigation.

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### Appendix 1

Whereas tableaux (23) through (25) have at least five candidates, the preceding ones do not. Thus, tableau (A) expands tableau (18), adding candidates (c–e). Tableau (20) is expanded in tableau (B), where candidates (a, c, e) correspond to (20a–c), respectively; (21) is expanded in (C), where (b–c) correspond to (20a–b), respectively. Tableaux (D) through (F) are new.

| (A) LV;<br>Actor [-me, +you, +pl];<br>Undergoer [+me, -you, -pl].              | O-O-σ | OCP-1σ | ME-1ST | YOU-1ST | AL-CL-L | *STRONG | *WEAK |
|--------------------------------------------------------------------------------|-------|--------|--------|---------|---------|---------|-------|
| a. {= <u>mamu</u> = <b>tsu</b> }<br>{=GEN.2PL =NOM.1SG}                        |       |        | *!     |         | *       |         |       |
| → b. {= <b>tsu</b> = <u>mamu</u> }<br>{=NOM.1SG =GEN.2PL}                      |       |        |        | *       | *       |         |       |
| c. {= <u>mamu</u> <i>ku.iij</i> }<br>{=GEN.2PL NEUTRAL.1SG}                    | *!    |        | *      |         |         |         | *     |
| d. { <i>ku.iij</i> = <u>mamu</u> }<br>{NEUTRAL.1SG =GEN.2PL}                   | *!    |        |        | *       | *       |         | *     |
| e. {= <u>mamu</u> } ... <b>ka?</b> <i>ku.iij</i><br>{=GEN.2PL} NOM NEUTRAL.1SG |       |        | *!     |         |         | *       |       |

| (B) LV;<br>Actor [+me, -you, -pl];<br>Undergoer [-me, +you, +pl].                                | O-O-σ | OCP-1σ | ME-1ST | YOU-1ST | AL-CL-L | *STRONG | *WEAK |
|--------------------------------------------------------------------------------------------------|-------|--------|--------|---------|---------|---------|-------|
| a. {= <u>mu</u> = <b>mamu</b> }<br>{=GEN.1SG        =NOM.2PL}                                    |       |        |        | *       | *.!     |         |       |
| b. {= <b>mamu</b> = <u>mu</u> }<br>{=NOM.2PL        =GEN.1SG}                                    |       |        | *.!    |         | *       |         |       |
| → c. {= <u>mu</u> <i>tsimu</i> }<br>{=GEN.1SG        NEUTRAL.2PL}                                |       |        |        | *       |         |         | *     |
| d. { <i>tsimu</i> = <u>mu</u> }<br>{NEUTRAL.2PL    =GEN.1SG}                                     |       |        | *.!    |         | *       |         | *     |
| e. {= <u>mu</u> }            ... <b>ka?</b> <i>tsimu</i><br>{=GEN.1SG}        NOM    NEUTRAL.2PL |       |        |        | *       |         | *.!     |       |

| (C) LV;<br>Actor [-me, -you, +pl];<br>Undergoer [-me, +you, +pl].                            | O-O-σ | OCP-1σ | ME-1ST | YOU-1ST | AL-CL-L | *STRONG | *WEAK |
|----------------------------------------------------------------------------------------------|-------|--------|--------|---------|---------|---------|-------|
| a. {= <u>naha?</u> = <b>mamu</b> }<br>{=GEN.3PL        =NOM.2PL}                             |       |        | *      | *.!     | *       |         |       |
| → b. {= <b>mamu</b> = <u>naha?</u> }<br>{=NOM.2PL        =GEN.3PL}                           |       |        | *      |         | *       |         |       |
| c. {= <u>naha?</u> <i>tsimu</i> }<br>{=GEN.3PL        NEUTRAL.2PL}                           |       |        | *      | *.!     |         |         | *     |
| d. { <i>tsimu</i> = <u>naha?</u> }<br>{NEUTRAL.2PL    =GEN.3PL}                              |       |        | *      |         | *       |         | *.!   |
| e. {= <u>naha?</u> }        ... <b>ka?</b> <i>tsimu</i><br>{=GEN.3PL}        NOM NEUTRAL.2PL |       |        | *      | *.!     |         | *       |       |

| (D) LV;<br>Actor [-me, -you, +pl];<br>Undergoer [+me, +you, +pl].                               | O-O-σ | OCP-1σ | ME-1ST | YOU-1ST | AL-CL-L | *STRONG | *WEAK |
|-------------------------------------------------------------------------------------------------|-------|--------|--------|---------|---------|---------|-------|
| a. {= <u>naha?</u> = <b>ta?</b> }<br>{=GEN.3PL        =NOM.INCL1PL}                             |       |        | *.!    | *       | *       |         |       |
| → b. {= <b>ta?</b> = <u>naha?</u> }<br>{=NOM.INCL1PL    =GEN.3PL}                               |       |        |        |         | *       |         |       |
| c. {= <u>naha?</u> <i>ita?</i> }<br>{=GEN.3PL        NEUTRAL.INCL1PL}                           | *.!   |        | *      | *       |         |         | *     |
| d. { <i>ita?</i> = <u>naha?</u> }<br>{NEUTRAL.INCL1PL =GEN.3PL}                                 | *.!   |        |        |         | *       |         | *     |
| e. {= <u>naha?</u> }        ... <b>ka?</b> <i>ita?</i><br>{=GEN.3PL}        NOM NEUTRAL.INCL1PL |       |        | *.!    | *       |         | *       |       |

| (E) LV;<br>Actor [-me, -you, +pl];<br>Undergoer [-me, +you, -pl].                                | O-O-σ | OCP-1σ | ME-1ST | YOU-1ST | AL-CL-L | *STRONG | *WEAK |
|--------------------------------------------------------------------------------------------------|-------|--------|--------|---------|---------|---------|-------|
| a. {= <u>naha?</u> = <u>su?</u> }<br>{=GEN.3PL            =NOM.2SG}                              |       |        | *      | *!      | *       |         |       |
| → b. {= <u>su?</u> = <u>naha?</u> }<br>{=NOM.2SG            =GEN.3PL}                            |       |        | *      |         | *       |         |       |
| c. {= <u>naha?</u> <i>isu?</i> }<br>{=GEN.3PL            NEUTRAL.2SG}                            | *!    |        | *      | *       |         |         | *     |
| d. { <i>isu?</i> = <u>naha?</u> }<br>{NEUTRAL.2SG        =GEN.3PL}                               | *!    |        | *      |         | *       |         | *     |
| e. {= <u>naha?</u> }            ... <b>ka?</b> <i>isu?</i><br>{=GEN.3PL}         NOM NEUTRAL.2SG |       |        | *      | *!      |         | *       |       |

| (F) LV<br>Actor [-me, -you, +pl];<br>Undergoer [+me, -you, -pl].                                  | O-O-σ | OCP-1σ | ME-1ST | YOU-1ST | AL-CL-L | *STRONG | *WEAK |
|---------------------------------------------------------------------------------------------------|-------|--------|--------|---------|---------|---------|-------|
| a. {= <u>naha?</u> = <b>tsu</b> }<br>{=GEN.3PL            =NOM.1SG}                               |       |        | *!     | *       | *       |         |       |
| → b. {= <b>tsu</b> = <u>naha?</u> }<br>{=NOM.1SG            =GEN.3PL}                             |       |        |        | *       | *       |         |       |
| c. {= <u>naha?</u> <i>ku.iŋ</i> }<br>{=GEN.3PL            NEUTRAL.1SG}                            | *!    |        | *      | *       |         |         | *     |
| d. { <i>ku.iŋ</i> = <u>naha?</u> }<br>{NEUTRAL.1SG        =GEN.3PL}                               | *!    |        |        | *       | *       |         | *     |
| e. {= <u>naha?</u> }            ... <b>ka?</b> <i>ku.iŋ</i><br>{=GEN.3PL}         NOM NEUTRAL.1SG |       |        | *!     | *       |         | *       |       |

Appendix 2

| Genitive   |                        | Exclusive [+me, -you]   |             | Inclusive [+me, +you] | 2nd person [-me, +you] |             | 3rd person [-me, -you] |              |
|------------|------------------------|-------------------------|-------------|-----------------------|------------------------|-------------|------------------------|--------------|
|            |                        | [-pl]                   | [+pl]       |                       | [-pl]                  | [+pl]       | [-pl]                  | [+pl]        |
| Nominative | Exclusive [+me, -you]  | mu                      | min         | ta?                   | su?                    | mamu        | ni?                    | naha?        |
|            |                        | tsu ~ ku <sup>tiŋ</sup> | min ~ tsami |                       | {=saku?}               | {=tsu=mamu} | {=tsini?}              | {=tsu=naha?} |
|            | Inclusive [+me, +you]  |                         |             |                       | {=su? ... ka? tsami}   | {=min=mamu} | {=mini?}               | {=min=naha?} |
|            |                        |                         |             |                       |                        |             |                        |              |
|            | 2nd person [-me, +you] |                         |             |                       |                        |             |                        |              |
|            |                        |                         |             |                       |                        |             |                        |              |
|            | 3rd person [-me, -you] |                         |             |                       |                        |             |                        |              |
|            |                        |                         |             |                       |                        |             |                        |              |

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## Indefinite demonstrative *dieser* in German

Annika Deichsel

This work offers experimental support for the hypothesis that some indefinite noun phrases do not only introduce new referents but also equip them with a certain ‘forward-looking potential’ which informs the hearer about the ‘importance’ of the referent in the subsequent discourse. Developing means to empirically account for the intuitions that exist with respect to English *this*-indefinites, I show that German has an analog phenomenon, indefinite *dieser*, which, in contrast to the simple indefinite article *ein*, functions to mark referents which are ‘more important’ in that they show high values with respect to two parameters: referential persistence and topic shift potential.

### 1. Introduction

It is a well known fact that demonstrative determiners like English *this* mark given, definite information and refer either deictically to entities perceptible in the situation of utterance or anaphorically to referents in the previous discourse. Given these facts it seems quite surprising that we can use *this*, the prototypical definite demonstrative determiner as an indefinite determiner in sentences like *yesterday this stranger came over and talked to me*.

Theories accounting for this use are diverging, but there is a consensus in the literature that the referent introduced with indefinite *this* is of some greater importance for the following discourse. For English, this intuition has already been labeled as ‘more information coming’ (Perlman 1969), (Prince 1981) or ‘noteworthiness’ (Ionin 2006). In this paper I attempt to refine and enhance these approaches by employing two parameters suggested by Givón (1983), Arnold (1998) and Ariel (1988), which enable us to clearly define and to empirically test the discourse effects these indefinites seem to trigger.

Investigating the equivalent German construction of the indefinite use of the demonstrative determiner *dieser*, I apply quantifiable means to account for the intuitions presented above. In order to make them measurable, I adopted two clearly quantifiable parameters, which are features of the broader concept of discourse prominence (Givón 1983, Arnold 1998, Ariel 1988): (i) referential persistence and (ii) topic shift potential (compare studies of Chiriacescu & von Heusinger 2010 for *pe*-marking in Romanian). The results of a story continuation experiment show that indefinite *dieser* triggers the following discourse effects: (i) the referential persistence of the referents marked with *dieser* exceeds the referential persistence

of unmarked constructions with the indefinite article and (ii) the referents marked with *dieser* are more likely to become the topic in the subsequent text than their unmarked counterparts.

## 2. The phenomenon: indefinite *dieser*

We clearly have to distinguish standard demonstrative uses of *dieser* in (1) or (2) from the indefinite use in (3):

- (1) Ich möchte **diese/die/\*eine Blume** da drüben.  
‘I want **this/the/\*a flower** over there.’ [deictic use]
- (2) Es war einmal ein König. **Dieser König** hatte eine Krone.  
‘Once upon a time there was a king. **This king** had a crown.’ [anaphoric use]
- (3) Gestern in der Bar hat mich **dieser/ein/\*der Mann** angesprochen.  
‘Yesterday in the bar **this/a/\*the man** was talking to me.’ [indefinite use]

In contrast to the deictic and anaphoric use, indefinite *dieser* can occur in existential-*there* constructions and is furthermore always interchangeable with the indefinite article *ein* (and not with the definite article). This shows that it is clearly indefinite. Indefinite *dieser* introduces a discourse and hearer new referent of the type individual. The referent is neither given in the previous discourse nor is it perceptible in the actual situation of utterance. It is completely new to the hearer. Often, indefinite *dieser* occurs in rather informal registers and in spoken language, however it can be found in written texts as well. On the other hand, it behaves like a (i) a truly referential expression, which always takes wide scope. Furthermore it is (ii) specific, which also rather reflects the behavior of definites. Relying on standard (in)definiteness tests (interchangeability with the indefinite article and occurrence in existential contexts) I claim that indefinite *dieser* is a truly indefinite determiner.

### 2.1 Scopal behavior

The referents of indefinite *dieser* always take wide scope with respect to any scope-taking operator:

- (4) a. Er gab jedem Student, der **das/dieses Gedicht** von Goethe zitierte, eine 1.  
‘He gave an A to every student who recited **the/this poem** by Goethe.’  
[→ only one poem for all]
- b. Er gab jedem Student, der **ein Gedicht** von Goethe zitierte, eine 1.  
‘He gave an A to every student who recited **a poem** by Goethe.’  
[→ different poems]

### 2.2 Specificity

Since indefinite *dieser*, unlike definite expressions, occurs in existential contexts (5) (Fodor & Sag 1982:361), we need to distinguish between the notions speaker known and hearer known

(or discourse known). One prominent type of specificity can be described best as speaker-dependent (or speaker anchored (von Heusinger 2011)): the speaker introduces a referent and intends to connect a certain object with the referent. As a test we can use the knowledge of the speaker with respect to the object. Unlike *ein* (6), indefinite *dieser* cannot be combined with the explicit denial of knowledge of the speaker.

(5) *German:*

Es gibt **dieses Mädchen** in meiner Klasse, das hat im Examen betrogen.

a) Sie heisst Maria und ist schon öfter negativ aufgefallen.

b) \*Keine Ahnung wer das ist, da war nur ein Spickzettel auf dem Boden.

*English:*

There's **this girl** in my class who cheated on the exam.

a) Her name is Mary and it's not the first time she causes trouble.

b) \*I have no idea who that is, I just found a cheat sheet on the floor.

(6) *German:*

Es gibt **ein Mädchen** in meiner Klasse, das hat im Examen betrogen.

a) Sie heisst Maria und ist schon öfter negativ aufgefallen.

b) <sup>OK</sup>Keine Ahnung wer das ist, da war nur ein Spickzettel auf dem Boden.

*English:*

There's **a girl** in my class who cheated on the exam.

a) Her name is Mary and it's not the first time she causes trouble.

b) <sup>OK</sup>I have no idea who that is, I just found a cheat sheet on the floor.'

### 3. Why *this/dieser*?

On the first glance, it might appear surprising that German, English and probably other languages make use of a prototypical definite demonstrative article in order to express indefiniteness. However, the reasons that *dieser/this* (and other demonstrative determiners in other languages) have gained the function to express indefinite reference, referentiality, specificity and the correlating discourse effects are by no means coincidental. Several differing accounts try to explain the origin of English indefinite *this*. Most of them share the idea that demonstratives can be expected to gain the respective functions, because they share their core demonstrative semantics with true demonstratives. Fodor & Sag (1982:360) claim that 'normal demonstrative *this* is as referential as anything can be, and so we're not too surprised to find it pressed into service to mark the referential understanding of an indefinite.' Himmelmann (1996:222) traces indefinite *this* back to definite demonstrative *this* as well. He claims it to be a sub-phenomenon of *Deixis am Phantasma* (Bühler 1934:140), which itself he considers a sub-phenomenon of the standard deictic use of demonstratives. Stating that 'the inability of new-*this* to introduce a nonspecific referent [...] reflects the continuity of its character as a demonstrative', Wald (1983:97) explicitly rejects the idea of linking the indefinite use of *this* to situational uses of *this*. Instead, he proposes an account in which he derives this use from the anaphoric use of *this*.

There are more accounts in the literature which try to point out similarities between the two determiners as indicators for a common historic root of indefinite *this* and the so-called standard uses of demonstratives (Maclaran 1982). Even if the accounts may vary with respect to the claimed 'origin' of indefinite demonstratives – there is an agreement in the literature

that they still share essential features with standard demonstratives and that exactly these features make them apt for gaining the discussed function.

#### 4. Previous accounts of discourse properties of indefinite *this*

Perlman (1969:78) already claims that indefinite *this* serves as a signal for additional upcoming information. However he does not offer a definition or means how one could empirically prove or measure this.

Prince (1981:235) has the same intuition and claims that indefinite *this* ‘introduces something that is going to be talked about’ and presents a small corpus study where she counts the implicit and explicit re-mentions of the referent introduced by indefinite *this*. However, she does not compare the findings with the unmarked counterpart (the indefinite article) and does not make clear what she means with implicit reference.

Ionin (2006:180), following Prince (1981) and Maclaran (1982:90), states that the use of indefinite *this* draws attention to the fact that ‘the speaker has a particular referent in mind about which further information may be given’. This is shown in Maclaran’s example in (7). The use of indefinite *this* in (7b) is infelicitous, where the identity of the 31-cent stamp is completely irrelevant, and where nothing further is said about the stamp. On the other hand, indefinite *this* is felicitous in (7a), where the identity of the stamp is important, and where the stamp is talked about in the subsequent discourse.

- (7) a. He put on **a/*this* 31-cent stamp** on the envelope, and only realized later that it was worth a fortune because it was unperforated.  
 b. He put on **a/*\*this* 31-cent stamp** on the envelope so he must want it to go airmail.  
 (Maclaran 1982:88)

Ionin (2006:184) labels this property of *this*-indefinites noteworthiness, defined as follows: ‘the use of a *this*-indefinite requires the statement of something noteworthy about the individual denoted.’ Ionin vaguely explains where noteworthiness can come from. She claims that noteworthiness has several sources, i.e. that it can come from the predicate, adjective modification, from a previous statement of the noteworthy property or from the subsequent referential pick-up of the referent. It does not seem clear how it could be distinguished from other notions of information structure like discourse topic, for example, and how it could be properly measured empirically.

#### 5. Discourse Properties: referential persistence and topic shift potential

I employed two parameters of the greater concept of discourse prominence (Givón 1983, Gundel et. al 1993, Ariel 1988, etc.) as a means to empirically account for the intuitions of ‘more information forthcoming’ or ‘noteworthiness’ offered in the literature. Discourse-based studies dealing with accessibility and discourse prominence already introduced several factors that make a referent more accessible or prominent. However, these accounts were mainly concerned with the licensing of anaphora resolution. In turn, I will use two of their parameters in order to account for the forward-looking-property of indefinite *dieser*. (Compare studies of Chiriacescu & von Heusinger 2010 for *pe*-marking in Romanian.)

Two discourse properties will be investigated:

- (i) *Referential persistence* (Givón 1983, Arnold 1998, Ariel 1988)  
Looks at how often a referent is mentioned again in the subsequent discourse.
- (ii) *Topic shift potential* (Givón 1983)  
Calculates whether a given referent has the potential to become a topic in the subsequent discourse. Topics are defined as aboutness topics in the sense of Reinhart (1981) and Roberts (2011). For reasons of simplicity and traceability in this study I equalized topics with grammatical subjects, since topics preferably occur in syntactic subject position in German. This general preference was confirmed by the data of the experiment in which I found a very strong correlation between aboutness topics and subjects. For the follow-up experiments professional topic annotation is planned.

The following predictions with respect to the discourse effects of German indefinite *dieser* in terms of discourse prominence are made:

*Prediction 1 (referential persistence):*

The referential persistence of the *dieser*-marked referents will exceed the referential persistence of their counterparts marked with the indefinite article *ein*.

*Prediction 2 (topic shift potential):*

In comparison to their *ein*-marked counterparts, *dieser*-marked referents will be more likely to become a subject in the subsequent discourse.

## 6. Pilot study

### 6.1. Method

A sentence continuation task based on two- to four-sentence stories was constructed, including two target stories and 2 filler stories. The first one or two sentences in each test item set the context for the story and contained reference to the first person speaker *I* 'ich'. The next sentence contained the target referent realized as an indefinite NP. The character introduced first by *I* 'ich' is the clearly established topic constituent of the story (mentioned at least once in subject position).

I manipulated the realization form of the indefinite target referents in the target sentences. (*dieser*-marked referents in experiment A and *ein*-marked in experiment B.)

#### (8) **Example stimulus item for experiment A/B: *dieser* vs. *ein* / *this* vs. *a*:**

Das Essen in dem Restaurant war wirklich total lecker, aber ziemlich teuer. Als ich nach fünf Gängen beim Dessert war, hab' ich<sub>1</sub> gesehen, wie **dieser/ein Mann**<sub>2</sub> Sekt bestellte.  
'The food in the restaurant was really delicious, but pretty expensive. When I had dessert, after five courses, I<sub>1</sub> saw how **this/a man**<sub>2</sub> ordered champagne.'

## 6.2. Participants

20 native speakers of German, 10 participants in experiment A (each 4 stories including 2 filler stories), 10 participants in experiment B (each 4 stories including 2 filler stories).

## 6.3 Procedure and data analysis

The participants were asked to read the given stimulus items and to write down five natural-sounding, logical continuation sentences. The respective five continuation sentences were coded with respect to the two parameters introduced in section 5. In (9) you find an example response to test item (8) suggested by one participant and the coding methods from the sentence continuation experiment (table 1).

### (9) Example response to item (8)

S1: **Er**<sub>2</sub> hatte eine riesige Nase. / **He**<sub>2</sub> had a huge nose.

S2: Deshalb starrte **ich**<sub>1</sub> **ihn**<sub>2</sub> immer wieder an. / That's why **I**<sub>1</sub> stared at **him**<sub>2</sub> all the time.

S3: Als **er**<sub>2</sub> den Sekt trank, verschüttete **er**<sub>2</sub> etwas. / When **he**<sub>2</sub> drank the champagne, **he**<sub>2</sub> spilled a bit.

S4: Die Krawatte war bekleckert. / The tie had stains.

S5: Dann musste **ich**<sub>1</sub> grinsen. / Then **I**<sub>1</sub> had to grin.

|    | Referential Persistence                                    |                                                     | Topic shift potential                                             |
|----|------------------------------------------------------------|-----------------------------------------------------|-------------------------------------------------------------------|
|    | Target referent: number of anaph. references item/sentence | Target referent: number of anaph. references in sum | Does the referent become subject/topic in any sub-sequent clause? |
| S1 | 1                                                          | 1                                                   | Topic <sub>2</sub>                                                |
| S2 | 1                                                          | 2                                                   |                                                                   |
| S3 | 2                                                          | 4                                                   |                                                                   |
| S4 | -                                                          | -                                                   |                                                                   |
| S5 | -                                                          | 4                                                   |                                                                   |

Table 1. Example of coding methods

The referential persistence was measured by counting the anaphoric references per sentence (item/S) and also as the sum of all referential items up to S5 (cumulative values).

In order to account for the topic shift potential I checked if the *dieser*- or *ein*-marked referents became a topic in one of the subsequent 5 sentences. Whether this change was maintained in the subsequent discourse was of no relevance.

## 7. Results

## 7.1 Referential persistence – number of anaphoric references

The numbers in table 2 show that prediction 1 is confirmed in the pilot study. The referential persistence of the *dieser*-marked objects is higher than the referential persistence of the *ein*-marked objects. That is, referents introduced by *dieser* were mentioned more often in the subsequent discourse. Compare the total numbers of 29 for *dieser* vs. 8 for *ein*-marked referents. The mean values per person are given in parentheses. On an average, indefinite *dieser* was re-mentioned in the subsequent 5 sentences 2,9 times, compared to 0,8 times for *ein*. These numbers are illustrated in figure 1 below.

|               | S1     | S2     | S3     | S4     | S5     | total          |
|---------------|--------|--------|--------|--------|--------|----------------|
| <i>dieser</i> | 7(0,7) | 6(0,6) | 5(0,5) | 7(0,7) | 4(0,4) | <b>29(2,9)</b> |
| <i>ein</i>    | 2(0,2) | 3(0,3) | 0(0)   | 1(0,1) | 2(0,2) | <b>8(0,8)</b>  |

Table 2. Referential persistence of *dieser/ein* Mann (*this/a man*), total numbers per sentence and mean values

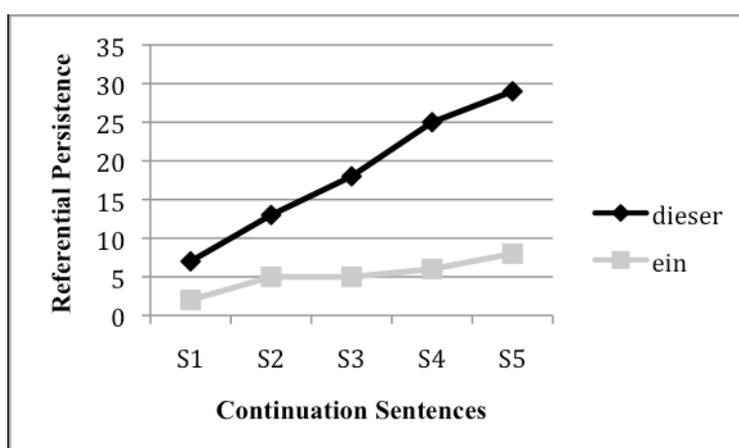


Figure 1. Referential persistence of *dieser/ein* Mann (*this/a man*) cumulated by sentence

## 7.2 Topic shift potential

Prediction 2 is confirmed as well: *dieser*-marked objects display an overall stronger preference to become a topic in the continuation sentences S1-S5, in comparison to their *ein*-marked counterparts. For *dieser*, in 60% of the cases the referents became topics in the first continuation sentence already. Looking at the whole discourse, in 80% of the test items the *dieser*-marked referent became a topic at some point in the discourse. For *ein*, this happened only in 40% of the cases (see figure 2).

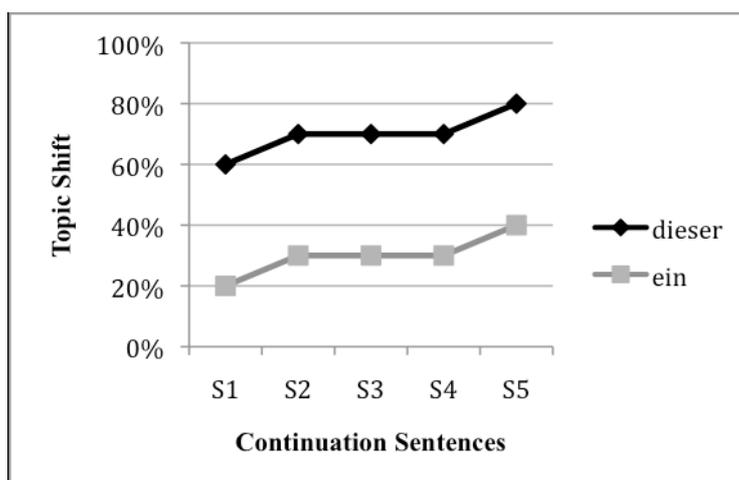


Figure 2. Topic Shift potential for *dieser/ein Mann* (this/a man)

### 8. Conclusions and future work

By enhancing previous accounts, which analyzed the discourse effects of indefinite *this*, I offer means to empirically test and measure its discourse behavior. The findings in section 7 strongly suggest that indefinite *dieser* is a marker of discourse prominence, since the results of the experiment show that there is a strong tendency of indefinite *dieser* to trigger two features of discourse prominence, i.e. referential persistence and topic shift. Further investigations, that (among others) also take into account the activation level of a referent (Gundel et al. 1993, Grosz et al. 1995, Ariel 1988), expressed by the type of referring expression, are planned in order to fully approach the greater notion of discourse prominence.

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# The focus sensitivity of sentence adverbs

Sophia Döring

## *Abstract*

This paper discusses the focus sensitivity of modal and evaluative sentence adverbs as *probably*, *maybe* and *unfortunately*, *surprisingly*. Using ways of testing on different linguistic levels, we claim that they are focus sensitive by the mechanism of free association with focus (cf. Beaver & Clark 2008). A short semantic analysis of the two classes of adverbs is given to explain differences they reveal in the tests. Finally, the notion of focus sensitivity in general is examined and different ways of deducing focus sensitive interpretations are compared.

## *1. Introduction*

Within the field of information structure, focus sensitivity still is the topic of ongoing discussions. Focus sensitive expressions crucially refer in their interpretation to the placement of focus in the sentence.

The focus of a sentence is a part that is intonationally highlighted to signal that it conveys either new information or a piece of information that is to be contrasted with an alternative. Such an alternative may be given in context explicitly or as well be present just implicitly. We can distinguish between two occurrences of focus: The first one is that of a free focus, which picks out an entity and indicates that from a set of alternatives, the focussed constituent is the one that holds. This is illustrated in (1), where the focus on *red* may indicate that it is new information that the pill Paul took was red.

Another possible interpretation is that of a correction: Maybe Mary claimed before that it was a blue pill. There is a number of alternatives for the colour of the pill and a sentence like (1) expresses that *red* is the alternative that is true.

(1) Paul took the [red]<sub>F</sub> pill.

Besides free occurrence of focus, there are also instances where the focus is bound by a semantic operator. These operators are called *focus sensitive expressions*:

‘[they] depend in their interpretation on which expression is intonationally highlighted, or put in ‘focus’ (Krifka 1995:2).

The standard example for focus sensitive expressions are focus particles, such as *only*, *even* or *also* in English (cf. Andersen 1972, König 1991, Krifka 1999, Bonomi & Casalegno 1993). Sentence (2) illustrates how *only* interacts with the sentence focus: (2a) stresses that it was only a rose that Paul gave to Charlotte and nothing else, while (2b) expresses that Charlotte was the only person Paul gave a rose to. Interestingly, in a context in which Paul gives a rose to Charlotte and one to Mary, (2a) would be true, but (2b) would be false.

- (2) a. Paul only gave a [rose]<sub>F</sub> to Charlotte.  
 b. Paul only gave a rose to [Charlotte]<sub>F</sub>.

This example shows that there is even a truth-conditional effect of focus in some cases.

While *only* and other so-called focus particles have been investigated as prime examples of the phenomenon of focus sensitivity, the question of whether sentence adverbs (SADV) display a similar behavior has received much less attention in the literature. They have been mentioned with respect to focus sensitivity in some papers, but have never been systematically analyzed. One such hint to a special relationship between a sentence adverb and the sentence's focus is given in Filipenko (2000):

'[...] it is well known that often the scope of a sentence adverbial is not a situation as a whole, but only a communicatively important, rhematic fragment of a situation' (Filipenko 2000:100).

A 'communicatively important, rhematic fragment of a situation' clearly refers to the focus of a sentence.

Additionally, Nuyts (2001) states that the scope of sentence adverbs is floating (cf. Nuyts 2001:57), i.e. it is not fixed which part of a sentence is to be modified by a SADV. It appears to be worthwhile to analyze whether the scope is floating depending on which entity of the sentence is focussed.

So far, only quantifying adverbs as *usually* have been mentioned with regard to focus, (cf. Lewis 1975, Rooth 1995, Krifka 2001). A systematic analysis of adverbs that refer to the degree of certainty of the speaker, as *maybe*, *possibly*, *probably* or *definitely*, as well as of those conveying the speaker's attitude (*fortunately*, *unfortunately*, *surprisingly*) is still missing. The goal of the present paper is to analyze in detail the focus sensitivity of SADVs and to relate it to the adverbs' meaning.

As can be seen in the sentence pair in (3), there appears to be a clear interaction between *unfortunately* and the focus: In (3a), the speaker considers it unhappy that it is the letter that was given to Mary, while in (3b) he regrets that it is Mary whom the letter was given to, instead of somebody else. If *unfortunately* is replaced by *probably* or *maybe*, the adverb meaning likewise takes into account the sentence focus.

- (3) a. Unfortunately George gave the [letter]<sub>F</sub> to Mary.  
 b. Unfortunately George gave the letter to [Mary]<sub>F</sub>.

When considering the syntax and semantics of sentence adverbs, there is a whole body of research, dealing with different aspects and establishing different criteria for classification (cf. Jackendoff (1972), Thomason & Stalnaker (1973), Bellert (1977), Verhagen (1979), McConnell-Ginet (1982), Koktova (1986), Eckardt (1998), Ramat & Ricca (1998), Filipenko (2000), Nuyts (2001), and others).

One such classification is done for the sub-class of speaker-oriented adverbs, which can be further divided into five subcategories (e.g. Bellert 1977):

- i. modal adverbs: *maybe, probably, definitely, ...*
- ii. evaluative adverbs: *(un)fortunately, surprisingly, ...*
- iii. domain adverbs: *logically, morally, mathematically, ...*
- iv. conjunctive adverbs: *however, nevertheless, finally, ...*
- v. pragmatic adverbs: *frankly, honestly, briefly, ...*

For this paper, I will limit myself to the analysis of modal and evaluative adverbs with respect to their interaction with focus. It is probable, however, that at least domain adverbs display a similar behavior.

Before taking a closer look at the mechanism of association with focus, I want to mention that there are in general always two readings available for the sentences to be discussed in the following sections. Consider sentence (4):

(4) Probably Peter spilled [white wine]<sub>F</sub>.

There is a wide scope reading available which can be paraphrased as ‘It’s probable that Peter spilled white wine’. In this case, *probably* takes scope over the whole sentence.

On the other hand, a narrow scope reading is possible: ‘It’s probably white wine that Peter spilled’. This one is the one we are interested in as *probably* associates with the focus of the sentence, i.e. *white wine*. In the following examples, thus, we concentrate on the narrow scope readings, even if a wide scope reading is available, too.

## 2. Association with focus

Taking a closer look at expressions that are claimed to be focus sensitive, it soon becomes obvious that the class is very heterogeneous with regard to their characteristics. For some of these items an influence on the truth conditions can be found, as in example (2) above. Others do not reveal such a strong effect. Besides that, it is still under discussion whether a focus sensitive item requires a prosodically stressed element in its scope or whether this is optional. Some of the so-called focus sensitive expressions depend on a stressed constituent, others do not.

As a consequence of this heterogeneity, it seems plausible to assume different mechanisms for the association with focus.

One such idea is spelled out in Beaver & Clark (2008) who claim that an item’s focus sensitivity can be ‘lexically encoded or a non-conventionalized epiphenomenon’ (Beaver & Clark 2008:41).

According to this grade of ‘strength’ of focus sensitivity, they establish three ways of association with focus: Quasi association, free association and conventional association with focus. (Their model will be called ‘QFC model’ in the following, as an abbreviation for the three types of association with focus.) We will shortly introduce these types.

The mechanism that is behind the notion of quasi association is a solely pragmatic inference and arises with non-veridical operators, as negation:

- (5) a. Peter does not buy a [diamond ring]<sub>F</sub> for his girlfriend.  
 b. Peter does not buy a diamond ring for his [girlfriend]<sub>F</sub>.

The inference that can be drawn from (5a) is that Peter buys something else for his girlfriend. (5b) on the other hand implies that Peter buys a diamond ring for someone else. These inferences can be best described as conversational implicatures in the sense of Grice (1975). As they are triggered by a specific form of the utterance, they can be calculated on the basis of the maxim of manner. They are cancelable: By adding ‘... *in fact Paul does not buy a diamond ring for anyone*’ to (5b), the implicature disappears. This is further proof for the claim that the effect here is a pragmatic one.

We know, however, that negation in a sentence does not require a focus, i.e. a prosodically stressed element in order to be interpretable. It is completely unmarked to have negation without a focus in its scope. So, we can see this type of association with focus as a rather loose connection between operator and focus.

Other instances of quasi-associating operators are verbs of belief like *to think* or verbs of appearance like *to seem* (cf. Beaver & Clark 2008:50).

The second type, free association with focus, appears with operators quantifying over an implicit domain, as quantifying adverbs (e.g. *always*) do:

- (6) a. Paul always brings [flowers]<sub>F</sub> for his wife.  
 b. Paul always brings flowers for his [wife]<sub>F</sub>.

*Always* in (6a) quantifies over the situations in which Paul brings something for his wife. The sentence asserts that whenever Paul brings something, it is flowers that he brings. (6b), on the other hand, has as an implicit domain the set of events in which Paul brings flowers for someone. Given this domain, (6b) states that it is his wife he brings flowers for.

Besides these adverbs, quantificational determiners (as *every* or *some*), generics, counterfactuals or verbs of desire display the same behavior and are treated as instances of free association with focus (cf. Beaver & Clark 2008:52).

The last type of association with focus is the ‘strongest’ interaction of an operator with focus and the one that is talked about most in papers on focus sensitivity. Conventional association can be found, for instance, in focus particles as *only* mentioned above. The dependence of *only* on the sentence focus is lexically triggered and makes an assertion on alternative answers to the ‘current question’. This current question (or ‘question under discussion’) can be thought of as the question that is answered with the current utterance. Consider the sentence pair in (7) for illustration: (7a) with a focus on *salad* answers a question like ‘What does George eat?’. (7b) on the other hand gives an answer to ‘What does George do with salad?’:

- (7) a. George only eats [salad]<sub>F</sub>.  
 b. George only [eats]<sub>F</sub> salad.

According to these different underlying questions, there are different sets of alternative answers, i.e. alternatives to the focussed element. The set for (7a) could be {cake, salad, soup, ice cream, sandwiches}, the one of (7b) would contain alternatives to *to eat* such as {eat, grow, like, buy}.

This distinction between three types of association with focus proves highly valuable as it accounts for different characteristics of focus sensitive expressions.

Considering sentence adverbs, we want to analyze by which mechanism they are focus sensitive. Where do they fit into the QFC-model of Beaver & Clark (2008)? And do modal adverbs behave different from evaluative adverbs? In what way does this focus sensitivity result from their semantics? These questions will be examined in the following sections.

### 3. Analysis

To analyze whether a sentence is conventionally associating or quasi associating, there is mainly one crucial question: Does the item in question require a stressed element within its scope? I mentioned above that focus sensitive expressions differ in this respect. Beaver & Clark (2008) claim that conventional associating items do need an intonationally highlighted element, quasi associating items do not.

This can be examined on almost all levels of linguistic analysis. First, we will test sentence adverbs on the phonological level by analyzing sentences with second occurrence focus and leaners, i.e. sentences without a stressed element in the adverbs' scope. As we will see in section 3.1, however, this is only in part applicable for sentence adverbs.

The same question can also be approached on the syntactic level by moving the stressed constituent out of the operator's scope to test whether the sentence is still acceptable. There are of course different movements of this type. We will, amongst others, discuss topicalization and inverted cleft constructions in section 3.2.

Finally, it was observed that some focus sensitive expressions can also associate with presuppositions. This observation can be used as a test on the semantic-pragmatic level: A presupposition will be inserted into the sentence to see if the focus sensitive item alternatively associates with this inference.

These tests serve as a first indication to how strict the interaction between sentence adverbs and the focus of the sentence is.

#### 3.1. Phonological level

In general, theories for focus sensitivity can be divided into semantic and pragmatic theories. Semantic theories analyze focus sensitivity as a lexical feature of an expression. They claim that a phonologically stressed element in the syntactic scope of the focus sensitive expression is a grammatical necessity.

Pragmatic theories of focus sensitivity, on the other hand, do not assume such a requirement for a stressed element.

The question whether an assumed focus sensitive expression requires a focus in its scope, therefore, is also relevant for the competition between semantic and pragmatic theories of focus. For a semantic approach that claims that a stressed element generally is necessary, it would be hard to justify why, when looking at examples, some expressions ask for such a stressed item and others do not. What is plausible then, is rather that there are different mechanisms for the association with focus, some semantic, others pragmatic. We will follow this idea in section 4.

In the course of this discussion, the phenomenon of second occurrence focus (SOF) attracted a lot of interest in the recent years (cf. Krifka 1995, Jäger 2004, Beaver et al. 2007, Büring 2008, Féry & Ishihara 2009). Second occurrence focus is the appearance of focus in a sentence which is merely repeated after a prior occurrence. Consider (8) for illustration:

- (8) A: Everyone already knew that Mary only eats [vegetables]<sub>F</sub>.  
 B: If even [Paul]<sub>F</sub> knew that Mary only eats [vegetables]<sub>SOF</sub>, then he should have suggested a different restaurant.  
 (Beaver & Clark 2008:143, original Hajičová et al. 1998)

The SOF in B's utterance is not prosodically highlighted again, but still, *only* associates with *vegetables*. The focus here, thus, is phonologically invisible. This could be a very convincing argument for pragmatic theories for focus sensitivity.

It was, however, claimed several times that there IS a phonological marking, it is just a weak one (cf. Beaver & Clark 2008, Beaver et al. 2007). The question whether focus sensitive expressions can associate with non-stressed items, therefore, is still not answered.

Another approach to the same question, i.e. whether a focused element is necessary, is to analyze sentences containing leaners (unstressed pronouns). Beaver & Clark (2008) discuss this for *only* and *always*; sentence (8) proves that *always* can do without a focus, while the same does not hold for *only*:

- (9) Content: You had many discussions with Sandy, but what I want to know is the extent to which you talked about Fred. Of all the times you talked with Sandy, how often was Fred the person you talked about?  
 I [always] discussed'im with Sandy.  
 'Whenever I discussed someone with Sandy, it was Fred.'  
 (Beaver & Clark 2008:150)

Transferring the same test to sentence adverbs causes problem as can be seen in the following two examples:

- (10) a. [Definitely]<sub>F</sub> she discussed'im with Sandy.  
 b. ?[Possibly]<sub>F</sub> she discussed'im with Sandy.
- (11) A: Charlotte always discusses people with Olivia but they never talk about George.  
 But yesterday they did.  
 B: #Yes, yesterday Charlotte [surprisingly]<sub>F</sub> discussed'im with Olivia.

(10) as well as (11) are hardly acceptable. Why is this?

The test is not perfectly applicable for sentence adverbs, as it requires that the adverb itself is stressed. But not all adverbs can be stressed – for different reasons: Weak modal adverbs cannot be intonationally highlighted for matters of plausibility. If the speaker is not sure whether something is true or not, it is not likely that he strengthens this uncertainty.

Evaluative adverbs, on the other hand, cannot be stressed as they operate on a different level than on that of descriptive meaning. They are expressive devices (cf. section 4) and expressions on this level of meaning usually cannot be stressed (cf. for instance German modal particles).

So, the test requires that the SADV itself is stressed as explicitly no other entity in the sentence should be focused. Everything apart from the sentence adverb is supposed to be given information. Strong modal adverbs can be stressed, weaker ones cannot and evaluative adverbs neither (only when contrasted with another evaluative adverb). Consequently, this test on the phonological level cannot be used for sentence adverbs.

## 3.2. Syntactic level

The same idea to judge the strength of focus sensitivity an item reveals, can be brought to the syntactic level. To test whether an item is as strictly focus sensitive as focus particles and thus requires a stressed entity in its c-command domain, we can simply move the focused constituent out of the scope of the adverb. If the sentence is no longer acceptable, this proves a strong dependency on focus.

A strong hypothesis may be formulated as in Tancredi's (1990) 'Principle of Lexical Association':

'An operator like *only* must be associated with a lexical constituent in its c-command domain.' (Tancredi 1990:39)

This hypothesis accounts perfectly for the ungrammaticality of a sentence like (12):

(12) \*[George]<sub>F</sub>, he only sees *t<sub>i</sub>*.

When considering a sentence adverb, however, we do not get such a clear result. A conversation as in (13), with the evaluative adverb *surprisingly* in B's answer, is marked but still acceptable:

(13) A: Do you know whether Paul ate anything during the party?  
B: ?Well, yes! [Chocolate cake]<sub>F</sub> I think Paul surprisingly ate *t*, although he always tells me that chocolate makes him put on weight!

The reading where *surprisingly* is focus sensitive would thus be: 'I think that it was chocolate cake that Paul ate and I was surprised that it was chocolate cake', which can be drawn from sentence (13). It is, however, not the preferred word order. The sentence would be unmarked if the focused constituent was inside *surprisingly*'s scope.

For a comparison, the same sentence is given with *possibly* and *typically*:

(14) A: Do you know whether Paul ate anything during the party?  
B: Yes, [chocolate cake]<sub>F</sub> I think Paul possibly ate *t*.  
(15) [Chocolate cake]<sub>F</sub> I think Paul typically eats *t*.

Usually, the SADV would associate with a constituent in its c-command domain, but as the verb is already mentioned in A's question, it constitutes background information. The reading where *probably* associates with *chocolate cake*, which is focused but moved outside the adverb's scope, is readily available in answer B in (14). In the case of *surprisingly* in (13), however, this reading is much less easily available, although not impossible. Sentence (15), then, is completely acceptable. The desired readings 'I think that it was possibly chocolate cake that Paul ate and nothing else', and respectively 'What Paul typically eats is chocolate cake and nothing else' are unproblematic to get.

Inverted cleft constructions and topicalization yield the same results:

(16) [Beer]<sub>F</sub> is what I think Mary probably/?surprisingly wants to drink *t*.

The modal adverb *probably* readily associates with the focus, while the version with the

evaluative adverb is marked: Again there is a clear preference for a different word order.

Finally, as a last piece of evidence, we want to consider whether the adverbs can associate with ellipsis. Sentences (13) and (14) are fully grammatical which is not self-evident as the same does not work for a focus particle like *only* (cf. (15)):

(17) Olivia probably ate [the fish]<sub>F</sub> because George definitely did.

(18) Olivia ate [the fish]<sub>F</sub> and George fortunately did (as well).

(19) Kim only SALUTES because Sandy only does.

(Cannot mean: ‘*Kim salutes (and does nothing else) because Sandy salutes (and does nothing else).*’ (Beaver & Clark 2008:177))

In general, therefore, it is possible for a sentence adverb not to have a focused constituent in its scope. What we observe in these cases of the focus being moved out of the adverb’s scope, however, is that there is a difference between different types of adverbs. It is not a difference in grammaticality, but rather a subtle difference in markedness: the sentences with the quantitative adverb *typically* are completely acceptable, *probably* is unmarked as well, but the evaluative adverb *obviously* is not as flexible with respect to the placement of focus.

### 3.2. Semantic-pragmatic level

In this part, we still follow the same question (i.e. Does the adverb necessarily associate with the focus of the sentence?), but from a different perspective: from a semantic-pragmatic point of view.

A number of approaches to focus sensitivity claims that association with focus actually is association with presupposition (cf. Cohen 1999, Rooth 1999, Geurts & van der Sandt 2004). This can be illustrated with the case of *always*: The implicit restrictor argument that plays a role in the interpretation of sentences like (6), is determined contextually, i.e. it can be seen as presupposed. The strong version of this claim is that all instances of focus sensitivity are cases of association with presupposition:

‘It has been argued that adverbial quantification is not sensitive to focus, but rather to presuppositions [...]. These sentences [sentences containing adverbial quantification, S.D.] can be understood as quantifications over situations that satisfy their presuppositions.’ (Krifka 2001:3)

This approach, however, does not always provide the right predictions (cf. Rooth 1999, Beaver 2004) as can be seen in (20). B’s focus on *John* does not presuppose that someone borrowed the badminton racket, although this would be predicted:

(20) A: Did someone borrow my badminton racket?

B: I don’t know. If [John]<sub>F</sub> borrowed it, you can forget about getting it back in one piece. (Rooth 1999:241)

Association with presupposition cannot account for all cases of focus sensitivity. Still, this theory is important for the recent analysis. It is useful as it can be used to test whether focus operators can associate with something else than the focus. The claim is that expressions that are strongly focus sensitive, such as focus particles necessarily associate with an focused

item. They would not associate with a presupposition instead, even if the sentence contains one. But 'weaker' focus sensitive operators may be free to chose the presupposition.

Sentence (21) contains a presupposition triggered by the verb *to fail*, i.e. that the police tried to find Paul's car.:

(21) The police probably/surprisingly failed to find Paul's [car]<sub>F</sub>.

According to our hypothesis, two readings are available: The adverb may associate with the presupposition ('It is probable/surprising that the police, if they searched for Paul's car, did not find it') or with the focus on *car* ('It is probable/surprising that what the police failed to/didn't find, was Paul's car and nothing else').

In general, both of these readings are possible. The context is crucial: a preceding context like 'Tell me some news!' would facilitate the first reading. When talking about *stolen things of Paul*, on the other hand, the association with focus reading is much more plausible, as Paul's car is contrasted with a number of alternatives.

A further example is given in (22):

(22) a. Charlotte probably took [someone]<sub>F</sub> to the movies.  
b. #Charlotte surprisingly took [someone]<sub>F</sub> to the movies. (Beaver & Clark 2008:205)

In this case, the reading where the adverb associates with the presupposition results in a completely uninformative proposition we can paraphrase like this: 'The person that Charlotte probably/surprisingly took to the movies was someone'.

We would expect the sentence to be unacceptable. (22a), however, is completely acceptable. This is due to the fact that *probably* associates with the presupposition (Charlotte went to the movies) here, which results in the reading: 'It is probable that, when Charlotte has gone to the movies, she took someone there'.

So, in (22), *probably* associates with the sentence's presupposition, while *surprisingly* associates with focus. Possible explanations for this difference will be considered in the next section.

To sum up what we know to this point, we can state that modal and evaluative sentence adverbs can associate with a constituent outside their scope and they can also associate with a presupposition instead of the focus. They are, thus, no conventional associating expressions. A discussion of the adverbs' semantics is supposed to clarify whether they are quasi or free associating with focus.

#### 4. The adverbs' semantics

Modal and evaluative adverbs differ in some important aspects. While modal adverbs are non-factive and do not presuppose the truth of the proposition, evaluative adverbs do that: If a speaker uses *unfortunately* to express his attitude towards a state of affairs, he presupposes at the same time that this state of affairs holds.

Modal adverbs, moreover, operate on the level of descriptive meaning and can be accounted for with modal logic. One approach that takes a grading of certainty into account, is the one by Kratzer (1991). She defines possibility and necessity as two basic notions to grasp different "shades" of certainty of the speaker with respect to the truth of the proposition. Necessity is defined as follows:

‘A proposition  $p$  is a **necessity** in a world  $w$  with respect to a modal base  $f$  and an ordering source  $g$  iff the following condition is satisfied:

For all  $u \in \cap f(w)$  there is a  $v \in \cap f(w)$  such that  $v \leq_{g(w)} u$  and for all  $z \in \cap f(w)$ : if  $z \leq_{g(w)} v$ , then  $z \in p$ .’ (Kratzer 1991:644)

This quote states that a proposition  $p$  is a necessity if and only if it is true in all worlds that are close to the ideal world. The ideal world is determined by the ordering source. From this, the definition of a possibility is deduced:

‘A **proposition**  $p$  is a possibility in a world  $w$  with respect to a modal base  $f$  and an ordering source  $g$  iff  $\neg p$  is not a necessity in  $w$  with respect to  $f$  and  $g$ .’ (Kratzer 1991:644)

These two basic terms, then, can be graded to weak necessities, good possibilities, slight possibilities, etc. An adverb like *probably*, for instance, would be a weak necessity according to Kratzer: ‘ $p$  is a better possibility than  $\neg p$  in  $w$  with respect to  $f$  and  $g$ ’ (Kratzer 1991:644). The modal base  $f$  and the ordering source  $g$ , thus, are used as parameters for the judgment of sentences:

(23)  $[[\text{probably } \alpha]]_{f,g} = \{w \in W: [[\alpha]]_{f,g} \text{ is a weak necessity in } w \text{ with respect to } f \text{ and } g\}$

Evaluative adverbs, on the other hand, are an instance of expressive meaning: they express the speaker’s attitude and operate on a different level than descriptive meaning. One approach to deal with expressive meaning, is to treat it as conventional implicature (cf. Potts 2003, 2005, 2007).

Conventional implicatures, according to Potts (2003), are comments upon the at-issue content of an utterance, but we won’t be able to go into detail about that here.

So, at first glance, the two types of adverbs seem to be rather different. What we are interested in is how their focus sensitivity arises.

Beaver & Clark (2008:52) claim that ‘free association affects operators which perform quantification over, or comparison within, an implicit domain.’ As described above, this type of association with focus occurs for expressions with implicit arguments: a free variable in the logical form is tied to a contextually salient value, as in (24):

(24) Peter always brings flowers in  $e$ .  
 $\forall e \in \sigma$ ,  
 where  $\sigma$  is a set of events

This idea can be transferred to modal adverbs. For them, an epistemic modal base serves as an implicit argument, i.e. the modal base is the set of possible worlds compatible with the speaker’s belief. The adverb then quantifies over the set of possible worlds, as illustrated for *definitely* in (25):

(25)  $[[\text{definitely } \Phi]](w) = 1$  iff  
 For all  $w' \in B(w)$ :  
 There is a  $w'' \in B(w)$  with  $w'' \leq_w w'$   
 and for all  $w''' \leq_w w''$ :  $[[\Phi]](w''') = 1$   
 (where  $B(w)$  is the modal base for  $w$  and  $\leq_w$  the ordering source for  $w$ )

Can the same assumption be made for evaluative adverbs? Yes, it just needs a minor

adjustment. Evaluative adverbs compare alternatives to the focused constituent, i.e. they express that the chosen entity is e.g. better or worse than some alternative. We can grasp this by a bulitic modal base, so the possible worlds are more or less ‘desirable’. (26) shows how this intuitively should look like:

- (26)  $[[\text{fortunately } \Phi]](w) = 1$  iff  
 There is a  $w' \in B(w)$  such that  $w' <_{\text{good}} w$ .

## 5. Discussion

### 5.1. Deducing the focus sensitive reading

The paragraph above shows how to deduce the adverbs’ focus sensitivity from their semantics. But there is a more basic question we want to address: Is it necessary to assume a specific property such as focus sensitivity to account for the reading in which the adverb’s meaning applies to the focused constituent?

In general, there are two possibilities how the focus and the operator interact. They can be described as follows:

- (27) a.  $[[\text{SADV } ]([\dots [\text{FOK}] \dots])] = [[\text{SADV } ]([\dots]_p)] + [[\text{FOK}]]$   
 b.  $[[\text{SADV } ]([\dots [\text{FOK}] \dots])] = [[\dots]_p] + [[\text{SADV } ]([\text{FOK}]]]$

Either the meaning of the adverb applies to the whole proposition and the focus is computed in a independent step (27a) or the sentence adverb interacts directly with the focus (27b).

Does the order of application matter? To answer that question, we will spell out both versions.

The first idea is to assume that *probably* is focus sensitive. So, in (28), *probably* associates with the focus on *white wine*, which can be illustrated as in (29):

- (28) Probably Peter spilled [white wine]<sub>F</sub>.  
 (29)  $\forall x \in \text{ALT}(\text{white wine}): [\text{Peter spilled } x <_p \text{ Peter spilled white wine}]$ ,  
 where  $x \in \text{ALT}(\text{white wine})$ ,  $x \neq \text{white wine}$ .

The reading that we get is: ‘It’s more probable that what Peter spilled was white wine than any other alternative’. This one is a straightforward approach for focus sensitive expression, using alternative semantics.

There is, however, a way to deduce this reading without assuming something like a lexicalized interaction between the sentence adverb and the focus. For this idea, we interpret the sentence’s focus as a free focus which leads to the calculation of a set of alternatives, such as  $\text{ALT} = \{\text{white wine, red wine, beer, coffee...}\}$ . The free focus on *white wine*, then, leads to an implicature that what Peter spilled was white wine:

- (30)  $\forall x [\text{Peter spilled } x \rightarrow x = \text{white wine}]$

The sentence adverb applies to the whole sentence. Either it applies to the conjunction of the proposition and the implicature triggered by the focus (31), or it applies to the proposition first and the implicature is calculated in a second step. The second possibility can be ruled out

as it would lead to the reading ‘It’s probably that Peter spilled white wine, and what he spilled was white wine and nothing else’. This paraphrase involves a factivity which actually is not present. It is not clear whether Peter spilled white wine or not, but the last part implies a certainty about that (32).

(31) probably (Peter spilled white wine  $\wedge \forall x$  [Peter spilled  $x \rightarrow x =$  white wine])

(32) probably (Peter spilled white wine),  $\forall x$  [Peter spilled  $x \rightarrow x =$  white wine]

The reading of the interpretation in (31) is ‘It’s probable that Peter spilled white wine and that what he spilled was white wine and nothing else.’

Basically, this comes close to the interpretation in (29) where *probably* is interpreted as focus sensitive. Before we discuss the relevance of these two analyses, we will have a short look at an evaluative adverb. We claim that it can be interpreted in the same way:

(33) Fortunately Peter spilled [white wine]<sub>F</sub>.

The focus value of white wine could be  $ALT = \{\text{white wine, red wine}\}$ . Our world knowledge influences the choice of alternatives here, as we know that usually we prefer that nothing is spilled at all, but if something is spilled, something that is easier to clean up is to be preferred.

(34) [Peter spilled white wine] = 1,  
 $\forall x$ . Peter spilled  $x <_{\text{good}}$  Peter spilled white wine,  
 where  $x \in ALT$  (white wine),  $x \neq$  white wine

The interpretation in (34) includes the idea that there has to be at least one worse alternative for the utterance to make sense, and expresses the factivity that is involved.

## 5.2. Focus Sensitivity

What we can conclude from these observations and possible interpretations, is that focus sensitivity is not an inherent, systematic characteristic of an expression, but rather a term for a range of strengths of association with focus.

When considering the two ways how to deduce the meaning of a sentence like (28), we do not want to claim that these are simply two distinct analyses, but rather that one develops from the other. We can imagine readily that the phenomenon of free focus, which is a purely pragmatic phenomenon, is something like a communicative universal. A prosodic stress signals that there are alternatives to the chosen expression which explicitly have not been taken.

If a semantic operator occurs in the same sentence as the free focus, then, it can be interpreted as correlating with the focus, e.g. such that the attitude of the speaker towards the state of affairs holds just in case of the chosen expression, but it would not hold for an alternative expression. This correlation between operator and focus has the status of Beaver & Clark’s (2008) quasi association, which is a merely pragmatic inference and corresponds to an interpretation as in (20).

As the result of a longer process, this correlation may become part of the item’s semantics, it becomes “semanticized”. So, whenever the item appears in a sentence, it is necessarily interpreted with respect to the sentence’s focus. More than that: it requires a focus to associate

with. This corresponds to the mechanism of conventional association.

Focus sensitivity, thus, ranges from a spontaneous co-occurrence to lexically determined and obligatory association with focus. It is more or less anchored in the semantics of an item, which can be seen as a matter of time of development.

### 6. Summary

In this paper, we could demonstrate that sentence adverbs are not necessarily focus sensitive but they can be interpreted as such. This means that they do not obligatorily require a stressed element in their scope, but they readily associate with one if present. We analyze them as an instance of free association with focus where a modal base serves as implicit argument (restrictor argument) for the adverb. In the case of modal adverbs, this is an epistemic modal base, for evaluative adverbs it is a deontic one.

Moreover, we noticed in the tests that there are subtle differences concerning the grammaticality of sentences with modal and evaluative adverbs. They are not as strong as affecting the grammaticality of the sentences, they are rather on the level of markedness. We discussed different explanations for them above.

Finally, there remain some open questions. First of all, it appears to be controversial whether the need for a stressed element in the scope can really be used as a criterion for focus sensitivity. It is often used as a test, but it should be rather regarded as a hint to how strongly an item is focus sensitive.

Another question that is not fully answered, is why modal adverbs are more flexible as evaluative adverbs with respect to the placement of focus.

Finally, it would be interesting whether there might be proof for the assumed development of focus sensitivity from a diachronic perspective. All of these open issues are of interest to further research.

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**There are several positions available:**  
English intermediate subject positions

Will Harwood

The distribution of floating quantifiers and associates of existential constructions provide the most compelling evidence in English for the vP-internal subject hypothesis. It is observed, however, that FQs and associates demonstrate similar patterns of behaviour which suggest they actually surface outside vP, contrary to standard analyses. Given the apparent ability for both floating quantifiers and associates to delineate low/intermediate subject positions, and given their similarities in distribution, this paper aims to provide a unified account of these two related phenomena. The analysis appeals to phase theory and Late Adjunction, claiming  $v_{\text{prog}}^{\circ}$  is the clause internal phase head instead of  $v^{\circ}$ .

*1. Introduction*

Existential constructions in English have often been used to provide evidence for Koopman & Sportiche's (1991) claim that subjects are merged within the vP domain:

- (1) There was a boy eating an apple.

In (1), the subject *a boy* is not sat in the canonical subject position Spec-TP, which appears to be occupied by the expletive *there*. Rather, *a boy* is found adjacent to the lexical verb *eating*.

Under the standard mono-clausal analysis of this construction (Chomsky 1981; Burzio 1986; Akmajian & Wasow 1975), the semantically vacuous expletive *there* is merged directly into the canonical subject position, Spec-TP. This satisfies the Extended Projection Principle (EPP) on  $T^{\circ}$  which requires Spec-TP, to be overtly filled.<sup>1</sup> The satisfaction of the EPP by expletive *there* subsequently prevents the subject from raising out of its initial merge position, namely Spec-vP, as it no longer has any motivation to move. Therefore, the subject (which is hereby referred to as *the associate* in existential constructions) surfaces in Spec-vP, adjacent to the lexical verb which occupies  $v^{\circ}$ . This is why in the sentence in (1), the associate *a boy* is found immediately preceding the lexical verb *eating*; hence the claim that existential constructions provide compelling evidence in English for the vP-internal subject hypothesis.

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<sup>1</sup> This can be formalized as follows:  $T^{\circ}$  has a  $[uD]$  feature which requires checking in a spec-head relationship with a DP.

Similarly, floating quantifiers (FQs) provide further evidence for the claim that subjects are merged within the vP domain. Sportiche (1988) noted that the following two sentences are semantically identical:

- (2) a. All the children had watched the movie.  
 b. The children had all watched the movie.

The only structural difference between the two sentences is the distribution of the FQ *all*. In (2) it precedes the subject *the children*, and in (2) it precedes the lexical verb *watched*. Sportiche hypothesised that for the two sentences to be semantically identical, they must have at some stage in the derivation been syntactically identical. Furthermore, FQs were shown to agree cross linguistically for person, number and gender with the argument to which they are related. Sportiche therefore claimed that rather than being a simple adverb, FQs enter the derivation adjoined to the subject in Spec-vP, and may either be pied-piped by the subject up to the canonical subject position, as in (2), or optionally stranded in the subject's base position, as in (2). In other words, the subject raises at the exclusion of the quantifier, leaving the quantifier behind in Spec-vP, adjacent to the lexical verb. Therefore, FQs are deemed to immediately c-command the traces of subjects, hence the claim that FQs provide compelling evidence in English for the vP-internal subject hypothesis.<sup>2</sup>

Upon closer inspection however, neither FQs nor existential constructions conform perfectly with their current analyses. The aim of this paper is to first observe that both FQs and associates share similar distributional patterns which suggest that neither are in fact able to surface within the vP domain. The goal is then to provide a unified analysis which accounts for these anomalous patterns of behaviour by claiming that all subjects raise to an intermediate position outside of the vP layer. This intermediate position exists in the form of a clause internal phase edge. I therefore reject the notion that  $v^{\circ}$  acts as the clause internal phase head, and instead posit that a higher functional head fulfils this role.

This paper is organised as follows: Section 2 discusses the predictions made by the analyses of FQs and existential constructions that were outlined in the introduction; section 3 highlights the fact that these predictions are not borne out by supplying detailed data on FQs and existential constructions. The motivation for a unified analysis is then given. Section 4 outlines a few prerequisites for the analysis, which is then presented in section 5. Section 6 explores an alternative account of existential constructions that has been proposed in the literature, whilst section 7 discusses the further issues that arise from my own analysis. Finally, section 8 concludes.

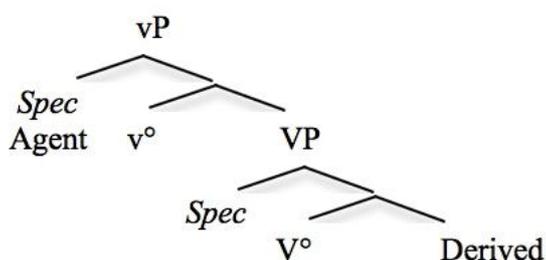
## 2. Predictions

Two basic types of subjects exist: the agentive subject, which has volitional control over the action of the lexical verb, and the derived subject, which potentially can bear a number of different thematic relations to the verb, though none of these are of volitional control. Crucially, agentive subjects are typically merged in Spec-vP (Koopman & Sportiche 1991), whilst derived subjects are merged as complement to  $V^{\circ}$ , i.e. object position:

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<sup>2</sup> It should also be noted that FQs may be optionally pied-piped by the subject through various intermediate specifiers, and subsequently stranded in any one of these intermediate positions. I return to this issue later.

(3)



Both agentive and derived subjects standardly surface in the canonical subject position by raising out of their base positions to Spec-TP to satisfy the EPP on T°. Agentive subjects are typically found with unergative and transitive verbs:

- (4) a. The boy laughed.  
b. The boy ate an apple.

Whilst derived subjects are typically found with unaccusative verbs or with passivised transitive verbs:

- (5) a. The letters arrived.  
b. The apple was eaten (by the boy).

Given these assumptions, a number of predictions fall out of the analyses presented above for both FQs and existential constructions. I first point out two predictions for associates, one for each type of subject, and then two parallel predictions for FQs.

First, agentive associates of existential constructions, supposedly surfacing in Spec-vP, should precede the lexical verb (which does not raise beyond v° in English), but follow all auxiliary verbs and pre-verbal adverbs, both of which are assumed to be merged above vP (Cinque 1999).

The second prediction is with regards to derived associates. According to the analysis outlined in section 1, derived associates, with no motivation to raise, should surface in their initial merge position, that is, complement to V°. Therefore we predict derived associates to follow all passive and unaccusative verbs, all auxiliaries and pre-verbal adverbs.

The third prediction is with regards to FQs related to agentive subjects. According to the analysis presented in the introduction, FQs should potentially be stranded in Spec-vP. Similar to agentive associates, these FQs are expected to precede lexical verbs whilst following all auxiliaries and pre-verbal adverbs.

The fourth and final predication involves FQs related to derived subjects. These FQs should potentially be stranded in object position, i.e. complement to V°. Similar to derived associates, these FQs are predicted to follow passive and unaccusative verbs, auxiliaries and pre-verbal adverbs.

The following section shows however, that these predictions are not borne out.

### 3. Data

I first discuss data related to the distribution of agentive associates, and then of derived associates. Following this I observe parallel data for the distribution of FQs, first related to agentive subjects, and then to derived subjects.

I begin by considering the distribution of agentive associates of existential constructions. Recall that these are expected to precede all lexical verbs, but follow all auxiliaries and preverbal adverbs (prediction 1). The first observation to be made contrary to this prediction is that the agentive associate must obligatorily precede the copular auxiliary *being*:

- (6) a. There were **several men** being rather loud.  
 b. \* There were being **several men** rather loud.

Whilst all other auxiliaries are standardly assumed to be merged above vP, copular *be* is in fact assumed to be generated on v° itself, making it seem more akin to a lexical verb. However, unlike lexical verbs, copular *be* is able to precede negation, undergo subject-auxiliary-inversion and escape VP ellipsis, suggesting that, like all other auxiliaries, it is prone to overt raising in order to receive tense inflections.

- (7) a. He isn't a doctor.  
 b. \* He runs not often.

- (8) a. Is he a doctor?  
 b. \* Runs he often?

- (9) a. He said he's a doctor, and indeed he is [~~a doctor~~].  
 b. \* He said he runs marathons, and indeed he runs [~~marathons~~].

I follow Cinque (1999) and Thoms (2010), among others, in claiming that auxiliary verbs in English raise overtly in order to receive aspectual inflections as well tense inflections. Therefore copular *be*, always bearing inflections of some kind, must always raise out of v° to a position beyond Spec-vP. In this case, copular *be* is expected to precede the agentive associate, which, under standard assumptions, resides in Spec-vP. As (6) demonstrates however, this prediction is not borne out.

Furthermore, as (10) illustrates, agentive associates precede low pre-verbal adverbs such as the measure adverb *completely* (Haegeman 2004) and the manner adverb *loudly*:

- (10) a. There were **several academics** completely destroying my argument.  
 b. \* There were completely **several academics** destroying my argument.  
 c. There was **a boy** loudly eating an apple.  
 d. \* There was loudly **a boy** eating an apple.

If we assume, as per Cinque (1999) and Ernst (2001) that such adverbs are merged above vP, then this observation is also contrary to prediction.

I next consider the distribution of derived associates. Recall that these are predicted to follow unaccusative and passive verbs, auxiliaries and pre-verbal adverbs (prediction 2). As

(11) demonstrates however, the derived associate must precede both unaccusative and passive verbs, contrary to prediction:

- (11) a. There were **three letters** arriving.  
b. \* There were arriving **three letters**.  
c. There were **several buildings** demolished by the local council.  
d. \* There were demolished **several buildings** by the local council.

Furthermore, the derived associate must precede the passive auxiliary *being*:

- (12) a. There were **several buildings** being demolished by the local council.  
b. \* There were being **several buildings** demolished by the local council.

Finally, derived associates must precede low pre-verbal adverbs such as the measure adverb *completely* and the manner adverb *loudly*:

- (13) a. There were **several buildings** completely demolished by the local council.  
b. \* There were completely **several buildings** demolished by the local council.  
c. There were **several buildings** loudly demolished by the local council.  
d. \* There were loudly **several buildings** demolished by the local council.

Given that both agentive and derived associates must in reality precede not only the lexical verb, but also low adverbs and auxiliary *being*, it seems that neither Spec-vP nor complement of V° are available as surface positions for associates. Associates must therefore be appearing in the specifier of some higher projection, one that is outside of the initial vP domain.

I next consider the distribution of FQs, beginning with FQs related to agentive subjects. These are expected to be potentially stranded in Spec-vP, preceding lexical verbs but following all auxiliaries and pre-verbal adverbs (prediction 3). As (14) and (15) illustrate however, this prediction is not borne out. First of all, FQs related to agentive subjects must precede the copular auxiliary *being*:

- (14) a. They were **all** being rather loud.  
b. \* They were being **all** rather loud.

Second, these FQs must precede pre-verbal manner adverbs such as *loudly* (Sportiche 1988) and measure adverbs such as *completely* (Cinque 1999):

- (15) a. They were **all** completely destroying my argument.  
b. \* They were completely **all** destroying my argument.  
c. They were **all** loudly destroying my argument.  
d. \* They were loudly **all** destroying my argument.

Notice that the distribution of FQs related to agentive subjects parallels that of agentive associates.

Finally, I consider the distribution of FQs related to derived subjects. These are expected to be potentially stranded in object position, crucially following unaccusative and passive verbs, all auxiliaries and pre-verbal adverbs (prediction 4). As the following examples illustrate

however, this prediction is not borne out. First of all, FQs related to derived subjects precede unaccusative and passive verbs:

- (16) a. They were **all** arriving.  
 b. \* They were arriving **all**.  
 c. The buildings were **all** demolished.  
 d. \* The buildings were demolished **all**.

Second, such FQs precede the passive auxiliary *being*:

- (17) a. They were **all** being punished.  
 b. \* They were being **all** punished.

Moreover, these FQs precede pre-verbal manner and measure adverbs:

- (18) a. The buildings were **all** loudly destroyed.  
 b. \* The buildings were loudly **all** destroyed.  
 c. The buildings were **all** completely destroyed.  
 d. \* The buildings were completely **all** destroyed.

Notice that the distribution of FQs related to derived subjects parallels that of derived associates.

Therefore it can be concluded that FQs and associates in general parallel one another in their distribution. This seems to suggest that Spec-vP and complement of V° are unavailable as surface positions for both FQs and associates, and that FQs and associates must therefore surface somewhere outside of the vP domain. If one continues to assume that both FQs and associates do indeed delineate non-canonical subject positions, and given the similarities in distribution that have just been observed, it seems reasonable that a unified account should be attempted of these two clearly related phenomena. FQs and associates therefore must be spelt-out in the same intermediate projection, which sits above vP but below TP. Assuming that the vP-internal subject hypothesis still holds, it may also be concluded that they appear in this position due to some form of subject raising. The question then is what is this intermediate position, and why must subjects raise there?

Though many analyses have been given in an attempt to explain the distribution of either FQs (Sportiche 1988; Shlonsky 1991; Boskovic 2004; Cirillo 2009) or associates (Caponigro & Schütze 2003; Rezac 2006; Burzio 1986), none of them are able to account for the distribution of both phenomena in Standard English at the same time (though see Henry & Cottell 2007 for a unified account of these constructions in Belfast English). The aim of this paper is thus to provide such an account.

Before commencing with an analysis, further data needs to be considered, in particular with regards to the peculiar behaviour of auxiliary *be* in its various different guises. This includes all forms of *be*: progressive, passive and copular. Recall first of all, as was illustrated in (6), (12), (14) and (17), FQs and associates must precede *being*. However, as the following examples show, associates and FQs must follow all other forms of *be*.<sup>3</sup> This includes tensed *be* (cf. (19)), infinitival *be* (cf. (20)), and *be* when preceded by perfective *have* (cf. (21)):

<sup>3</sup> Some native speakers of English find instances in which the FQ follows *be* or *been* (as in (20) and (21)) to be unacceptable, or somewhat degraded. The current analysis will ignore this variation, focussing instead on the

- (19) a. There were **several people** standing in the garden.  
 b. They were **all** standing in the garden.  
 c. There were **several buildings** demolished by the local council.  
 d. They were **all** demolished by the local council.  
 e. There was **a man** in the garden.  
 f. They were **all** in the garden.
- (20) a. There could be **several people** standing in the garden.  
 b. They could be **all** standing in the garden.  
 c. There could be **several buildings** demolished by the local council.  
 d. They could be **all** demolished by the local council.  
 e. There could be **a man** in the garden.  
 f. They could be **all** in the garden.
- (21) a. There have been **several people** standing in the garden.  
 b. They have been **all** standing in the garden.  
 c. There have been **several buildings** demolished by the local council.  
 d. We could have been **all** killed... or worse.<sup>4</sup>  
 e. There had been **a man** in the garden.  
 f. They had been **all** in the garden.

This raises the question of why FQs and associates must precede *being*, but not necessarily any other form of *be*, a puzzle which will assist the analysis later on.

Finally, before moving on to the prerequisites and the analysis, there is one further piece of data to be addressed, namely that FQs and associates do not pattern exactly the same. There does indeed appear to be a certain intermediate position where FQs and associates obligatorily raise to, but unlike FQs, associates are frozen in this position. As (22) and (23) illustrate, FQs obligatorily precede *being* but may freely precede all other higher auxiliaries as well, whereas associates obligatorily precede *being*, but follow all other higher auxiliaries. This fact will also be incorporated into the analysis.

- (22) a. We **all** could have been being punished for our crimes.  
 b. We could **all** have been being punished for our crimes.  
 c. We could have **all** been being punished for our crimes.  
 d. We could have been **all** being punished for our crimes.  
 e. \* We could have been being **all** punished for our crimes.
- (23) a. \* There **a man** could have been being punished for his crimes.  
 b. \* There could **a man** have been being punished for his crimes.  
 c. \* There could have **a man** been being punished for his crimes.  
 d. There could have been **a man** being punished for his crimes.  
 e. \* There could have been being **a man** punished for his crimes.

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majority of speakers who do find such constructions grammatical. I leave the observed dialectal variation for future research.

<sup>4</sup> Hermione Granger in 'Harry Potter and the Philosopher's Stone' by J.K. Rowling, 1997.

To summarise, I will try to provide a unified analysis which can account for the fact that associates and FQs obligatorily precede lexical verbs, auxiliary *being* and low adverbs, with FQs furthermore being able to occur freely amongst all higher auxiliaries:

- (24) Subj <all> Modal <all> *have* <all> *be/been* <all>*being* <\*all> V <\*all>  
 (25) Expl <\*as>Modal <\*as>*have* <\*as>*be/been* <as> *being* <\*as> V <\*as>

#### 4. Prerequisites

There are two prerequisites to the analysis. One is with regards to auxiliary raising, and the other with regards to subject raising. I deal with each in turn.

##### 4.1 Auxiliary Raising

Adapting ideas from Cinque (1999) and Thoms (2010), I assume a basic hierarchical structure within the TP layer. Specifically, four separate functional projections exist in which auxiliary and modal verbs are merged.<sup>5</sup> I assume that perfective *have*, progressive *be* and passive *be* all head a vP shell (which I have labelled vP<sub>perf</sub>, vP<sub>prog</sub> and vP<sub>voice</sub> for the sake of clarity), and that modals are merged in a separate ModP.<sup>6</sup>

The sentence in (26) illustrates that auxiliaries and modal verbs rigidly occur in the order modal>perfective *have*>progressive *be*>passive *be*:

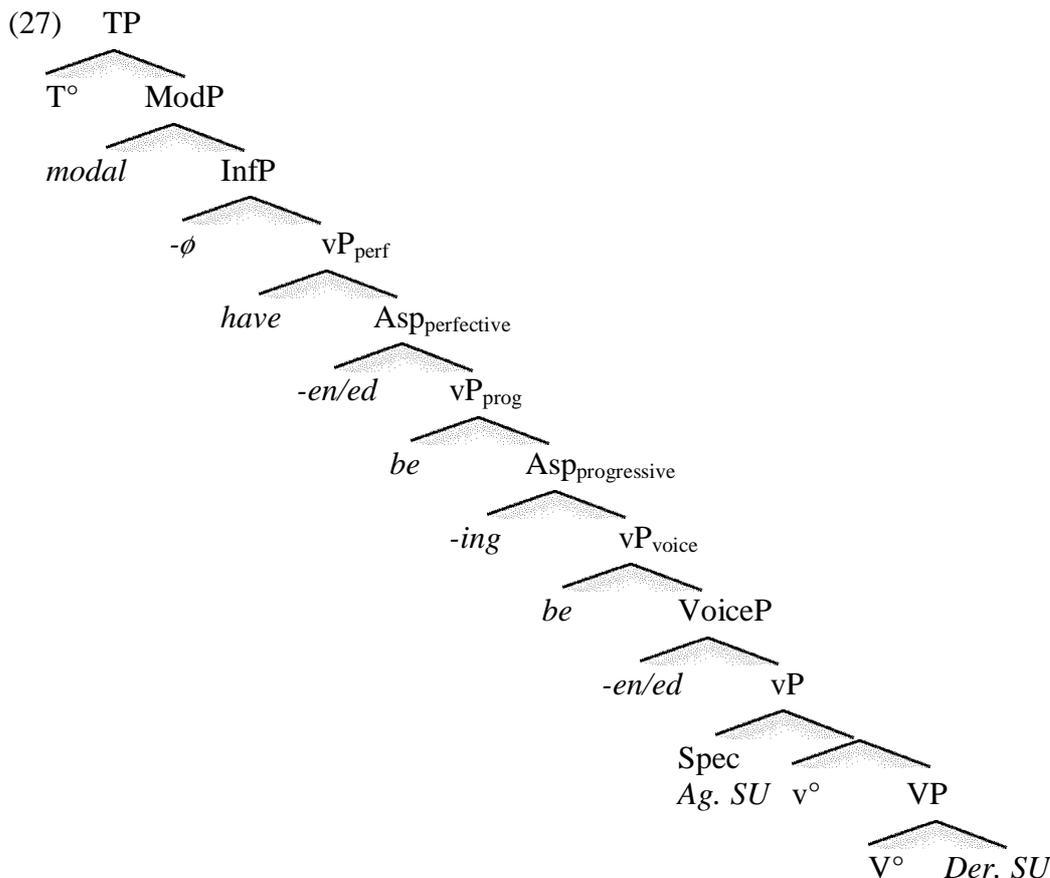
- (26) He could have been being punished.<sup>7</sup>

Given this, I assume these four functional projections to be arranged in the following hierarchical order: ModP>vP<sub>perf</sub>>vP<sub>prog</sub>>vP<sub>voice</sub>. Moreover, I assume that each of these phrases immediately selects a further functional projection, in the head of which the relevant inflection associated with that auxiliary is merged. Specifically, ModP selects an InfP in the head of which a  $-\emptyset$  inflection is generated. Similarly, vP<sub>perf</sub> selects Asp<sub>perfective</sub>, in the head of which the relevant  $-en/ed$  inflection is merged; vP<sub>prog</sub> selects Asp<sub>progressive</sub>, in the head of which the relevant  $-ing$  inflection is merged; and vP<sub>voice</sub> selects VoiceP, in the head of which the passive  $-en/ed$  inflection is generated. Finally, I assume along the lines of strict cartography (Rizzi 1997, Cinque 1999) that these functional phrases are always present in the derivation, whether overtly realised or not. This produces the following hierarchy:

<sup>5</sup> There may very well be more than four functional projections for modals and auxiliaries, but for the purposes of this paper I will keep things simple.

<sup>6</sup> As before, I also standardly assume copula *be* is merged in v<sup>o</sup>

<sup>7</sup> Some native speakers of English find sentences containing four auxiliary verbs of the type *could have been being V* difficult to parse, though such sentences are standardly still considered grammatical.



As mentioned before, I assume that auxiliaries and modal verbs may raise overtly in English to T° for tense inflections, and, following Akmajian & Wasow (1975); Boskovic (2004); Thoms (2010); Cinque (1999), that auxiliaries in English also raise overtly in the structure in order to receive aspectual/infinitival inflections. More specifically, if an auxiliary  $\alpha$  is preceded by a higher auxiliary/modal verb  $\beta$ , then  $\alpha$  will overtly raise to the aspectual/infinitival projection associated with  $\beta$ .

For instance, if *have* or a form of *be* is preceded by a modal, then *have* or *be* will raise to InfP° in order to pick up the  $-\phi$  inflection and surface as *be* or *have*:

- (28)
- a. I could **have** died.
  - b. We could **be** eating by now.
  - c. We could **be** discovered.
  - d. He could **be** a doctor.

If a form of *be* is preceded by *have*, then *be* raises to Asp<sub>perfective</sub>° in order to receive the relevant  $-\text{en/ed}$  inflection and surface as *been*:

- (29)
- a. We have **been** walking for some time now.
  - b. We have **been** defeated.
  - c. We have **been** such idiots.

Finally, if passive or copular *be* is preceded by progressive *be*, it raises to  $\text{Asp}_{\text{progressive}}^{\circ}$  in order to receive the progressive *-ing* inflection and surface as *being*:

- (30) a. We were **being** fed.  
 b. We were **being** rather loud.

I assume that lexical verb raising in English is always non-overt, whether for tense, infinitival, aspectual or passive morphology. Therefore the lexical verb will always surface in  $v^{\circ}$ , and no higher.

The crucial point of this subsection is that auxiliary *be* only raises as high as  $\text{Asp}_{\text{progressive}}^{\circ}$  in order to surface as *being*, but raises beyond this position in order to be spelt out as *be*, *been* or tensed *be*.<sup>8</sup>

Recall that associates and FQs obligatorily precede *being* but not *be*, *been* or tensed *be*. This implies that associates and FQs must be spelt out in a position that sits somewhere between  $\text{Asp}_{\text{progressive}}^{\circ}$  and  $\text{Asp}_{\text{perfective}}^{\circ}$ . For now I suggest that this position is  $\text{Spec-vP}_{\text{prog}}$ . My motivations for this will become clear later on. The next task is to explain why associates and FQs must surface in this position, which calls for a brief discussion on the nature of subject raising.

#### 4.2 Subject raising

Here I appeal to the notion of phase theory (Chomsky 2000, 2001) as a means of motivating subject raising to intermediate positions. Under phase theory, spell-out is taken to be cyclic. That is, syntactic structures are not shipped off to PF all at once; instead they are shipped off in chunks as a means of reducing the computational load on the syntactic component. This implies that a subpart of the overall structure is formed, and sent to spell-out before the rest of the structure is completed. Phases are delineated by phase heads, which are traditionally taken to be  $v^{\circ}$  and  $C^{\circ}$ . The specifier of a phase head comprises the phase edge, and the complements of  $v^{\circ}$  and  $C^{\circ}$  are considered to be the phasal domains, i.e. the spell-out domain of the phase. Once the phase head is constructed, the phasal domain is sent to PF. Though considered to be a part of the lower phase, spell-out of the phase head and its edge is always delayed and is instead sent to PF as part of the phasal domain of the higher phase head.

The cyclic nature of spell out implies that material contained within the lower phase is unavailable for computations/operations in the higher phase. That is, if an item has already been shipped off to PF, it is unavailable to further syntactic processes in the higher phase. This is known as the Phase Impenetrability Condition (PIC, Chomsky 2000), which is stated formally as thus:

- (31) Given structure  $[_{ZP} Z [_{XP} [_{HP} \alpha [H YP]]]]$ , with H and Z the heads of phases – in phase  $\alpha$  with head H, the domain of H is not accessible to operations outside  $\alpha$ ; only H and its edge are accessible to such operations.

Since the spell-out of the phase head and edge is delayed, elements sat in these positions remain available for further syntactic operations, whilst elements sat in the phasal domain, i.e. the complement of the phase head, are not. Therefore, if an item merged in the domain of the lower phase head is required for operations in the higher phase, it must first move to the phase

<sup>8</sup> I use auxiliary *be* as a cover term for any form of *be* as it makes little difference in terms of the positioning of *be*.

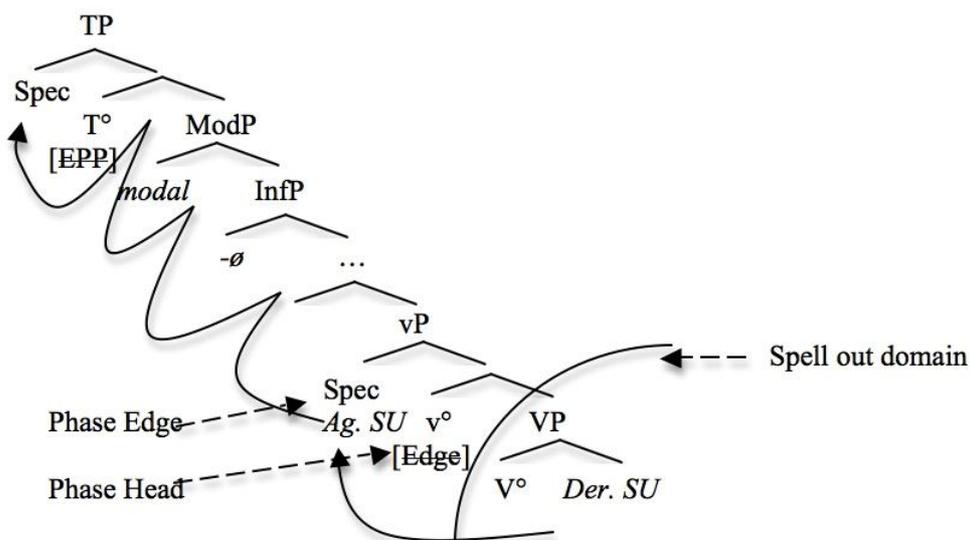
edge in order to escape spell-out and be visible to the higher phase. One way of motivating this raising is by positing an EPP feature on the phase head, also known as an ‘Edge’ feature. This would drive movement of the required element to the phase edge. I assume use of this ‘Edge’ feature for present purposes.<sup>9</sup>

I claim, as is standardly believed, that subject raising is always driven by the EPP feature, whether this be on T° or on the phase head. I furthermore assume that subject raising is successive cyclic, that is, the subject must pass through every available intermediate specifier on its way to checking the EPP feature (due to limitations on space, I am unable to go into how successive cyclic movement is possible under an Attract F theory of movement. However, see Ochi (1999) for such proposals). For now this successive cyclic raising will be of little use, but it will come in handy when discussing the freer distribution of FQs in comparison to associates.

I also assume that in order for a subject to check the EPP on T°, it must first raise to satisfy the Edge feature on the clause internal phase head. That is, T° is not merged until the higher phase, whereas subjects are merged in the clause internal phase. This means that, in accordance with the PIC, subjects would not be available to the higher phase to check the EPP on T° unless they first raised out of the lower phase. In order to do this, the subject would first have to raise to the clause internal phase edge to check the Edge feature on the phase head. This would allow the subject to escape spell-out by having been evacuated from the domain of the lower phase head. Only then, under the rules of the PIC, would the subject be visible to T° and therefore available to satisfy the EPP on T°.

Under standard assumptions, the agentive subject is merged on Spec-vP, the clause internal phase edge. Being merged on the phase edge, the agentive subject automatically escapes spell-out of the lower phase, so no raising is required other than to Spec-TP. Derived subjects however, merged as complement to V°, would be required to raise to the Spec-vP phase edge in order to escape spell-out and therefore appear visible to T°. This is all exemplified in the tree below:

(32)



<sup>9</sup> Use of the Edge feature obviously raises huge problems in terms of look ahead. There are ways of getting around this matter, but due to limitations on space, and for the sake of simplicity, I will forego this issue for the purposes of this paper.

All the basic mechanics are now in place with which a unified analysis of existential constructions and FQs can be pursued.

### 5. Analysis

I begin by claiming that, contrary to popular belief,  $v^\circ$  is not a clause internal phase head, rather,  $v_{\text{prog}}^\circ$  is. This is not an entirely unmotivated claim. It has been proposed before that the heads of  $vP$  shells (in which auxiliary verbs are merged) may act as intermediate phase heads (Deal 2009; Legate 2003; Rocquet 2010), and Aboh (2005) has even singled out progressive aspect in particular as acting as the clause internal phase head as opposed to  $v^\circ$ .

There is also empirical weight in English to the claim that  $v_{\text{prog}}^\circ$  may act as a phase head. Recall that auxiliary *being* will only raise as far as  $\text{Asp}_{\text{progressive}}^\circ$ , crucially, below the  $v_{\text{prog}}^\circ$  phase head, whereas *be*, *been* and tensed *be* raise beyond the phasal boundary. This means we would predict certain behavioural differences between *being* and other forms of *be*. These predictions, in certain environments, are borne out.

First of all, under VP ellipsis, *being* is obligatorily elided, whereas other forms of *be* are not:<sup>10</sup>

- (33) a. I thought we were being watched, and it turns out we were ~~{being watched}~~.  
 b. \* I thought we were being watched, and it turns out we were **being** ~~{watched}~~.  
 c. I thought we couldn't be defeated, but it turns out we could **be** ~~{defeated}~~.  
 d. I thought they had been defeated, and it turns out they had **been** ~~{defeated}~~.  
 e. I thought the apple was eaten by the dog, and in fact it **was** ~~{eaten by the dog}~~.
- (34) a. He said they were being idiots, and in fact they were ~~{being idiots}~~.  
 b. \* He said they were being idiots, and in fact they were **being** ~~{idiots}~~.  
 c. He said they could be aliens, and indeed they could **be** ~~{aliens}~~.  
 d. He said they had been absolute idiots, and indeed they had **been** ~~{absolute idiots}~~.  
 e. He said he was a doctor, and indeed he **was** ~~{a doctor}~~.

I follow Gengel (2007), Gallego (2009), Yoshida & Gallego (2008) in claiming that the ellipsis site of VP ellipsis is the complement of the clause-internal phase head. Therefore, in order for *being* to be elided, it must sit in the domain of the phase head. This obviously cannot be  $v^\circ$ , which is generated below *being*, but is instead more likely to be  $v_{\text{prog}}^\circ$ . Furthermore, since *been* need not be elided, we can rule out  $v_{\text{perf}}^\circ$  or any head above that from being the relevant phase head also.

Zagona (1982) and Johnson (2001) also note that the same site which may be elided, may also be fronted. That is, under VP fronting, *being* is obligatorily fronted, whereas other forms of *be* are not:

<sup>10</sup> A problem with this evidence is that *be* and *been* are optionally elided, a fact for which I have no explanation.

- (i) I thought we couldn't be defeated, but it turned out we could ~~{be defeated}~~.  
 (ii) I thought they hadn't been defeated, but it turned out they had ~~{been defeated}~~.  
 (iii) He said they could be aliens, and indeed they could ~~{be aliens}~~.  
 (iv) He said they had been absolute idiots, and indeed they had ~~{been absolute idiots}~~.

- (35) a. He said they were being watched, and **being** watched they were.  
 b. \* He said they were being watched, and watched they were **being**.  
 c. He said they could be defeated, and defeated they could **be**.  
 d. He said they had been defeated, and defeated they had **been**.  
 e. He said they were defeated, and defeated they **were**.
- (36) a. He said they were being noisy, and **being** noisy they were.  
 b. \* He said they were being noisy, and noisy they were **being**.  
 c. He said they could be noisy, and noisy they could **be**.  
 d. He said they had been noisy, and noisy they had **been**.  
 e. He said they were noisy, and noisy they **were**.

It may also be noted that *being* is the only auxiliary which remains in a reduced relative clause:

- (37) a. The boy (~~who was~~) **being** punished yesterday was my brother.  
 b. \* The boy (~~who had~~) **been** punished yesterday was my brother.  
 c. \* The boy (~~who could~~) **be** punished yesterday was my brother.

Akmajian & Wasow (1975) also note that *being* cannot be used in tag questions, whereas other forms of *be* can:

- (38) a. \* They are being punished, aren't they **being**?  
 b. They could be punished, couldn't they **be**?  
 c. They have been punished, haven't they **been**?  
 d. They were punished, **weren't** they?
- (39) a. \* They are being very noisy, aren't they **being**?  
 b. They could be very noisy, couldn't they **be**?  
 c. They have been very noisy, haven't they **been**?  
 d. They were very noisy, **weren't** they?

Therefore *being* does indeed appear to behave differently from other instances of auxiliary *be*. Although a full account of VP ellipsis, fronting, tag questions and reduced relative clauses is beyond the scope of this paper, it seems reasonable to suggest that this distinction may be attributed to the claim that *being* does not raise beyond the clause internal  $v_{\text{prog}}^{\circ}$  phase head, whereas all other instance of *be* do.

Having posited  $v_{\text{prog}}^{\circ}$  as the clause internal phase head rather than  $v^{\circ}$ , and having provided justification for this claim, I now proceed with a specific analysis of associates and FQs. I begin with the distribution of associates of existential constructions.

### 5.1 Existentials

As stated previously, *being* surfaces in  $\text{Asp}_{\text{progressive}}^{\circ}$  and lexical verbs in  $v^{\circ}$ . Furthermore, pre-verbal manner adverbs such as *loudly* and measure adverbs such as *completely* are merged

below Voice<sup>°</sup> (Cinque 1999; Ernst 2001)<sup>11</sup>.

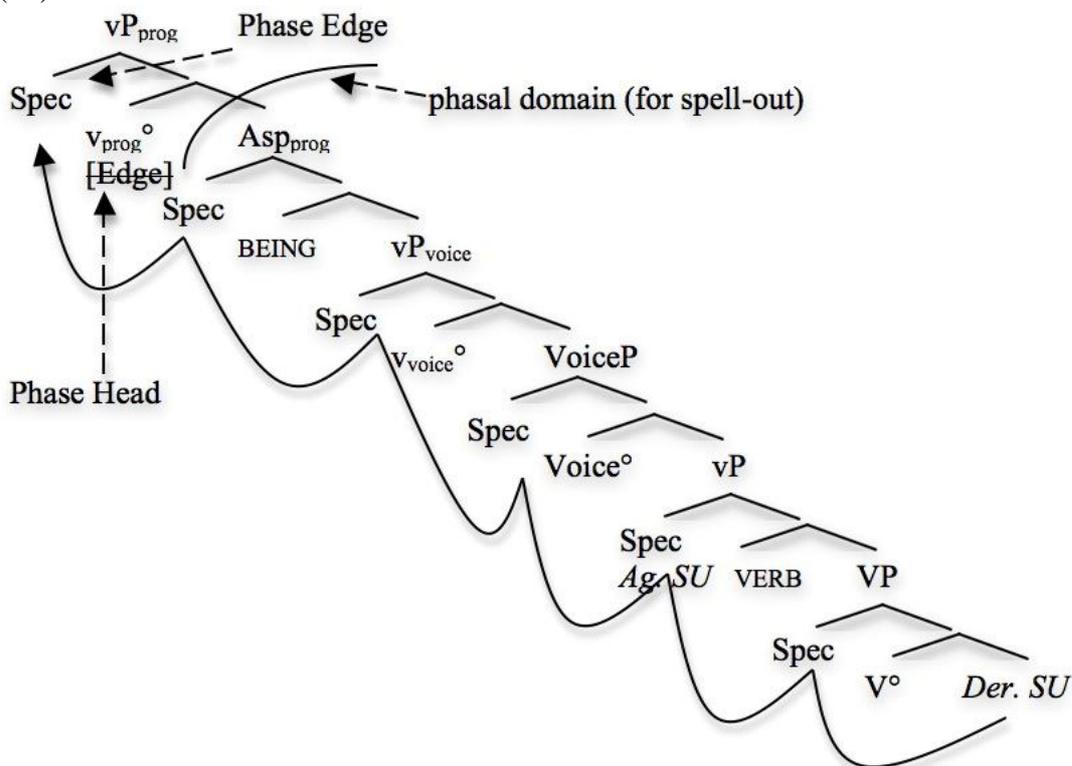
Recall that subject raising is motivated by the need to check EPP features, whether this be on T<sup>°</sup> or on the phase head. Recall furthermore that  $v_{\text{prog}}^{\circ}$  acts as the clause internal phase head as opposed to  $v^{\circ}$ . This means that all subjects, whether agentive or derived, must raise to Spec- $vP_{\text{prog}}$  in order to satisfy the Edge feature on  $v_{\text{prog}}^{\circ}$  and escape spell-out of the phasal domain. Crucially, this causes derived subjects to raise beyond the lexical verb (in  $v^{\circ}$ ), and for subjects in general to raise beyond low pre-verbal adverbs (merged below Voice<sup>°</sup>) and auxiliary *being* (in  $\text{Asp}_{\text{prog}}^{\circ}$ ). Note, however, that the clause internal phase edge on which the subject now sits is situated below all other auxiliaries, which have either risen beyond this position, in instances of auxiliary *be*, or were merged above it in the first place, in instances of auxiliary *have* and modal verbs.

I would particularly like to draw attention to the fact that agentive subjects must raise under this analysis, as they are no longer merged on the phase edge. That is, agentive subjects are still merged in Spec- $vP$ , but as  $v^{\circ}$  is no longer the clause internal phase head, Spec- $vP$  no longer acts as the phase edge. Therefore, agentive subjects, just like derived subjects, must raise to Spec- $vP_{\text{prog}}$  in order to check the Edge feature on  $v_{\text{prog}}^{\circ}$ .

The subject, now on the phase edge, escapes spell-out of the clause internal phasal domain, and is therefore available to computations in the higher phase, i.e. to check the EPP on T<sup>°</sup>.

The tree diagram below represents subject movement within the clause internal phase.

(40)

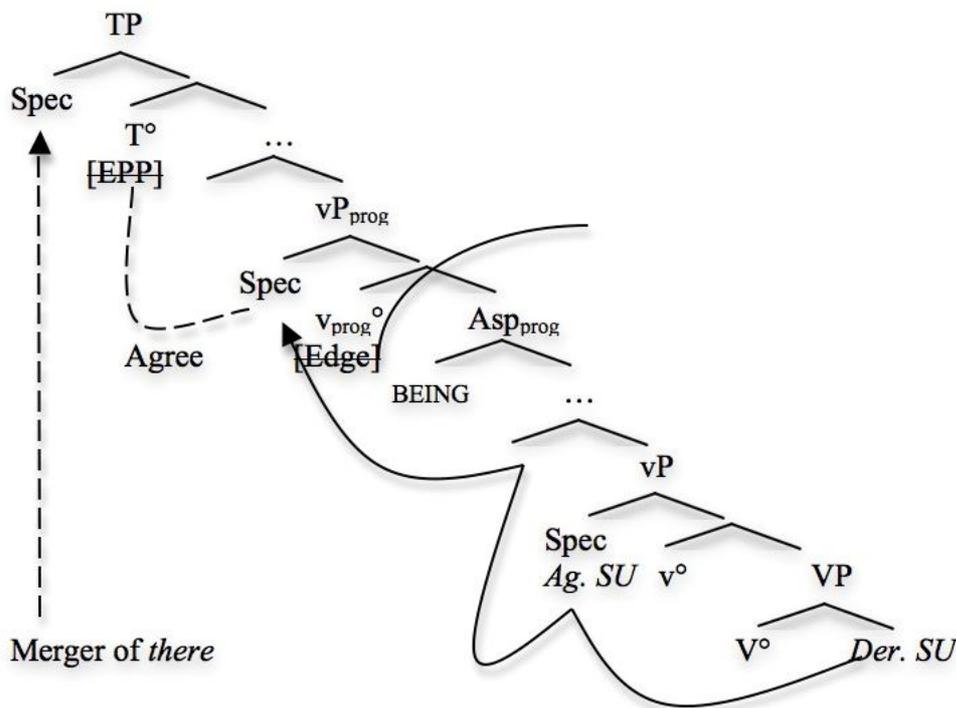


Following subject raising to the edge of the clause internal phase, the higher phase is constructed. In standard constructions, the subject raises to Spec-TP once T<sup>°</sup> is merged, in order to check T's EPP feature, thereby surfacing in the canonical subject position. I follow

<sup>11</sup> According to Cinque (1999) manner and measure adverbs are merged as specifiers of separate functional projections.

Emonds (1970), Milsark (1974), Stowell (1978) and Burzio (1986) however, in assuming that in existential constructions, once T° is merged, expletive *there* is instantly inserted into Spec-TP. This satisfies the EPP on T°. The subject (now the associate), without any further motivation to raise, is subsequently frozen in its last position, namely Spec-vP<sub>prog</sub>, the clause internal phase edge. From this position the associate precedes *being*, low pre-verbal adverbs and the lexical verb, but follows all other auxiliaries. Furthermore, the associate, sitting on the phase edge, is still visible to T° in accordance with the PIC. Therefore, the associate is still able to receive Case from T° and enter into an agreement relationship with the finite verb via Agree.<sup>12</sup> This is why the associate must always precede lexical verbs, low adverbs and *being*, because it must raise to the phase edge so as to avoid spell-out and therefore be visible to T° in the higher phase. If the associate remained within the domain of the phase head, potentially following *being*, low adverbs and the lexical verb, it would be sent to spell-out at the end of the phasal derivation. According to the PIC, this would render the associate invisible to T° in the higher phase, resulting in the associate failing to receive Case, and in T's uninterpretable phi-features failing to be checked, causing the derivation to crash. The tree diagram below represents the basic derivation for existential constructions. This analysis successfully captures the distribution of associates of existential constructions. The next task is to capture the distribution of FQs under a similar mechanism.

(41)



### 5.2 Floating Quantifiers

In order to capture the parallel distribution of FQs I appeal to the principle of Late Adjunction (Stepanov 2001; Newell 2005). The principle of Late Adjunction states that adjuncts are

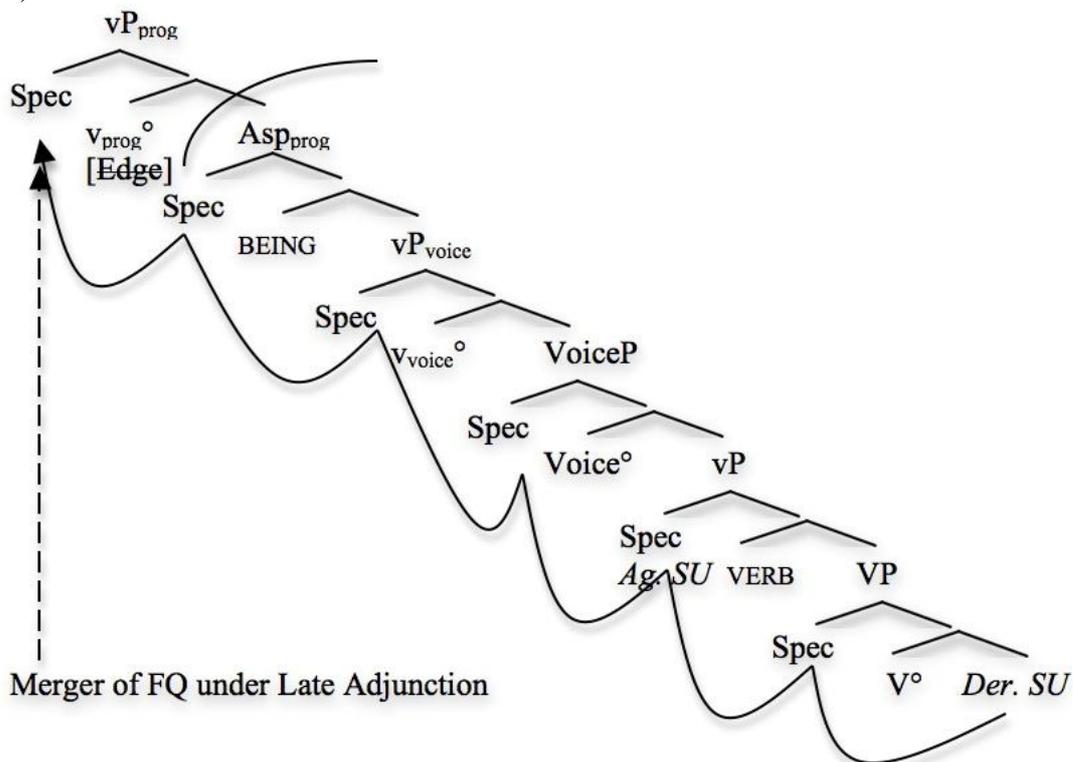
<sup>12</sup> Formally: through a probe-goal relationship, the associate is able to receive Case and value the uninterpretable phi-features on T°.

merged into the syntactic structure post cyclically. That is, according to Stepanov (2001), they are introduced late into the structure after all other elements have been merged. Newell (2005) claims specifically that adjuncts are only merged at the end of a phasal derivation, crucially, after all other operations have taken place. If we assume, as argued by Sportiche (1988), that FQs are adjoined, the principle of Late Adjunction bears some pleasing consequences for the distribution of FQs under the current analysis.

As before I assume that both agentive and derived subjects must raise to Spec- $vP_{prog}$ , the clause internal phase edge, in order to check the Edge feature on  $v_{prog}^{\circ}$ , thereby escaping spell-out of the phasal domain. This causes them to raise over lexical verbs (which surface in  $v^{\circ}$ ), low adverbs (which are merged below  $Voice^{\circ}$ ) and auxiliary *being* (which surfaces in  $Asp_{progressive}^{\circ}$ ).

According to the principle of Late Adjunction, FQs cannot be adjoined to the subject until the end of the phasal derivation, that is, when the clause internal phase is complete. Crucially, the FQ can only be merged with the subject once all other operations within the phase are finished, including movement of the subject to the phase edge. This means that the FQ cannot be merged with the subject in its base position, i.e. in Spec- $vP$  or complement to  $V^{\circ}$ , until the end of the phasal derivation, by which point the subject has already raised to the phase edge. Therefore, under Late Adjunction, the lowest point at which the FQ may actually be adjoined to the subject is on the phase edge, crucially above *being*, low adverbs and lexical verbs, but below all other auxiliary verbs. Now that the FQ has been adjoined to the subject in Spec- $vP_{prog}$ , it may subsequently be stranded in that position. This trivially explains why FQs can never be stranded lower than this, i.e. below *being*, low adverbs or lexical verbs: because FQs are never merged in these lower positions. To adjoin a FQ to a subject in a position lower than the phase edge would violate the principle of Late Adjunction, thus causing the derivation to crash. The diagram below maps out the aforementioned analysis.

(42)



With regards to construction of the higher phase, once  $T^\circ$  is merged, the subject raises to Spec-TP to check the EPP feature. The FQ may either be optionally stranded in Spec- $vP_{\text{prog}}$ , or it may be pied-piped by the subject into a higher specifier. As stated earlier, I assume the raising of the subject to be successive cyclic (Ochi 1999), in which the subject passes through every available intermediate specifier on its way to checking the EPP on  $T^\circ$ . The FQ may be optionally stranded in any one of these intermediate specifiers, or it may be pied-piped by the subject all the way up to Spec-TP; hence the reason why FQs may freely occur amongst the higher auxiliaries. This thereby successfully captures the distribution of FQs in a way that parallels that of associates of existential constructions.

### 5.3 Summary

To summarise the analysis presented, I have claimed that  $v_{\text{prog}}^\circ$  acts as a clause internal phase head as opposed to  $v^\circ$ . This causes subjects to raise to Spec- $vP_{\text{prog}}$  to check the Edge feature on  $v_{\text{prog}}^\circ$ , thereby escaping spell-out of the lower phasal domain. This renders them available to  $T^\circ$  in the higher phase in accordance with the PIC so that  $T$ 's uninterpretable phi-features may be valued, and the EPP feature checked. The movement of the subject to the phase edge causes the subject to raise out of the  $vP$  domain, above lexical verbs, low adverbs and auxiliary *being*, but below all other auxiliaries, which either themselves raise beyond this position, or are already merged above it.

Once on the Spec- $vP_{\text{prog}}$  phase edge, the subject may then proceed to Spec-TP in the higher phase in order to check the EPP feature. However, in existential constructions, expletive *there* is merged directly onto Spec-TP as soon as  $T^\circ$  enters the derivation, satisfying the EPP. The subject/associate, now with no motivation to raise, is frozen on the clause internal phase edge, from where it is still able to value the phi-features on  $T^\circ$  via Agree.

With regards to FQs, the quantifier, under the principle of Late Adjunction, may not adjoin to the subject until the end of the phasal derivation, crucially after all other operations have taken place, including raising to the phase edge. This means the FQ may only be adjoined to the subject in Spec- $vP_{\text{prog}}$ , where it sits above lexical verbs, low adverbs and auxiliary *being*. From this position, the FQ may then be subsequently stranded. It may also be optionally pied-piped by the subject to an intermediate specifier, and then stranded in that position.

From this it may be concluded that indeed an intermediate subject position does exist outside of the  $vP$  domain, in the form of a clause internal phase edge, and that the similarities in distribution that were observed between associates and FQs hinge upon the obligatory movement of all subjects to this position.

## 6. Reduced Relative Analysis

This section explores an alternative account of existential constructions which has been proposed in the literature, namely the reduced relative analysis. Under this approach (Williams 1984; McNally 1992; Moro 1997; Law 1999), the lexical verb of the existential derivation is claimed to in fact be a part of a reduced relative clause embedded within the associate DP:

- (43) a. [<sub>TP</sub>There were [<sub>DP</sub> several men [<sub>CP</sub> (who were) running a marathon]]]  
 b. [<sub>TP</sub>There were [<sub>DP</sub> several men [<sub>CP</sub> (who were) being watched]]]  
 c. [<sub>TP</sub>There were [<sub>DP</sub> several men [<sub>CP</sub> (who were) arriving]]]

- d. [<sub>TP</sub>There were [<sub>DP</sub> several men [<sub>CP</sub> (who were) being rather loud]]]

Under this analysis, expletive *there* is merged in Spec-TP, copular *be* (as opposed to progressive or passive *be*) occupies T°, and the associate selects a reduced relative clause, of which the lexical verb (and *being*) is a part. If this is true, then existential constructions do not in fact reveal anything about non-canonical subject positions. Thereby the perceived connection with FQs would be deemed to be spurious, and the entire analysis given above would have little to offer in terms of theoretical significance. Here, I explore arguments both for and against the reduced relative analysis, concluding that the reduced relative analysis is either untenable, or, at the very least, that existential derivations are ambiguous constructions for which both mono-clausal and reduced relative structures apply. I begin with arguments for the reduced relative analysis, which mainly centre around the behavioural similarities that both existential constructions and reduced relative clauses share.

First of all, reduced relatives can occur in progressive or passive states, but not in perfective, infinitival or tensed states (the bracketed, crossed out material indicates the reduced elements):

- (44) a. The man (~~who was~~) showing off at the beach was annoying.  
 b. The building (~~which was~~) destroyed yesterday was suddenly rebuilt.  
 c. \* The man (~~who had~~) showed off at the beach was annoying.  
 d. \* The man (~~who could~~) show off at the beach was annoying.  
 e. \* The man (~~who~~) showed off at the beach was annoying.

This same pattern holds for existentials:

- (45) a. There was a man showing off at the beach.  
 b. There were several buildings destroyed.  
 c. \* There has a man showed off at the beach.  
 d. \* There may a man show off at the beach.  
 e. \* There a man showed off at the beach.

This observed similarity is perhaps the most compelling evidence for the reduced relative analysis. It is also a fact about existential derivations for which the mono-clausal analysis currently has no explanation. See Deal (2009) however, for steps towards an account under the mono-clausal approach. I am also currently pursuing an analysis which may be able to fully account for this property of existential constructions, though due to space limitations, and the fact that it is still very much a work in progress, I do not go into this analysis here.

Second, the reduced relative analysis can easily account for the ordering data that was observed to be problematic for the traditional mono-clausal analysis. Observe that reduced relatives in English must always follow the DPs they modify; they can never precede them:

- (46) a. I severely disliked **the man** showing off at the beach.  
 b. \* I severely disliked showing off at the beach **the man**.  
 c. **The boy** being punished was my brother.  
 d. \* Being punished **the boy** was my brother.  
 e. **The people** being rowdy are all relatives of mine.  
 f. \* Being rowdy **the people** are all relatives of mine.  
 g. I'm not familiar with **the people** arriving.

- h. \* I'm not familiar with arriving **the people**.

The fact that the associates of existential constructions always precede *being* and the lexical verb, as was observed earlier in this paper, naturally falls out of the reduced relative analysis. Under this approach, the material following the associate is all part of the reduced relative clause which modifies, and therefore naturally follows, the associate.

According to proponents of the reduced relative analysis, the only instance of a genuine mono-clausal existential which actually delineates non-canonical subject positions, would be that of non-progressive unaccusatives where the associate follows the lexical verb rather than precedes it:

- (47) a. There have arrived **three letters**.  
 b. There arrived **three letters**.  
 c. There may arrive **three letters**.

To add further weight to this claim is the fact that there are no reduced relative equivalents to the sentences in (47) (as previously observed, reduced relatives can only occur under progressive or passive morphology):

- (48) a. \*The letters (~~which have~~) arrived are on the table.  
 b. \*The letters (~~which~~) arrived are on the table.  
 c. \*The letters (~~which may~~) arrived will be on the table.

The reduced relative analysis therefore captures the ordering data in an efficient and elegant manner: if a reduced relative clause is present, it is embedded inside the subject DP, following the associate; and if there is no reduced relative clause present, as in the case of non-progressive unaccusatives, the associate is seen to occupy its base position, following the unaccusative verb. This is more elegant than appealing to notions of verb raising (see section 7) and subject raising to a Spec-vP<sub>prog</sub> phase edge.

However, I now present six arguments *against* the reduced relative analysis. These mainly centre around the behavioural differences exhibited by existential constructions and reduced relative clauses.

First, passive verbs in existentials can occur independently of any further material within the VP (cf. (49)). This is not the case for reduced relatives, where more material is required (cf. (49), (49)):

- (49) a. There were several buildings destroyed.  
 b. \* The buildings destroyed were quickly rebuilt.  
 c. The buildings destroyed yesterday were quickly rebuilt.

Second, Deal (2009) observes that reduced relatives must precede full relatives, whereas in existential constructions, no such restriction occurs. The examples in (50) (from Deal 2009) demonstrate this pattern with regards to unergative verbs, whilst (51) shows that the same pattern holds for passive verbs.

- (50) a. The teacher scolded [the student laughing in the hall who was wearing a cap]  
 b. \* The teacher scolded [the student who was wearing a cap laughing in the hall]  
 c. There is a man laughing in the hall who's wearing a red cap.

- d. There is a man who's wearing a red cap laughing in the hall.
- (51) a. We began rebuilding the house destroyed yesterday which was built by our forefathers.  
 b. \* We began rebuilding the house which was built by our forefathers destroyed yesterday.  
 c. There was a house destroyed yesterday which was built by our forefathers.  
 d. There was a house which was built by our forefathers destroyed yesterday.

Third, Milsark (1974); Lasnik (1995); Caponigro & Schütze (2003); Chomsky (2001) all observe that whilst extraction is possible out of an existential construction, it is not possible out of a full or reduced relative clause. The sentences in (52) show that this is true for transitives, (53) for passives, and (54) for unaccusatives (the sentences in brackets show the original sentence before extraction):

- (52) a. From what were there many people running?  
 b. What were there many people running from?  
 (There were many people running from the monster.)  
 c. \* From what were there many people who were running?  
 d. \* What were there many people who were running from?  
 (There were many people who were running from the monster.)  
 e. \* From what did I rescue the people running?  
 f. \* What did I rescue the people running from?  
 (I rescued the people running from the monster.)
- (53) a. By who were there many people being harassed?  
 b. Who were there many people being harassed by?  
 (There were many people being harassed by the police.)  
 c. \* By who were there many people who were being harassed?  
 d. \* Who were there many people who were being harassed by?  
 (There were many people who were being harassed by the police.)  
 e. \* By who did I speak to the people being harassed?  
 f. \* Who did I speak to the people being harassed by?  
 (I spoke to the people being harassed by the police.)
- (54) a. To what was there a man falling?  
 b. What was there a man falling to?  
 (There was a man falling to his death.)  
 c. \* To what was there a man who was falling?  
 d. \* What was there a man who was falling to?  
 (There was a man who was falling to his death.)  
 e. \* To what did I try to save the man falling?  
 f. \* What did I try to save the man falling to?  
 (I tried to save the man falling to his death.)

Fourth, Chomsky (2001) observes that existential constructions permit idiom chunks, whereas existential constructions containing a relative clause do not:

- (55) a. There were tabs being kept on Kate.  
b. \* There were tabs which were being kept on Kate.

Fifth, Milsark (1974) and Rezac (2006) claim that copular existential constructions are illicit under an eventive interpretation (examples from Caponigro & Schütze 2003:11):

- (56) a. \* There's just been a frog.  
b. \* There was a frog just now.

Since the reduced relative analysis predicts existential *be* to always be a copula, all existential constructions should be illicit under an eventive interpretation. That is, the lexical verb, supposedly embedded inside the reduced relative, should have no effect on the grammaticality of the main clause, as can be seen when an overt relative clause is introduced into the existential derivation:

- (57) \*There've just been several fish which were caught.

This is not the case however when a passive verb is introduced on its own into the existential derivation. As can be seen in (58), the existential construction is indeed accepted under an eventive interpretation when a passive verb is present, showing that the passive verb truly is a part of the main clause and is not contained inside an embedded clause.

- (58) a. There've just been several fish caught.  
b. There were several fish caught just now.

The sentences in (59) demonstrate that the same pattern holds for unergative existentials:

- (59) a. \* There was a dog just now.  
b. There was a dog dancing just now.  
c. \* There has just been a dog which was dancing on stage.  
d. There has just been a dog dancing on stage.

Finally, the reduced relative analysis is argued for based on certain behavioural similarities between existentials and reduced relatives. However, it has been observed in this paper that associates of existentials also exhibit behavioural similarities with another syntactic phenomenon, one which in fact favours the mono-clausal approach: FQs. To adopt the reduced relative analysis would force the similarities between FQs and associates to be sidelined as mere coincidence, an undesirable result. Of course, this also entails that by adopting the mono-clausal analysis, one is forced to sideline the similarities between existential constructions and reduced relatives as mere coincidence. This remains a matter for further research.

Given that existential constructions and reduced relative clauses exhibit such differences in behaviour, it can be concluded that existential derivations are indeed mono-clausal constructions, or at the very least, are ambiguous derivations with both reduced relative and mono-clausal structures available to them; hence the need to explain the irregularities in distribution that the associate demonstrates.

## 7. Further Issues

A major issue that needs to be addressed is with regards to unaccusative existential constructions. As was observed in (11), derived associates must precede progressive unaccusative verbs. This was accounted for by claiming that derived associates obligatorily raise to the Spec-vP<sub>prog</sub> phase edge, above the unaccusative verb, which resides in v°. If it is standardly assumed that lexical verbs never overtly raise in English, then it should be expected that associates always precede the lexical verb (assuming the cartographical viewpoint that the v<sub>prog</sub>° phase head is always present). As (47) (repeated here as (60)) demonstrates however, this prediction is not borne out. Unlike transitive and unergative existentials, unaccusative existentials may occur without progressive or passive morphology, which subsequently causes the associate to follow the unaccusative verb, contrary to prediction:

- (60) a. There have arrived **three letters**.  
 b. \* There have **three letters** arrived.  
 c. There may arrive **three letters**.  
 d. \* There may **three letters** arrive.  
 e. There arrived **three letters**.  
 f. \* There **three letters** arrived.

This is indeed problematic for the proposed analysis, as the opposite ordering is expected to hold. Caponigro & Schütze (2003) claim however, that in such instances the unaccusative verb is able to undergo additional raising beyond the associate. They observe that lexical verbs inflected for perfective aspect appear to raise beyond adverbs such as *poorly*, whereas those inflected for passive morphology do not:

- (61) a. They have **built the house** poorly.  
 b. \* They have poorly **built the house**.  
 c. The house was poorly **built**.  
 d. \* The house was **built** poorly.

This can be extended to lexical verbs inflected for tense and infinitival morphology, which appear to also undergo similar raising:

- (62) a. They may **build the house** poorly.  
 b. \*They may poorly **build the house**.  
 c. They **build the house** poorly.  
 d. \*They poorly **build the house**.

This suggests therefore that in English, lexical verbs inflected for perfective, infinitival or tensed morphology do undergo some form of intermediate raising beyond the associate, which would account for the problematic ordering in (60). Note however, that lexical verbs inflected for progressive morphology also appear to undergo a similar form of raising:

- (63) a. They were **building the house** poorly.  
 b. \* They were poorly **building the house**.

This would predict that lexical verbs inflected for progressive morphology should also raise beyond the associate, contrary to fact. Thereby it significantly reduces the weight of the argument that the non-progressive unaccusative verbs in (60) have actually risen over the associate, or at least brings into question the reliability of the evidence used in (61) and (62) to support this claim. The observation therefore that non-progressive unaccusative verbs must precede the associate, remains a problem for my analysis.

To further complicate matters, FQs must always precede the unaccusative verb, irrespective of its inflectional morphology:

- (64) a. The guests were **all** arriving.  
 b. \* The guests were arriving **all**.  
 c. The guests have **all** arrived.  
 d. \* The guests have arrived **all**.  
 e. The guests might soon **all** arrive.  
 f. \* The guests might soon arrive **all**.  
 g. The guests **all** arrived.  
 h. \* The guests arrived **all**.

Here the similarities in distribution between associates and FQs obviously break down, which brings into question the motivation for providing a unified analysis. However, given the similarities in distribution observed at the beginning of this paper, and given that both FQs and associates do supposedly delineate non-canonical subject positions, I believe that a unified account should still be pursued, with the aim of incorporating the distributional facts observed in (60) and (64) into the analysis. How exactly this can be achieved remains at present a matter for further research.

## 8. Conclusion

To conclude, it was observed that both FQs and associates of existential constructions exhibit similar distributional patterns of behaviour which suggest that neither can be spelt out within the vP-domain, contrary to standard analyses, and also in contradiction with the general notion of the vP-internal subject hypothesis. The aim of this paper was to provide a unified account of these phenomena which posits an intermediate position outside of vP but below TP to which all subjects must obligatorily raise. This position exists in the form of a clause internal phase edge. Specifically, I claimed that  $v_{\text{prog}}^{\circ}$  acts as the phase head (with Spec-vP<sub>prog</sub> as the respective phase edge) as opposed to  $v^{\circ}$ . All subjects must obligatorily raise to this phase edge, outside of vP, in order to check the relevant Edge feature. All subjects thus escape spell out of the clause internal phasal domain. Under the PIC, subjects are therefore available to agree with the finite verb and to check the EPP on T<sup>°</sup>.

In existential constructions, merger of expletive *there* in Spec-TP satisfies the EPP, preventing the subject/associate from raising beyond the clause internal phase edge. Under the principle of Late Adjunction, FQs can only be adjoined to the subject at the end of the phasal derivation, when the subject sits in the phase edge. The FQ may subsequently be stranded in this position, or may be optionally pied-piped by the subject to an intermediate specifier (assuming raising to be successive cyclic) and be stranded from there.

I furthermore showed that existential constructions are indeed mono-clausal derivations, or at the very least, are ambiguous constructions with both reduced relative and mono-clausal

structures available to them. Therefore an analysis of why associates must be spelt out outside of the vP domain is warranted. Further issues of course need to be explained, such as why associates appear to be able to surface within the vP domain when accompanied by a non-progressive unaccusative verb, whereas FQs must always precede these verbs. I leave this issue for future research.

The majority of the analysis is dependent upon the notion of phases, and in particular upon the crucial assumption that  $v_{\text{prog}}^{\circ}$  acts as the clause internal phase head as opposed to  $v^{\circ}$ . Although this is non-standard, increasing amounts of evidence appear to be pointing in this direction (Aboh 2005; Deal 2009; Preminger & Coon 2011). If this analysis is on the right track, then the concept of phases might need to be reconsidered. Either the traditional notion that a predicate relationship constitutes a phase needs to be abandoned altogether in favour for a more liberal definition of what constitutes a phase, or one needs to be open to the idea that multiple predicational layers are possible within a clause, which extends the notion of the phase beyond the traditional vP.

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# Multiple sequence alignment in historical linguistics

## A sound class based approach

Johann-Mattis List

In this paper, a new method for multiple sequence alignment in historical linguistics is presented. The algorithm is based on the traditional framework of progressive multiple sequence alignment (cf. Durbin et al. 2002:143-149) whose shortcomings are further enhanced by (1) a sound class representation of phonetic sequences (cf. Dolgopolsky 1986, Turchin et al. 2010) accompanied by specific scoring functions, (2) the modification of gap scores based on prosodic context, (3) a new method for the detection of swapped sites in already aligned sequences.

The algorithm is implemented as part of the LingPy library (<http://lingulist.de/lingpy>), a suite of open source Python modules for various tasks in quantitative historical linguistics. The method was tested on a benchmark dataset of 152 manually edited multiple alignments covering data for 192 Bulgarian dialects (Prokić et al. 2009). The results show that the new method yields alignments which differ only in 5 % of all sequences from the gold standard.

### 1. Sequences

Many structures we are dealing with – be it in daily life or in science – can be represented as *sequences*. The bird songs which awake us in the morning are sequences of sound waves, the movies we watch are sequences of pictures, and the meals we cook are created by a sequence of instructions received from a recipe book.

What recipes, movies, and music have in common, or – to put it in other terms – what allows us to view them as sequences, is that they all can be seen as ordered chains of objects whose identity is a product of both their *order* and their *content*.

**Definition 1** Given an *alphabet* (a non-empty finite set, whose elements are called *characters*), a *sequence* is an ordered list of characters drawn from the alphabet. The elements of sequences are called *segments* (cf. Böckenbauer & Bongartz 2003:30f).

According to Definition 1, the constitutive elements of sequences are the *alphabet*, the *characters*, and the *segments*. One can imagine a sequence as a string of colored beads. If we take the beads separately from the string, it is impossible to distinguish those beads which have the same color from each other, as it is impossible to distinguish identical *characters* drawn from the same *alphabet*. Yet lining them up on a string, every bead becomes an individual *segment*, since it has a position different from all the other beads on the string (see Figure 1).

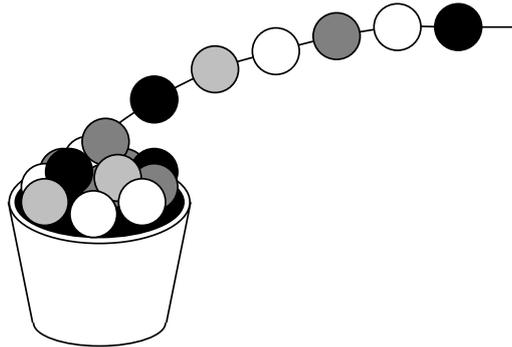


Figure 1: Sequences as strings of colored beads

## 2. Alignment analyses

Due to their complex character, the comparison of sequences has to be based on a comparison of both their segments and their structure. Comparing two sequences of which we assume that they are in a certain relationship, it is important to determine how (or if) the segments of the sequences correspond to each other. Ignoring complex matches (where one segment of one sequence corresponds to multiple segments in another sequence), we can distinguish three kinds of segment correspondence: *matches* (the segments are identical), *mismatches* (the segments are not identical), *empty matches* (one segment corresponds to a null-segment, see Figure 2).

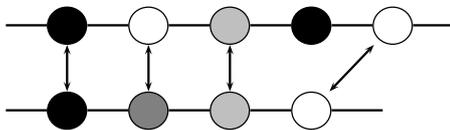


Figure 2: Sequence Comparison

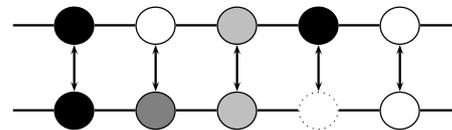


Figure 3: Alignment analyses

*Alignment* analyses are a specific way to model and to visualize differences in sequences. They reflect the three kinds of correspondences by replacing null-segments with gap characters. The result is a matrix in which all matching segments appear in the same column (see Figure 3).

**Definition 2** An *alignment* of  $n$  sequences is an  $n$ -row matrix in which all sequences are arranged in such a way that all matching and mismatching segments occur in the same column, while empty cells, resulting from empty matches, are filled with gap symbols (cf. Gusfield 1997:216).

Alignment analyses are the most common way to model differences between sequences. With the help of alignment analyses all different kinds of sequences can be compared, regardless of where they occur or what the purpose of the comparison is. Thus, when trying to detect plagiarism in scientific work, texts can be interpreted as sequences and the words can be interpreted as their segments. In this way, an alignment analysis can shed light on the differences between the original text and the plagiary (see Example 1). In molecular biology, the alignment of protein and DNA sequences is a very common method and the basis of phylogenetic reconstruction (see Example 2), and in type setting programs and search engines, sequence alignments can be used to detect spelling errors (cf. Example 3).<sup>1</sup>

(1)      -      Ein      Motto      das      -      programmatisch      zu      verstehen      ist  
           und      dieses      Motto      -      ist      programmatisch      zu      verstehen      -

(2)      G    A    -    C    G    G    A    T    T    A    T    G  
           G    A    T    C    G    G    A    A    T    A    -    G

(3)      p    -    l    i    e    c    e    m    e    n  
           p    o    l    i    -    c    e    m    a    n

Since manually conducted alignments of sequences can be very time-consuming (especially in data-driven disciplines such as evolutionary biology) many different methods and algorithms for *automatic alignment analyses* have been proposed. When dealing with automatic alignment analyses, it is common to make a distinction between *pairwise sequence alignments* (PSA) and *multiple sequence alignments* (MSA). This is due to the fact that the computational solutions for pairwise alignment analyses which deal with the alignment of only two sequences differ greatly from multiple sequence analyses regarding their complexity. In the following, I shall roughly present the main ideas behind the most common algorithms for both pairwise and multiple sequence alignment.

### 2.1. Pairwise sequence alignment

The basic algorithm for computing an optimal alignment of two sequences was independently developed by different scholars from different scientific disciplines (cf., e.g., Wagner & Fischer 1974, Needleman & Wunsch 1970). An optimal global pairwise alignment of two sequences is computed via a dynamic programming algorithm (DPA, cf. Gusfield 1997:217f). The basic idea of the algorithm is ‘to build up an optimal alignment using

<sup>1</sup>Source text and plagiary in Example 1 are taken from Kommission “Selbstkontrolle in der Wissenschaft” der Universität Bayreuth 2011:Appendix 3, Example 2 is taken from Böckenbauer & Bongartz (2003:79).

previous solutions for optimal alignments of smaller subsequences' (Durbin et al. 2002:19). In order to do so, all segments of the sequences are confronted with each other and with gap characters in a matrix. The algorithm then recursively calculates the total scores for all subsequences by filling the matrix from top to bottom and from left to right. Once the score for one subsequence is known, the score for a larger subsequence can be calculated. In each recursion step, a specific *scoring function* is employed in order to evaluate whether the segments should be matched with themselves, or with one of the gap characters. Once the matrix is filled, the value in the last cell of the matrix will yield the best score. In order to obtain the alignment of the sequences, a *traceback function* has to be applied in order to find the 'path of choices [...] which led to this final value' (Durbin et al. 2002:19).

|   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
|   | h | e | a | r | t |   | 0 | 1 | 2 | 3 | 4 | t |   | 0 | 1 | 2 | 3 | 4 | 5 |
| - | h | e | a | r | t | - | 1 | 0 | 1 | 2 | 3 | t | - | 1 | h | 1 | 2 | 3 | 4 |
| - | e | e | a | r | t | - | 2 | 1 | 0 | 1 | 2 | t | - | 2 | 1 | e | a | 2 | 3 |
| - | r | r | a | r | t | - | 3 | 2 | 1 | 1 | r | - | t | 3 | 2 | 1 | 1 | r | 2 |
| - | z | z | a | r | t | - | 4 | 3 | 2 | 2 | r | - | t | 4 | 3 | 2 | 2 | 2 | t |
|   | - | - | - | - | - |   |   |   |   |   | - | - |   |   |   |   |   |   | z |

Figure 4: The dynamic programming algorithm

Which scoring function one uses for the computation depends on the purpose of the respective alignment analysis. A very simple scoring function, which penalizes mismatches and gaps with 1 and identity matches with 0 (the Levenshtein metric, cf. Levenshtein 1966) is employed in the illustration of the algorithm in Figure 4. Here, the two strings *heart* and *herz* (cf. English *heart* and German *Herz* 'heart') are aligned. The first matrix shows how all segments of both sequences are matched with each other and with gap characters. The second matrix shows how the cost for every subsequence is calculated by summing up all scores recursively by starting from the first row of the first column, moving from top to down and from left to right. In each step, the scoring function evaluates three possible alignment pairs for the values in each cell. The second column in the second row for example is filled with 0 (which is the lowest cost and therefore the best score), since, according to the Levenshtein scoring function, matching the two segments as  $\binom{h}{h}$  is better than matching one of the segments with a gap yielding  $\binom{h}{-}$  or  $\binom{-}{h}$ . The third matrix shows, how the alignment is obtained by a traceback.

## 2.2. Multiple sequence alignment

While the dynamic programming algorithm is useful for finding an optimal solution for the problem of pairwise sequence alignments, it is not practical for the computation of multiple sequence alignments, since the computational effort will increase enormously with the number of sequences being analyzed (Gusfield 1997:345). It is therefore common to employ certain heuristics which can only guarantee to find a near-optimal solution for

multiple sequence alignments. Among the most popular algorithms applied in multiple sequence analyses are the so-called progressive techniques (Feng & Doolittle 1987; Higgins & Sharp 1988; Thompson et al. 1994). These approaches start by constructing a *guide tree* from the pairwise alignment scores of all sequence pairs using traditional cluster algorithms such as UPGMA (Sokal & Michener 1958) or Neighbor-joining (Saitou & Nei 1987). This guide tree is then used to align all sequences successively with each other, moving from its branches down to its root. Figure 5 gives an example for progressive alignment based on a guide tree for the four sequences Czech *jablko* [jablko], Bulgarian *jabǎlka* [jabǎlka], Russian *jabloko* [jablǎkǎ], and Polish *jablko* [japko] ‘apple’.

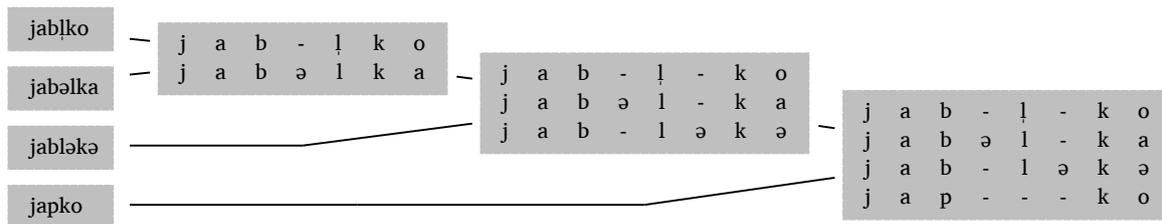


Figure 5: Progressive MSA

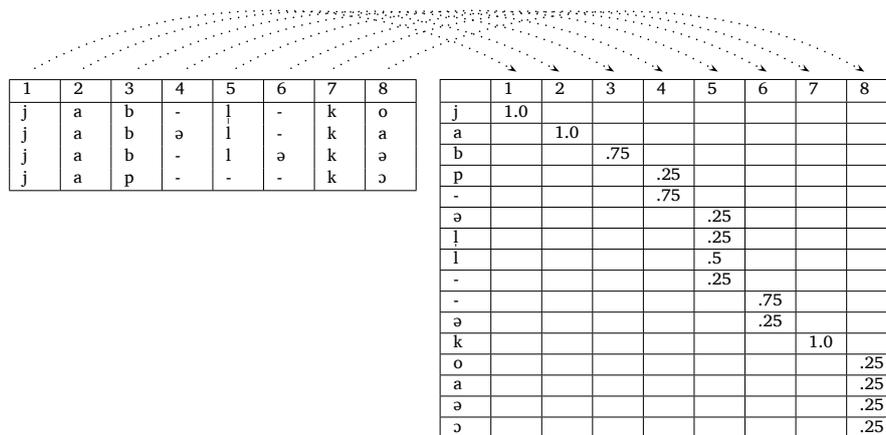


Figure 6: Profile representation of an MSA

The algorithm for progressive MSA can be further enhanced in different ways, the most important improvement being the application of *profiles*. A profile represents the relative frequency of all segments of an MSA in all its positions (Durbin et al. 2002:146f). A profile therefore can be seen as a sequence of vectors (see Figure 6). In profile-based approaches, once two sequences are aligned along the guide tree, they are further represented as profiles. When aligning already joined sequences, the traditional dynamic programming algorithm is used to align profiles with profiles, or profiles with sequences. The alignment score for the columns of two profiles is usually calculated as a *sum-of-pairs score* (Durbin et al. 2002:138f) which is the mean of the sum of the pairwise scores for all residue pairs in the two columns. The advantage of profile approaches over approaches which take one

sequence as representative for a whole multiple alignment is that more information can be taken into account during the alignment process.

### 2.3. The purpose of alignment analyses

When dealing with alignment analyses, it is of great importance to be aware of their potentials and limits. Alignments themselves do *not* draw an evolutionary scenario which explains how sequences evolved from common ancestor sequences into their current shape. Alignments merely tell us which segments of the aligned sequences share a common history, or – to state it in biological terms – which residues among a set of aligned sequences are *homologous* (Durbin et al. 2002:135). From the viewpoint of historical linguistics, alignment analyses – though seldom explicitly applied (with the only exceptions I am aware of being Anttila 1972:229-263) – are only the first stage of linguistic reconstruction.

### 3. Sequence comparison in historical linguistics

Sequence comparison in historical linguistics, i.e. the comparison of words and morphemes which have evolved from the same ancestor forms, is traditionally carried out manually. Yet the technique by which systematic correspondences between words from different languages are retrieved are not much different from the techniques which are applied in automatic alignment analyses in evolutionary biology. Figure 7 illustrates, how the systematic comparison of the words German *Zahn* [ts<sup>h</sup>a:n], English *tooth* [tu:θ], Italian *dente* [dente] and French *dent* [dã] leads to a reconstruction of the proto stages of the languages.

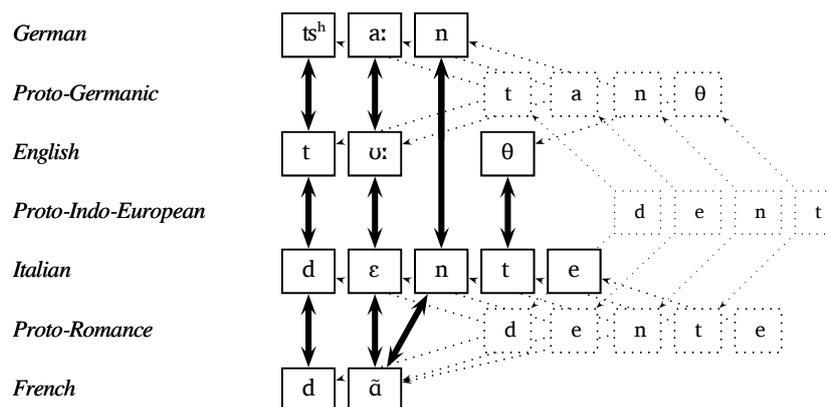


Figure 7: Structural comparison of multiple words

### 3.1. Sequence similarity

In linguistics one can distinguish two different perspectives regarding the similarity of phonetic sequences, which I will call the *synchronic* and the *diachronic* perspective. From a synchronic perspective sequences are judged to be similar, if they show resemblances regarding the way they are produced or perceived. From a diachronic perspective, however, sequences are judged to be similar, if they have a common origin. The words in Table 1 are similar from a synchronic viewpoint, since they consist of synchronically similar segments. The words in Table 2, however, are similar from a diachronic viewpoint, since they consist of segments which can be traced back to common ancestors.<sup>2</sup>

|       |             |       |   |         |             |       |
|-------|-------------|-------|---|---------|-------------|-------|
| Greek | <b>mati</b> | 'eye' | ≈ | Malay   | <b>mata</b> | 'eye' |
| Greek | <b>θεος</b> | 'god' | ≈ | Spanish | <b>dios</b> | 'god' |

Table 1: Synchronic similarity

|         |              |         |   |         |             |         |
|---------|--------------|---------|---|---------|-------------|---------|
| German  | <b>tʰa:n</b> | 'tooth' | ≈ | English | <b>tu:θ</b> | 'tooth' |
| Spanish | <b>etfo</b>  | 'fact'  | ≈ | French  | <b>fɛ</b>   | 'fact'  |

Table 2: Diachronic similarity

The differences between the synchronic and the diachronic perspective lie in the way in which similarity is defined: Synchronic resemblance is determined by an evaluation of phonetic or acoustic features. If the features of the segments are close, the segments are judged to be similar, and likewise the sequences. Diachronic resemblance between two sequences is determined by comparing the distinctive function which their segments fulfil in both language systems: If a comparison of the languages shows that 'whenever word W1 in language L1 contains sound S1 in a certain position, then a word W2 of the same or similar meaning in language L2 contains sound S2 in the same position' (Trask 2000:336), one can conclude that the segments correspond *systematically*, and – as a result – are similar (or even identical in historical terms). When dealing with systematic *sound correspondences* in two or more language systems, one can further conclude that one is dealing with common descent. This conclusion is based on the fact that there are good reasons to assume that 'sound change is overwhelmingly regular, [and] we must expect a great degree of systematicity [...] in the phonetic similarities between putatively related languages' (Hock & Joseph 2009:435). Lass (1997:130) calls this kind of resemblance 'genotypic' in opposition to a 'phenotypic' resemblance of phonetic segments which do not correspond systematically.

### 3.2. Sound correspondences and correspondence classes

The strict notion of diachronic similarity is prevalent in historical linguistics: Diachronic similarity is defined in absolute terms. Only if two segments are judged to correspond systematically, they are judged to be similar. In alignment analyses, which are the first stages of linguistic reconstruction, however, we need a heuristic which helps us to find *probably* corresponding segments rather than *absolutely* corresponding ones. Many authors (cf. e.g. Holzer 1996:174f, Szemerényi 1970:14f) emphasize that synchronic similarity can be neglected when establishing correspondence patterns, since, 'given a long enough time span,

<sup>2</sup>Cf. Hock (1991:557) for the Greek-Malay example.

almost any sound can change into any other sound’ (Arlotto 1972:77). While it is true that there are good examples for sound changes which are difficult to explain on pure phonetic terms, most scholars, however, would probably also agree that sound change often *does* follow certain patters, that ‘even the most divergent languages show examples of phonetic change which are remarkably similar’ (Arlotto 1972:77), and that ‘[not] all changes are [...] equiprobable’ (Lass 1997:136). The difference regarding the probability of certain sound changes to occur will also show up in the patterns of *sound correspondences* which can be observed in genetically related languages, with certain patterns occurring more often and other ones being quite rare. Stating segment similarity in terms of *correspondence probability* will differ from a pure synchronic notion of similarity, yet it will, nevertheless, come closer to it than the strict notion of diachronic similarity, which is ignorant of phonetic realization.

The first one to attempt to derive a model of the probability of sound correspondences which is known to me was A. Dolgopolsky in a Russian paper from 1964 which appeared only 22 years later in an English translation (Dolgopolsky 1986). Based on a statistical analysis of the frequency of certain types of sound correspondences in a large (but unfortunately unpublished) etymological dataset of about 400 languages, he divided speech sounds into ten types (see Table 3), and ‘thereby distinguished [them] in such a way that phonetic correspondences inside a “type” are more regular than those between different “types”’ (Dolgopolsky 1986:35). Dolgopolsky’s *sound classes* have been employed as a heuristic device for determining genetic language relationship in a few recent approaches (cf. Turchin et al. 2010, Mortarino 2009). In alignment analyses, however, sound classes have not been applied so far.

| No. | Class | Description                                        | Example   |
|-----|-------|----------------------------------------------------|-----------|
| 1   | P     | labial obstruents                                  | p,b,f     |
| 2   | T     | dental obstruents                                  | d,t,θ,ð   |
| 3   | S     | sibilants                                          | s,z,ʃ,ʒ   |
| 4   | K     | velar obstruents, dental and alveolar affricates   | k,g,ts,tʃ |
| 5   | M     | labial nasal                                       | m         |
| 6   | N     | remaining nasals                                   | n,ɲ,ŋ     |
| 7   | R     | liquids                                            | r,l       |
| 8   | W     | voiced labial fricative and initial rounded vowels | v,u       |
| 9   | J     | palatal approximant                                | j         |
| 10  | ∅     | laryngeals and initial velar nasal                 | h,ɦ,ŋ     |

Table 3: Dolgopolsky’s sound classes

#### 4. A new method for multiple sequence alignment

The new method for multiple sequence alignment in historical linguistics which shall be presented in the following is based on the traditional framework of progressive multiple sequence alignment in evolutionary biology as it is presented in the CLUSTAL W package (Thompson et al. 1994). Apart from the outline given by this package, there are three

major modifications which have been made in order to suite the specific needs of alignment analyses in historical linguistics: (1) phonetic sequences are internally represented as *sound classes*; (2) methods of *position-specific scoring* are extended to cover *prosodic context*; and (3) alignments are automatically searched for *swapped sites*.

In the following, I shall briefly discuss these three basic modifications. Afterwards, the working procedure of the method shall be illustrated along with an example.

#### 4.1. Sound classes as internal representation format

Offering a stochastically based intermediate solution between the two extreme positions of synchronic and diachronic similarity, sound classes seem especially suitable for automatic alignment analyses. Choosing strings of sound classes as internal representation format has many advantages: While alignment analyses in disciplines such as evolutionary biology always deal with the same *fixed set of characters*, such as the protein or DNA alphabets, the sound systems of the world's languages differ to a great degree (cf. the overview in Maddieson 2011), and the number of characters (including diacritics) of phonetic transcription systems such as the IPA will force the algorithm to handle a large bunch of phonetic values which will be meaningless in most applications. This is due to the fact that, on the one hand, there is a lot of variation regarding the way linguists transcribe languages: Apart from the difference between narrow and broad phonetic transcriptions, there are many cases in which linguists simply slightly differ in their judgments, especially in poorly studied languages. On the other hand, there are many correspondence patterns which occur so frequently, that it seems justified to give the respective sounds an identical value from the beginning. Thus, while probably no one would doubt that the velar unvoiced plosive [k] should be kept distinct from the labial unvoiced plosive [p], the distinction between the velar nasal [ŋ] and the uvular nasal [ɴ] is far less obvious and it doesn't seem likely that the performance of the algorithm will suffer if both sounds will be merged into one. In the current implementation of the method, the user can select between two different predefined sound class systems, a narrow one being based on the ASJP code (Brown et al. 2008) which reduces the full range of the IPA to 41 symbols, and a broad one being based on Dolgopolsky's original approach (Dolgopolsky 1986).

Apart from the sound class model, the scoring function which defines transition probabilities among sound classes is also of crucial importance. For Dolgopolsky's original sound class model (extended by a specific class for vowels), the scoring function employed by the method is pretty simple in so far as it penalizes all mismatches among consonant classes equally while forcing the program to avoid matches of the vowel class with one of the consonant classes. In contrast to this simple scoring scheme, the scoring function for the ASJP sound classes is far more complex. It is based on a substitution matrix of correspondence frequencies derived from a recent approach by Holman et al. (2011) in which an automated method for the detection of sound correspondences is applied to a large database containing word lists of more than 4000 languages (Wichmann et al. 2010) transcribed in ASJP code.

## 4.2. Position-specific scoring

In biological alignment algorithms it is common to treat specific positions of certain sequences differently by modifying the scores for the introduction of gaps (cf. Thompson et al. 1994). In the approach presented here, the idea of position-specific scoring is adopted to account for modified gap scores according to *prosodic context*. The main idea behind this modification is to account for the well-known fact that certain types of sound change are more likely to occur in specific prosodic contexts. For example, vowels are more likely to get lost than consonants, and consonants are more likely to get lost in syllable-final positions than in syllable-initial ones. It therefore seems fruitful to modify the gap scores in order to ease the introduction of gaps in prosodically weak positions while making it difficult to introduce them in prosodically strong positions. The algorithm employs a very simple method to account for this: In each progressive alignment step, a *prosodic profile* is constructed for all sequences. The prosodic profile is represented as a vector of numbers representing the relative sonority of all segments in a sonority hierarchy, going from lower numbers for less sonorous segments to higher numbers for more sonorous segments. The algorithm currently employs the sonority hierarchy given in Example 4, which follows Geisler (1992:30) with an additional sonority class for affricates.

|     |                 |                   |                   |               |                |               |               |
|-----|-----------------|-------------------|-------------------|---------------|----------------|---------------|---------------|
| (4) | <i>plosives</i> | <i>affricates</i> | <i>fricatives</i> | <i>nasals</i> | <i>liquids</i> | <i>glides</i> | <i>vowels</i> |
|     | 1               | 2                 | 3                 | 4             | 5              | 6             | 7             |

Once the sonority profile of a sequence is calculated, all segments can be assigned to different prosodic contexts according to their position in the profile. Given the fact that syllabification is often language-specific (Hall 2000:226f), and that a given syllabification can change during the alignment process when more sequences are joined, the algorithm employs a modified strategy for the determination of prosodic context which is not based on syllabification. Given a sonority profile of a linguistic sequence, it is easy to determine peaks of *maximum* sonority, which will usually be vowels. It is further possible to determine whether a given segment (which does not appear in a maximum peak position) is in a position of *descending* or *ascending* sonority.

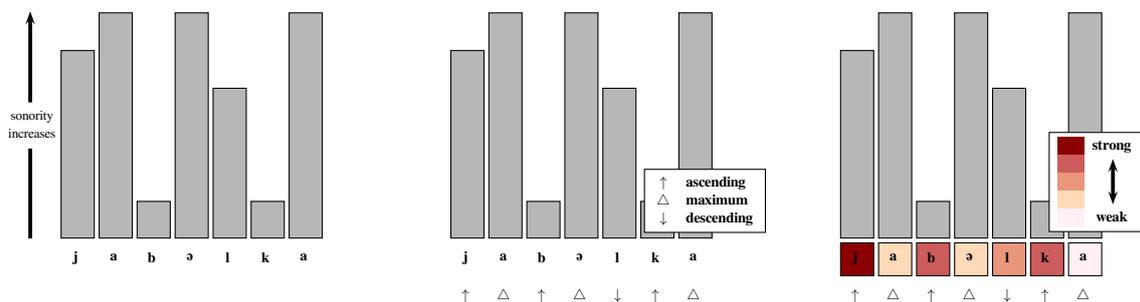


Figure 8: Relative weights derived from prosodic information

Apart from the positions of ascending, descending, and maximum sonority, the word-initial and the word-final positions are treated as separate specific environments, the

former being extremely strong and the latter being extremely weak in comparison to the other positions.<sup>3</sup> Once the positions are determined for a given sequence, the gap scores for each position can be modified according to its relative weight. Figure 8 illustrates, how the relative weights of all positions of Bulgarian *jabǎlko* [jabǎlka] ‘apple’ are derived from the prosodic information: In a first step, only the sonority class is determined for each segment of the phonetic sequence. In the second step, positions of ascending, maximum, and descending sonority are calculated. In the final step, the relative weight of each position is determined.

#### 4.3. Detection of swapped sites

Determining swapped sites (transpositions) in an alignment may be useful in some applications, since metathesis is a common sound change process which may even regularly occur in certain languages (Hock 1991:110). The method for the detection of swaps in a given multiple alignment is based on the idea that swaps are often aligned in a linear way in multiple alignment analyses, with one segment of a swapped site matching in two or more sequences and the remaining segments being matched with a gap to the left and the right of the match. This results in *complementary structures* in an MSA containing swapped sites (see Example 5). These structures can be easily detected. In order to guarantee that these structures really belong to swaps in an alignment, a scoring procedure for swaps in multiple alignments has to be applied.

$$(5) \quad \begin{array}{l} \text{Bulgarian} \quad \text{j} \quad \text{a} \quad \text{b} \quad \text{ə} \quad \text{l} \quad \text{-} \quad \text{k} \quad \text{a} \\ \text{Russian} \quad \quad \text{j} \quad \text{a} \quad \text{b} \quad \text{-} \quad \text{l} \quad \text{ə} \quad \text{k} \quad \text{ə} \end{array}$$

Given the two hypothetical words *forma* and *froma*, we may align and score them in different ways. When allowing for swaps, the Damerau-Levenshtein distance metric (named after the work of Damerau 1964 and Levenshtein 1966) can be used. It penalizes swaps with 1, as illustrated in Example 6, yielding a total score of 1 for the two hypothetical sequences, since they only differ by one transposition.

$$(6) \quad \begin{array}{cccccc} \text{f} & \text{○} & \text{r} & \text{-} & \text{m} & \text{a} \\ \text{f} & \text{r} & \text{○} & \text{m} & \text{a} & \\ \hline 0 & 1 & 0 & 0 & & \end{array}$$

Once we do not allow the algorithm to score swaps in this way, we arrive at a score of 2, if we adopt Levenshtein’s traditional penalty system (Levenshtein 1966). Applying a different scoring system, where gaps are scored as 1, but mismatches are scored as 2, we can force the algorithm to avoid mismatches once complementary structures offer a better overall score, as shown in Example 7.

$$(7) \quad \begin{array}{cccccc} \text{f} & \text{○} & \text{r} & \text{-} & \text{m} & \text{a} \\ \text{f} & \text{-} & \text{r} & \text{○} & \text{m} & \text{a} \\ \hline 0 & 1 & 0 & 1 & 0 & 0 \end{array} \quad \begin{array}{cccccc} \text{f} & \text{-} & \text{○} & \text{r} & \text{m} & \text{a} \\ \text{f} & \text{r} & \text{○} & \text{-} & \text{m} & \text{a} \\ \hline 0 & 1 & 0 & 1 & 0 & 0 \end{array}$$

<sup>3</sup>Regarding the concept of ‘strength’ and ‘weakness’ in theories of sound change, cf. Geisler (1992).

This is exactly the situation we have in many MSAs, where sequences are linearly aligned, not allowing for crossed matches. Having detected complementary structures in an MSA, it is important to evaluate whether they really might point to swapped sites by scoring the alignment allowing for swaps. The problem with extensions of the dynamic programming algorithm for swaps is, however, that these are usually based on identity-conditions, where transposed characters are identical throughout an alignment, as the solution proposed by Wagner & Lowrance (1975). Oommen & Loke (1997) give a solution for an extension of the DPA which includes transpositions, but it applies only to pairwise alignments. For multiple sequence alignments it is important to have an alternative way to score swapped sites, where identity is given up in favour of a similarity or distance score which should be based on a sum-of-pairs scheme for MSAs.<sup>4</sup> This can be easily done by introducing a new character (+) into the sound class alphabet. The character scores only when it is matched with a gap, when matched with itself it scores 0, and it scores *infinite* when it is matched with any other character. The character is introduced into the gapped columns of a complementary site instead of the characters which are not a gap. The non-gap characters themselves are moved to the position where they would appear, if the site was not swapped. Transforming a given alignment in this way, the resulting score will be the same as in the Damerau-Levenshtein analysis, yielding 1 for two similar sequences which only differ by one transposition.

$$(8) \quad \begin{array}{cccccc} \text{f} & \text{+} & \text{r} & \text{o} & \text{m} & \text{a} \\ \text{f} & \text{-} & \text{r} & \text{o} & \text{m} & \text{a} \\ \hline 0 & 1 & 0 & 0 & 0 & 0 \end{array} \quad \begin{array}{cccccc} \text{f} & \text{-} & \text{o} & \text{r} & \text{m} & \text{a} \\ \text{f} & \text{+} & \text{o} & \text{r} & \text{m} & \text{a} \\ \hline 0 & 1 & 0 & 0 & 0 & 0 \end{array}$$

Given this scoring scheme, the method for swap detection works as follows: The algorithm first checks whether there are complementary structures in the alignment. If such structures are detected, the alignment is converted as shown in Example 8 and the total score of the alignment is calculated for the new alignment. If the new score exceeds the old one, the respective site is judged to be a swapped one.

Since alignment analyses are always a linear representation of sequences, it is not possible to display swapped sites properly. For the output one can choose between two formats, one merging the swapped sites into a single column and one which merges the three columns of a complementary site into two columns, as shown in Example 9.

$$(9) \quad \begin{array}{c|c|c|c} \text{f} & \text{or} & \text{m} & \text{a} \\ \hline \text{f} & \text{ro} & \text{m} & \text{a} \end{array} \quad \begin{array}{c|c|c|c} \text{f} & \text{o} & \text{r} & \text{m} & \text{a} \\ \hline \text{f} & \text{r} & \text{o} & \text{m} & \text{a} \end{array}$$

#### 4.4. Working procedure

The working procedure of the method consists of seven stages as illustrated in Figure 9.<sup>5</sup> Every stage is accompanied by an example which shows the progress of the alignment of the four sequences Czech *jablko* [jablko], Bulgarian *jabǎlka* [jabǎlka], Russian *jabloko*

<sup>4</sup>Regarding the calculation of sum-of-pairs scores, cf. Durbin et al. (2002:139f).

<sup>5</sup>The figure was inspired by the flow chart illustrating the CLUSTAL algorithm for MSA in evolutionary biology in Higgins & Sharp (1988:238).

[jabləkə], and Polish *jabłko* [japko] ‘apple’ at the respective stage. As mentioned before, the method closely follows the traditional way in which multiple sequences are progressively aligned in evolutionary biology. Comparing the linguistic working procedure with the biological one, there are four additional stages, namely Stage 1, Stage 5, Stage 6, and Stage 7.

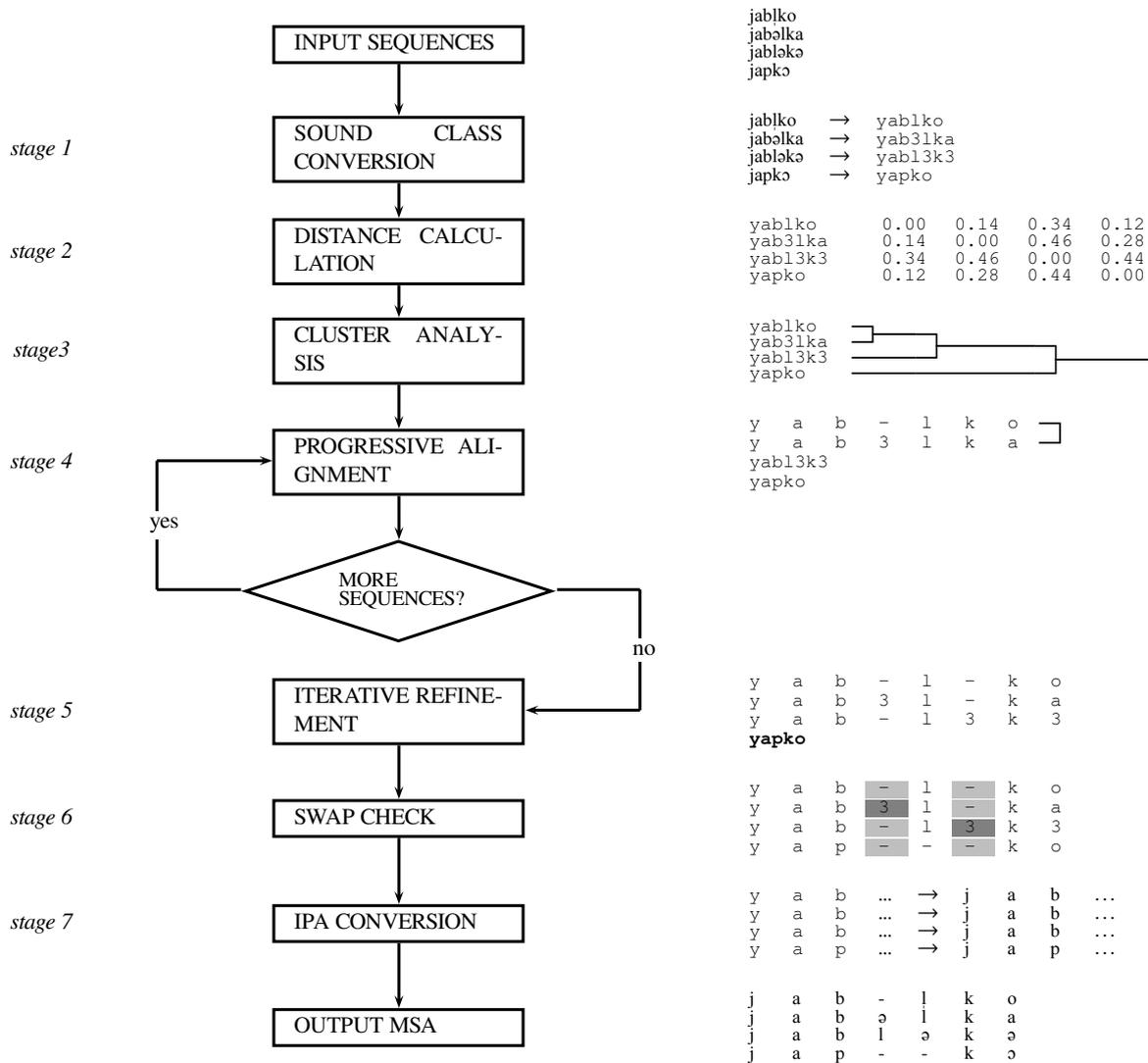


Figure 9: Working procedure of the basic algorithm

In Stage 1, the input sequences which are given in IPA transcription are converted to sound classes, e.g. the sequence Czech [jablko] is converted to yablko according to the ASJP sound class model. In Stage 2, a distance matrix is computed from the pairwise similarity scores of all sound class sequences. The approach of Downey et al. (2008) is used for the conversion of similarity into distance scores. In Stage 3, the sound class sequences are clustered by applying a simple agglomerative hierarchical cluster algorithm to the

distance matrix calculated in Stage 2.<sup>6</sup> The clustering procedure yields the guide tree which is important for the progressive alignment procedure applied in Stage 4. Stage 4 is the core of the alignment process. In this stage, all sequences are stepwise aligned with each other, following the branching order of the guide tree (cf. the description in Section 2.2). In Stage 5, iterative refinement methods are applied to the already aligned sequences in order to account for possible errors resulting from misaligned sequences.<sup>7</sup> The method for swap detection which was described above, is applied in Stage 6. As can be seen from the example, the algorithm identifies a swap for the alignment of the four input sequences. In Stage 7, all sequences are converted back from their internal representation format to their original IPA format.

#### 4.5. Implementation of the method

The method is implemented as part of the LingPy library (List 2011). LingPy is a suite of open source Python modules for sequence comparison, distance analyses, data operations and visualization methods in quantitative historical linguistics.<sup>8</sup>

#### 5. Performance of the method

In order to test the performance of alignment algorithms it is common to compare their output with independently compiled gold standard datasets which serve as a benchmark. By comparing the *reference alignment* with the *test alignment* produced by the algorithm, an assessment of the accuracy of the algorithm can be given.

For this study, a benchmark dataset originally compiled for the study of Prokić et al. (2009) was used. In this pilot study on multiple alignment of phonetic sequences, the authors employed the ALPHAMALIG algorithm to a dataset of phonetic transcriptions of Bulgarian dialects (taken from the Buldialect project<sup>9</sup>). In contrast to the new method presented here, ALPHAMALIG was not especially designed for the alignment of phonetic sequences.<sup>10</sup> The gold standard used in the study (Prokić et al. 2009) was kindly provided by the authors and covers 152 manually edited multiple sequence alignments for a total of 192 taxa (dialect points). Before reporting the results of the comparison of the performance of the method presented in this paper with that of the ALPHAMALIG algorithm, I will briefly point to some general issues regarding the evaluation of alignment analyses based on benchmark datasets.

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<sup>6</sup>For the details of agglomerative hierarchical clustering, see e.g. Tan et al. (2006:515-526).

<sup>7</sup>To go into the details of this step would go beyond the scope of this paper. For a general account on iterative procedures in MSA, cf. Durbin et al. (2002:148f).

<sup>8</sup>See <http://linguist.de/lingpy/>.

<sup>9</sup>See <http://www.sfs.uni-tuebingen.de/dialectometry/> for the Buldialect project, and see <http://algen.lsi.upc.es/recerca/align/alphamalig/intro-alphamalig.html> for the ALPHAMALIG algorithm.

<sup>10</sup>Cf. Prokić et al. (2009) for more details regarding the ALPHAMALIG algorithm.

## 5.1. Evaluation

The comparison of alignments produced by different methods with a benchmark dataset is a complicated task, and all methods, which have been proposed so far, be it in biological or linguistic applications, bear certain shortcomings. Generally, when comparing alignments, there are two perspectives which can be taken: (1) The *column perspective*, which focuses on the columns in both the reference and the test alignment; and (2) the *row perspective*, which focuses on the rows in both the reference and the test alignment. The simplest way to compare a reference with a test alignment is to base the comparison solely on one of the two perspectives, and calculate either the *percentage of identical columns* (PIC), or the *percentage of identical rows* (PIR).

Both measures, however, are problematic, as can easily be demonstrated: Table 4 gives five exemplary cases on how alignments can differ from each other. The left alignment is an exemplary reference alignment, and the two alignments on the right are one and the same possible deviation from the reference alignment where the differences in terms of columns and rows are shaded in lightgray. As can be seen from the examples, it may be difficult to say which of a couple of test alignments is closest to a reference alignment, when relying on either of both scores: When relying on the PIR score, errors resulting from identical erroneous decisions cannot be properly distinguished from errors resulting from different erroneous decisions as in Examples 1 and 2 of Table 4. Furthermore, certain errors will be exaggerated, as in Examples 3 and 4 of Table 4 where no rows are identical although the alignments only differ in two columns. Relying solely on the PIC score, however, a single erroneously aligned sequence may likewise greatly exaggerate the score (see Example 5 of Table 4).

|   | Seqs | Reference   | Test (column)   | Test (row)      |
|---|------|-------------|-----------------|-----------------|
| 1 | Seq1 | A - C D E   | A - C D E       | A - C D E       |
|   | Seq2 | A - C - E E | A C - - E E E   | A C - - E E E   |
|   | Seq3 | A - C D E E | A C C - D E E E | A C C - D E E E |
|   | Seq4 | A B - D E   | A B - D E E     | A B - D E E     |
|   | Seq5 | A - - D -   | A - - D -       | A - - D -       |
| 2 | Seq1 | A - C D E   | A - C D E       | A - C D E       |
|   | Seq2 | A - C - E E | A - - C D E E E | A - - C D E E E |
|   | Seq3 | A - C D E E | A C - - D E E E | A C - - D E E E |
|   | Seq4 | A B - D E   | A B - D E E     | A B - D E E     |
|   | Seq5 | A - - D -   | A - - D -       | A - - D -       |
| 3 | Seq1 | A - C D E   | A - C D - E     | A - C D - E     |
|   | Seq2 | A - C - E E | A C - - D E E E | A C C - - E E E |
|   | Seq3 | A - C D E E | A C - - D E E E | A C C - - D E E |
|   | Seq4 | A B - D E   | A B - D E E     | A A B - D E E   |
|   | Seq5 | A - - D -   | A - - D -       | A - - D -       |
| 4 | Seq1 | A - C D E   | A C C D E       | A C C D E       |
|   | Seq2 | A - C - E E | A C C - E E     | A C C - E E     |
|   | Seq3 | A - C D E E | A C C D E E     | A C C D E E     |
|   | Seq4 | A B - D E   | A B D E E       | A A B D E E     |
|   | Seq5 | A - - D -   | A - D -         | A - D -         |
| 5 | Seq1 | A - C D E   | A - C D E       | A - C D E       |
|   | Seq2 | A - C - E E | A - C - E E E   | A - C - E E E   |
|   | Seq3 | A - C D E E | A - C D E E E   | A - C D E E E   |
|   | Seq4 | A B - D E   | A B - D E E     | A A B - D E E   |
|   | Seq5 | A - - D -   | - A D - -       | - A D - -       |

Table 4: Differences between reference and test alignments

A common evaluation measure for alignment accuracy in evolutionary biology is based on the sum-of-pairs score (SP, cf. Thompson et al. 1999). This score is defined as the size of the intersection of aligned pairs of residues in reference and test alignment divided by the size of aligned pairs of residues in the reference alignment. Despite the fact that

the SP score is a very common evaluation measure in evolutionary biology (Aniba et al. 2010), its suitability as an evaluation measure may be questioned: Since the SP score takes only identical pairs in both alignments into account, ignoring non-identical pairs in the test alignment, the measure fails to discriminate between differences in reference and test alignment as those marked in Case 4 of Table 4, where the SP score is 1, indicating identity, despite the fact that both alignments are different. Instead of the SP score, it seems more adequate to compute the Jaccard coefficient (JC) which is defined as the size of the intersection of two sets divided by the size of their union (Batagelj & Bren 1995:80).

Prokić et al. (2009) propose two enhanced methods to evaluate the performance of their alignment algorithm on the gold standard of Bulgarian dialects. The first score, the *column dependent evaluation* (CDE) is an enhancement over the simple PIC where the similarity of the columns is evaluated instead of their identity (see Prokić et al. 2009:20f for details). The second score is based on the *modified rand index* (MRI). While the CDE score is sensitive to order, the ‘MRI itself only takes into account the quality of each column separately since it simply checks whether the same elements are together in the candidate alignment as in the gold-standard alignment’ (Prokić et al. 2009:21).

|          | PIC  | PIR  | CDE  | MRI  | SP   | JC   |
|----------|------|------|------|------|------|------|
| <b>1</b> | 0.60 | 0.60 | 0.84 | 0.90 | 0.89 | 0.80 |
| <b>2</b> | 0.40 | 0.60 | 0.84 | 0.81 | 0.83 | 0.65 |
| <b>3</b> | 0.80 | 0.00 | 0.80 | 0.92 | 0.83 | 0.83 |
| <b>4</b> | 0.60 | 0.00 | 0.27 | 0.93 | 1.00 | 0.86 |
| <b>5</b> | 0.20 | 0.80 | 0.84 | 0.71 | 0.72 | 0.59 |

Table 5: Comparison of evaluation scores

In Table 5, all scores for the evaluation measures applied to the five examples in Table 4 are given. As can be seen from the table, the JC and MRI scores properly distinguish all differences between reference and test alignments.

## 5.2. Results

Based on the new method for progressive MSA, the 152 alignments of the benchmark dataset of Bulgarian dialects were analyzed using the two standard sound class models described in Section 4.1, i.e. the Dolgopolsky model (LingPy-DOLGO), and the ASJP model (LingPy-ASJP).<sup>11</sup>

|                     | Perf. Alm. | PIC    | PIR    | CDE    | MRI    | SP     | JC     |
|---------------------|------------|--------|--------|--------|--------|--------|--------|
| <b>LingPy-DOLGO</b> | 123 (81 %) | 0.8704 | 0.8825 | 0.9494 | 0.9844 | 0.9850 | 0.9742 |
| <b>LingPy-ASJP</b>  | 132 (87 %) | 0.9313 | 0.9531 | 0.9763 | 0.9902 | 0.9901 | 0.9834 |
| <b>ALPHAMALIG</b>   | 103 (68 %) | 0.8401 | 0.7632 | 0.9324 | 0.9824 | 0.9825 | 0.9743 |

Table 6: Results of the evaluation

<sup>11</sup>The data for all analyzes, including the concise results for the evaluation is available under <http://lingulist.de/lingpy/sole-data.zip>.

Table 6 shows the results for the evaluation of the LingPy method for the two models in comparison with the results achieved by the ALPHAMALIG algorithm. As the table shows, both models of the LingPy algorithm perform better than ALPHAMALIG throughout all evaluation scores, the differences being especially evident when comparing the simple PIR scores, where LingPy-ASJP aligns 95% of all sequences in the same way as the gold standard, while ALPHAMALIG gets only 76% of identical rows.

As a closer analysis of the output of the different methods compared with the gold standard shows, one main advantage of the new method lies in its ability to detect swapped sites: Of the 21 test alignments in the database which contain swaps, LingPy-ASJP correctly identifies 19, and 13 of them are further aligned without errors. Figure 10 gives an example for a correct alignment of a swapped site produced by LingPy-ASJP in contrast to an erroneous alignment produced by ALPHAMALIG in Figure 11 (characters are colored according to the Dolgopolsky sound class scheme).

|               |   |   |   |   |    |   |   |
|---------------|---|---|---|---|----|---|---|
| Aldomirovci   | v | r | ɑ | - | tʃ | ɑ | m |
| Asparuhovo    | v | r | ʁ | ʃ | t  | ɑ | m |
| Panagjurishte | v | ʁ | r | ʃ | t  | ə | m |
| Rakovica      | v | r | - | ʃ | t  | ɑ | m |
| Stambolovo    | v | r | ʁ | ʃ | t  | ə | m |

Figure 10: MSA 21: LingPy-ASJP

|               |   |   |   |   |   |    |   |   |
|---------------|---|---|---|---|---|----|---|---|
| Aldomirovci   | v | - | r | ɑ | - | tʃ | ɑ | m |
| Asparuhovo    | v | - | r | ʁ | ʃ | t  | ɑ | m |
| Panagjurishte | v | ʁ | r | - | ʃ | t  | ə | m |
| Rakovica      | v | - | r | - | ʃ | t  | ɑ | m |
| Stambolovo    | v | - | r | ʁ | ʃ | t  | ə | m |

Figure 11: MSA 21: ALPHAMALIG

The differences between LingPy-ASJP and LingPy-DOLGO further illustrate, that the automatic detection of swapped sites is not the sole advantage of the algorithm, but that the model of sound classes and the scoring function are also of crucial importance for its performance. While the DOLGO model clusters sounds in a very broad way and employs a very rough scoring function, the ASJP model is based on a more subtle sound class model and a scoring function which was derived from a large empirical basis. The differences between the two models are illustrated in Figures 12 and 13: While the DOLGO model always prefers consonant-consonant matches over matches of consonants and vowels, no matter whether the consonant classes are similar or not, the ASJP model yields an alignment in accordance with the gold standard, where the preference over the avoidance of vowel-consonant matches is given to the matching of the phonetically more similar characters.

|             |   |   |   |   |                |   |
|-------------|---|---|---|---|----------------|---|
| Aldomirovci | u | n | e | t | r              | e |
| Asparuhovo  | v | - | ʁ | t | r <sup>j</sup> | ə |
| Babjak      | f | n | e | t | r              | e |
| Bachkovo    | v | - | ɑ | t | r <sup>j</sup> | ə |
| Bagrenci    | u | n | e | t | r              | e |

Figure 12: MSA 27: LingPy-ASJP

|             |   |   |   |   |                |   |
|-------------|---|---|---|---|----------------|---|
| Aldomirovci | u | n | e | t | r              | e |
| Asparuhovo  | - | v | ʁ | t | r <sup>j</sup> | ə |
| Babjak      | f | n | e | t | r              | e |
| Bachkovo    | - | v | ɑ | t | r <sup>j</sup> | ə |
| Bagrenci    | u | n | e | t | r              | e |

Figure 13: MSA 27: LingPy-DOLGO

## 6. Conclusion

While multiple sequence alignment has a long tradition in evolutionary biology, it is still in its infancy in historical linguistics and dialectology. The algorithm described in this paper only slightly differs from the common framework of progressive multiple sequence alignment in biology which was developed during the last twenty years. The main improvements of the algorithm lie in the incorporation of some specifically linguistic features, such as the use of sound classes along with specific scoring functions, or the modification of gap scores based on prosodic profiles.

When implementing the new method I intentionally took care to keep it flexible regarding most of its parameters. Using the LingPy library, it is easy to create new sound class models or to modify given ones in dependence of the data one wishes to analyze. In my opinion, this flexibility is important when trying to get multiple sequence alignment in historical linguistics out of its infancy: Despite more than 200 years of research on genetic language relationship and sound change, we still do not fully understand the phenomena in all their complexity, and all work in quantitative historical linguistics remains provisional until we drastically increase our data basis and start to get theory and practice closer to each other.

## Acknowledgements

I am deeply indebted to Jelena Prokić, Martijn Wieling, and John Nerbonne for providing me with the gold standard dataset of Bulgarian dialects, the source code for the calculation of the CDE and MRI scores, and the results of their analysis using the ALPHAMALIG algorithm. I would also like to thank Hans Geisler for helpful and inspiring critics.

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# Synchronic variation, gradualness, and the Jespersen Cycle

Emilienne Ngangoum

The gradual aspect of the Jespersen cycle unfolds in various languages by the synchronic co-existence of negative strategies standardly associated with different Jespersen stages. This paper shows that there is an underlying principle regulating the redistribution of overlapping strategies across languages, and proposes a clause structure able to capture the overlap and continual shift of strategies throughout the JC.

## 1. Introduction

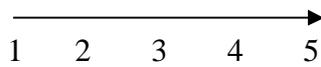
This paper looks at the overlap of negative strategies during the diachronic development of negation known as the Jespersen Cycle (JC). As a cyclic process, the JC is usually conceived as a process through which a language is changed from a monopartite to a bipartite negation construction and back again to a monopartite negation construction. This is reflected in the well known French patterns *ne*, *ne..pas* and *pas*, which respectively represent stages 1, 2, and 3 of the JC. The process has been identified across variable languages from diverse families and is considered to be a universal development in human languages. Following Jespersen (1917), a standard analysis of the JC usually brings out the chronological succession of markers that have been involved in the cycle - with the relation they have held toward each other, thus motivating the rise and fall of different markers on morpho-syntactic or semantic/pragmatic grounds. This results into a linear evolution with no overlap. As a consequence, the stages of the JC are conceived as discrete entities (1). This view is, however, not consistent with the empirical data.

Rather, the history of languages which have completed or almost completed the cycle tells us that there is a cline and a decline of the JC. In between the two poles exists the flux of the cycle where all the markers involved in the JC co-exist. This implies that the original marker will still be available until the marker that will ultimately replace it is in place. Conceptually, the cycle is not completed at the introduction of the marker that will eventually take over in the new system. Then starts the decline, during which the older markers are gradually lost to the language. Hence the schema that would best portray the overlap of negative strategies thus described is that of a triangle<sup>1</sup> (2), rather than a straight line (1).

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<sup>1</sup> The triangle should be read from left to right. The arrows indicate the direction of the rise and fall. From the extreme left (represented by 1) to the flux of the cycle (the vertical line in the centre of the triangle), newly grammaticalized items are added to existing ones. The reverse pattern is observed in the second half of the triangle where older items are gradually lost until we end up with 5 (representing the extreme right) which introduces a new system.

## (1) Discrete mapping



## (2) Overlapping mapping

|   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|
|   |   |   |   | 1 |   |   |   |   |
|   |   |   | 1 | 2 | 2 |   |   |   |
|   |   | 1 | 2 | 3 | 3 | 3 |   |   |
|   | 1 | 2 | 3 | 4 | 4 | 4 | 4 |   |
| 1 | 2 | 3 | 4 | 5 | 5 | 5 | 5 | 5 |

Empirically, (2) predicts that there are periods of mutual co-existence and overlap between the French negative strategies *ne*, *ne...pas* and *pas*. Beyond French, such a period of co-existence has been attested in many other languages. Hence, the need arises to take it into consideration while modelling language change in general and the JC in particular.

The approach represented by (1) is supported by a parametric view to grammar in which a single value for a particular parameter holds at a time. Therefore, each change of value results into an abrupt language change (Lightfoot, 1991). An implementation of this approach is found in the Neg-criterion proposed by Haegeman (1995:106) with respect to the configuration for negation.

## (3) The Neg-criterion

- a. A Neg-operator must be in a spec-head configuration with an  $X^0$  [Neg];
- b. An  $X^0$  [Neg] must be in a spec-head configuration with a Neg-operator.

Thus perceived, negation is necessarily a bipartite phenomenon. Roberts and Roussou (2003) specifically make use of the Neg-criterion to derive the JC in terms of whether lexical material is found in the head, in the specifier or in both slots of NegP. Conceptually, this does not leave any space for *ne* in the language once *ne...pas* is functional. In fact, any co-existence situation is excluded. From this perspective, the Neg-criterion implicitly predicts the impossibility for language to accommodate two strategies for negation simultaneously. Yet, this is at odds with the synchronic variation encountered across languages around the flux of the JC. The question this raises is what alternative configuration is needed to accommodate the overlap and continual shift of strategies throughout the JC.

Before addressing this question, I first provide the reader with the empirical data that beg for integration into a structural account of the JC. In this respect, I take into consideration languages from four different families: Germanic (English), Romance (French), Celtic (Welsh), and Bantu (Fe?fe?). In section 2, I discuss the redistribution of co-existing strategies in English, French and Welsh, thus showing how languages with historical records have accommodated co-existing strategies during the JC. In section 3, the data of Fe?fe? are introduced and accounted for as the JC at work. In order to achieve this goal, I adopt the method proposed by Greenberg for extrapolating the links of a diachronic process through the dynamicization of synchronic variants. For this to be made possible, a micro-comparative view of the negation system of closely related languages of the Grassfield Bantu area is provided. The section closes with a discussion of common distributional patterns emerging from both macro and micro-comparison. This shows that the language change process under consideration does not evolve in a random manner. Rather, there is an underlying system at work, and this system is manifested through the surface redistribution of co-existing negative strategies throughout the evolution of the cycle. Leaving the question of modelling such a system for future research, I close the paper (section 4) by proposing how overlapping negative strategies can be accommodated in the structural spine.

## 2. Synchronic variation and JC in Indo-European languages

This section provides a summary of the redistribution of co-existing and overlapping negative strategies in three Indo-European languages. The aim of the synthesis of cross-linguistic data thus provided is to demonstrate that the overlap of multiple strategies or stages throughout the JC is attested across languages from different affiliation and, as a consequence, deserves due consideration. Due to space restriction, substantive details and illustrations are not provided, and I refer the reader to the source articles from the authors listed for more details.

### 2.1. The co-existence of multiple stages in English

The co-existence situation between multiple strategies in the case of English can be summarised as seen in table 1 by bringing together data provided by Jack (1978a, 1978b), van Kemenade (2000) and Wallage (2008). From table 1, we can see that JC in English is characterised by overlapping negative strategies. As seen in columns 3 & 4, we already have a situation of overlap between *no*, *ne* and *ne..no/na* in old English main clauses, and the situation increases in complexity as we move into Middle English.

| Periods | cl. types | Stage 1 | Stage 2                 | Stage 3 |
|---------|-----------|---------|-------------------------|---------|
| OE      | Main cl.  | no/ne   | ne..na/no               |         |
|         | Sub. cl.  | no/ne   |                         |         |
| EME     | Main cl.  | ne      | ne..nawiht <sup>2</sup> | naught  |
|         | Sub. cl.  | ne      | ne.. noht               | not     |
| LME     | Main cl.  | ne      | ne..naught              | nat     |
|         | Sub. cl.  | ne      | ne..not                 | not     |

Table 1: overlapping negative strategies in English.

### 2.2. The co-existence of multiple stages in French

From the French data provided by authors such as Price (1997), Martineau (1994), Muller (1991) among others, one can deduct the co-existence or the overlap of negative strategies throughout the JC in French. Table 2 provides a succinct summary of the coexistence situation.

|                 |         | Main cl            | Sub. cl            | Modal verbs        | Temporal auxiliaries |
|-----------------|---------|--------------------|--------------------|--------------------|----------------------|
| Old French      | Stage 1 | non/ne             | non/ne             | non/ne             | non/ne               |
|                 | Stage 2 | ne mie/pas/gote    | ne mie/pasgote     | ne mie/pas/gite    | ne mie/pas/gote      |
|                 | Stage 3 | -----              | -----              | -----              | -----                |
| Medieval French | Stage 1 | ne                 | ne                 | ne                 | ne                   |
|                 | Stage 2 | ne mie/pas/gote/pt | ne mie/pas/gote/pt | ne mie/pas/gote/pt | ne mie/pas/gote/pt   |
|                 | Stage 3 | -----              | -----              | -----              | -----                |

<sup>2</sup> The variable versions of *not* in this table do not have any implication for my analysis. I am simply trying to reflect the variation found in existing texts in this respect.

|                                      |         |              |        |        |        |
|--------------------------------------|---------|--------------|--------|--------|--------|
| Standard classical & modern French   | Stage 1 | -----        | ne     | ne     | ne     |
|                                      | Stage 2 | ne pas/point | -----  | -----  | -----  |
|                                      | Stage 3 | -----        | -----  | -----  | -----  |
| Colloquial classical & modern French | Stage 1 | -----        | -----  | -----  | -----  |
|                                      | Stage 2 | ne pas       | ne pas | ne pas | ne pas |
|                                      | Stage 3 | pas          | pas    | pas    | pas    |

Table 2: co-existing negative stages in French.

### 2.3. The co-existence of multiple stages in Welsh

The evolution of negation as described by Borsley & Jones (2005) displays the co-existence situation summarised in table 3. We observe the co-existence of stages 1 and 2 in formal Welsh. We can further observe that imperatives and infinitives are one stage behind declaratives and interrogative clauses. In informal Welsh, declarative main clauses and interrogative clauses are definitely in stage 3, yet they still have a surviving remnant of stage 2. However, subordinate clauses exhibit the simultaneous co-existence of stages 1, 2 and 3. At this point, imperatives and infinitives are still transiting from stage 1 to stage 2. Hence, all three stages are available, particularly in Informal Welsh, during the same time span.

|                |         | Main cl  | Sub. cl  | Int. cl   | Imp. cl     | Inf. Cl      |
|----------------|---------|----------|----------|-----------|-------------|--------------|
| Formal Welsh   | Stage 1 | ni       | na       | oni       | na/peidio   | beidio       |
|                | Stage 2 | ni..ddim | na..ddim | oni..ddim | -----       | -----        |
|                | Stage 3 | -----    | -----    | -----     | -----       | -----        |
| Informal Welsh | Stage 1 | -----    | na       | -----     | paid        | beidio       |
|                | Stage 2 | d..ddim  | na..ddim | (d)..ddim | Paid...ddim | beidio..ddim |
|                | Stage 3 | ddim     | ddim     | ddim      | -----       | -----        |

Table 3: Co-existing negative strategies in Welsh.

### 2.4. Interim summary: Tendencies emerging from macro comparison

The following observation emerges from the tables: the oldest marker during a period of overlap between multiple strategies has a restricted distribution. In French and English, the oldest strategies *ne* mostly occurs in subordinate environments and in clauses with modal verbs, while the newer strategies have more freedom in their distribution. The addition of the Celtic language Welsh to the sample brings yet another distinction, namely the distinction of declarative and non-declarative environments. Hence, older strategies in Welsh occur in addition to subordinate clauses in imperatives and infinitives. Putting these environments together, we hypothesise that there is a tendency in a situation of multiple co-existing strategies for the older ones to be redistributed in subordinate rather than main clauses or /and non-declarative rather than in declarative clause types; modal verbs also tend to correlate with older strategies. On the contrary, newer markers associate with main clauses and with declarative clause types. Assuming the validity of the uniformitarian hypothesis, according to which languages of the past are not different from those of the present Croft (1991), it is possible to extend these distributional patterns to languages without historical records such as Fe?fe?. However, I will demonstrate in section 3 that this correlation holds in Fe?fe? and

related languages independently from what has been observed in Indo-European languages. I hope, by so doing, to raise this correlation beyond the stage of a mere tendency to that of a strong generalisation.

### 3. Synchronic variation in the negation system of Feʔfeʔ: A case of JC at work

Feʔfeʔ is a Grassfield Bantu<sup>3</sup> language spoken in Cameroon. A summary of the distribution of the negative strategies of Feʔfeʔ is provided in examples (4) to (8). In the indicative, negative markers in Feʔfeʔ come in complementary distribution. In past<sup>4</sup> tenses preceding the speech day, *si* is used to express negation (4a). In non past environments, namely future tenses, habitual and progressive present tenses, and in locatives, the strategy used to express negation is *si bā* (4b). In the past tense restricted to the speech day as well as in the perfect tense, the language makes use of *káʔ* ((5a) and (5b)). Finally, *lé* is used in consecutive clauses and complement clauses to the modal *páʔ* ((7b), (8a)). In non-indicative environments, negative markers come in free variation. In imperatives, subjunctive, hortative and optatives *si* and *páʔ* are in free variation (6b). In infinitives and purpose clauses, *si bā* and *mbáʔ* are in free variation (6a). This distribution is summarised in table 4.

- |     |                                                                                                                                                         |                                                                                                                |
|-----|---------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| (4) | a. Siani <i>lè sɪ</i> <i>ɣé</i> <sup>5</sup> <i>kò</i><br>Siani P3 NEG go farm<br>'Siani did not go to the farm.'                                       | b. Siani <i>sɪ</i> <i>ngé</i> <i>kò</i> <i>bā</i><br>Siani NEG go farm NEG<br>'Siani does not go to the farm.' |
| (5) | a. Siani <i>káʔ</i> <i>fú</i> <i>ngé</i> <i>kò</i><br>Siani NEG P1 go farm<br>'Siani did not go to the farm (earlier today).'                           | b. Siani <i>káʔ</i> <i>ɣé</i> <i>kò</i><br>Siani NEG go farm<br>'Siani has not gone to the farm.'              |
| (6) | a. Siani <i>pé</i> <i>nà</i> <i>mbáʔ</i> <i>ngé</i> <i>kò</i><br>Siani agree to NEG go farm<br>'Siani has agreed not to go to the farm.'                | b. <i>Páʔ</i> <i>ngé</i> <i>kò</i><br>NEG go farm<br>'Don't go to the farm.'                                   |
| (7) | a. Siani <i>lɔʔ</i> <i>yé</i> <i>kò</i><br>Siani NEG go farm<br>'Siani has never gone to the farm.'                                                     | b. <i>páʔ</i> Siani <i>lé</i> <i>yé</i> <i>kò</i><br>Can Siani NEG go farm<br>'Siani cannot go to the farm.'   |
| (8) | a. Siani <i>lǒ</i> <i>syé</i> <i>ǎ</i> <i>lé</i> <i>ɣé</i> <i>kò</i><br>Siani quit ground 3sg NEG go farm<br>'Siani got up and did not go to the farm.' | b. O <i>sɪ</i> <i>yé</i> <i>kò</i><br>2sg NEG go farm<br>'Don't go to the farm.'                               |

<sup>3</sup> Bantu languages belong to the Benue-Congo family of the Niger-Kordofanian phylum.

<sup>4</sup> Like Most Bantu languages, Feʔfeʔ has a tense system based on remoteness distinctions. Hence, the following notations will be used to indicate different tenses: P1: past tense restricted to the speech day; P2: past tense for yesterday or a few days ago; P3: distant past tense; F1: near future tense; F2: distant future tense.

<sup>5</sup> The transcription of the verb *yé/ɣé* 'go' differs in the different examples. The bare versus pre-nasalised versions represent the two forms of the Feʔfeʔ verb. The pre-nasalised form is triggered by what Ngangoum (forthcoming) refers to as pre-nasalisation triggers. These are made up of progressive and habitual markers, the P1 and F1 tense markers, the infinitive marker, the infinitive and imperative negator *páʔ*, the remoteness marker and some adverbs. The bare form surfaces after all other tense and negative markers.

|                       | Main clause    | Subordinate clause | Imperative, hortative & optative |
|-----------------------|----------------|--------------------|----------------------------------|
| Non-past              | Sì bǎ          |                    |                                  |
| Past 2&3              | sì             |                    |                                  |
| Past 1                | kǎʔ            |                    |                                  |
| Perfect               | kǎʔ            |                    |                                  |
| Relative clauses      | Si, si bǎ, kǎʔ |                    |                                  |
| Perspectival          | lǎʔ            |                    |                                  |
| Modal complement      |                | Lǎ                 |                                  |
| Consecutive clause    |                | Lǎ                 |                                  |
| Directive subjunctive |                | Pǎʔ/ sì            |                                  |
| Other subjunctives    | Si, si bǎ, kǎʔ |                    |                                  |
| Purpose clause        |                | Pǎʔ/sì bǎ          |                                  |
| Infinitive            |                | mbǎʔ/sì bǎ         |                                  |
|                       |                |                    | Pǎʔ/sì                           |

Table 4: Negative strategies in Feʔfeʔ.

### 3.1. A Feʔfeʔ internal reconstruction

Following Croft (1991), my approach to the data is based on the assumption that synchronic variability has its source in historical changes in progress. Against this background, diachronic gradualness is the first hypothesis to envision when confronted with the co-existence of multiple strategies for a single grammatical function. In the process of showing how historical linguistics can be used to provide explanations for the facts of synchronic language state, Croft (1991:3) makes the following statement:

‘Consider the case of variation between...forms for a single grammatical function. Even in the case in which the two forms have become specialised (e.g. one negative for the perfect tenses and one for imperfect tenses), it is almost always the case that the two forms originated at different times in the past, and one is older than the other.’ Croft (1991:3)

Adopting this position, I argue that the negative strategies of Feʔfeʔ illustrated above are the result of an ongoing language change. Therefore, the need arises to find criteria that can help decide which of the strategy is older or newer. Following Elsig (2009) quoted by Larrivee (2010:2243), I consider the following diagnostic for the current or new marker: a) widest distribution; b) high frequency; c) productivity; d) context independence. Besides the criteria proposed by Elsig (2009), there are also socio-linguistic criteria, according to which newer forms are associated with innovative socio-linguistic forces (cf. Croft 1991). Hence, younger speakers would usually prefer the newer form. Furthermore, Bybee et al. (1994:230, 235, 296), argues with regard to the markers of tense, aspect and mood that the grammaticalization of new items has been observed to always occur in independent main clauses.

Against this background the *si* strategy in its monopartite and bipartite configuration should be considered the default form for the expression of negation in Feʔfeʔ. It has the widest distribution, being found in both indicatives and non-indicatives. Because of its widest distribution and context independence, *si* is very productive and has a high frequency of use. Moreover, it was observed during the field work that teenagers make an exclusive use of *si* in imperatives and subjunctives, and almost never use *pǎʔ*. This shows that *pǎʔ* is older in comparison to *si*. This settles the question for non-indicative environments, as there are two competing strategies *si* and *pǎʔ* in these environments. Concerning indicatives, if *si* is the current and default strategy, then *kǎʔ* and *lǎ* are older. The next question consists of knowing which of *kǎʔ* or *lǎ* is the oldest. Taking into consideration the criteria of distribution, frequency

and productivity,  $ka\grave{\lambda}$  should be considered more recent than  $le\grave{\lambda}$ . Going back to table 4, we can see that  $le\grave{\lambda}$  is restricted to consecutive and modal complement clauses. However,  $ka\grave{\lambda}$  has a much wider distribution. It is used in the past tense restricted to the speech day, in perfect tenses, in relative and non directive subjunctive clauses. Hence, it is used in both main and subordinate clauses. As such it is more productive than  $le\grave{\lambda}$ . So far, we have been able to identify the newer strategies. *Si* is the most productive, most widely distributed and almost context-independent, whether one considers main clauses, subordinate clauses, declarative or non declarative clauses, *si* is present everywhere. Though  $ka\grave{\lambda}$  is restricted to indicative clauses, it is much widely distributed than  $le\grave{\lambda}$ . Hence,  $ka\grave{\lambda}$  is the second current or default marker. It follows that  $le\grave{\lambda}$  and  $pa\acute{\lambda}$  are the oldest strategies. If we rely on the criterion of distribution, we would be led to postulate that  $pa\acute{\lambda}$  is more productive, as it is found in infinitives, subjunctives, purpose clauses, optatives, hortative and imperatives. However, the fact that it is neither very productive nor frequent in those environments due to the competition of *si* makes it difficult to make a conclusive statement. So, we leave it as an open option for the time being.

We however have a last question to handle. This concerns the productivity of the clause final negator  $ba\grave{\lambda}$  which is used in a bipartite construction with *si* in infinitives, purpose clauses, conditionals, habitual and progressive present, in locatives, in focus constructions, in future tenses, on its own in tag questions, in a bipartite construction with  $ka\grave{\lambda}$  in emphatic negation, in a bipartite construction with  $ka\grave{\lambda}$  and *si* in emphatic statements in the form of question. This makes the clause final negator very frequent, almost as frequent as *si*. It does not respect the indicative vs. non indicative distinction. As such, it is close to satisfying the criteria of context independence. The clause final negator does however not meet the criterion of productivity, because it does not express negation when used on its own. Hence, it cannot be considered to be in competition with *si* with regard to the status of current negator. Moreover, were we to ignore the criterion of productivity, there would be another factor that could invalidate  $ba\grave{\lambda}$  as current marker. This has to do with its morpho-phonological form that is now varying between / $b\grave{a}$ / and / $\grave{s}$ / or / $\grave{a}$ / . More and more, teenagers make use of a simple vowel instead of the full form / $b\grave{a}$ /, thus showing that this morpheme is being eroded phonetically. This may have some impact for its continuation in the expression of negation in the decades ahead. It follows that  $ba\grave{\lambda}$  falls among the older markers for negation in Fe?fe?. Furthermore, it is the less productive form with respect to the expression of negation, as there is absolutely no context where it is used on its own to express negation. The fact that  $ba\grave{\lambda}$  is used with both *si* and  $ka\grave{\lambda}$  suggests that it is older than both of them. However, it is never used in a bipartite configuration with the older markers  $le\grave{\lambda}$  and  $pa\acute{\lambda}$  in Fe?fe?. Hence, it is difficult to make a conclusive statement with respect to its being older than them. Therefore, we conclude that  $ba\grave{\lambda}$ ,  $le\grave{\lambda}$  and  $pa\acute{\lambda}$  are the older negative markers in Fe?fe?. In the following section, we consider whether the use of micro-comparison can help settle the question of the directionality between these three markers.

### 3.2. A Grassfield internal reconstruction

In the previous section, we relied on the criteria of distribution, frequency, productivity and context (in)dependence to distinguish between newer and older markers. On this basis, we were able to identify the most recent marker in the Fe?fe? negation system. Moreover, we were also able to identify the second current marker. These two were thus distinguished from older markers. It was however not possible to establish with any level of certainty which of the older markers is really the oldest. In the present section, we supplement the criteria used in the previous section with the criterion of family trees or names. This can be made more

explicit by using a non linguistic phenomenon. When one usually looks back into a family lineage, one factor that helps to see that there has been new blood comes from innovative names. Hence, a family that has had only baby boys over the years will keep the same name throughout the generations. However, it is possible to see when a manly input from outside was introduced by the introduction of a new name into the lineage. And as often as new manly input are introduced, we can see an increasing variation in the change of names between cousins, grand cousins, great grand cousins, etc. It is also possible at some point to look back into the living people of the clan and realise that there is absolutely no one bearing a name that used to be particularly renowned in the ancestry line. This is usually the result of successions of new names coming with daughters of the family getting into alliances with men from different families and names. Since we are looking at languages with the same related ancestry, we consider that a system close to that of name change over the centuries in family lineage also applies here. Accordingly, the morphemes that have been in the languages longer, if not lost, should be shared by all the languages. On the contrary, those that have been added to individual languages more recently should be restricted to the more innovative languages. However, we should expect a conflict to arise between the oldest or one of the older marker(s) and the most productive and thus current marker. This is because the family tree method will produce the same effect for the older marker that the widest distribution and frequency method will produce for the current marker. It is however not possible to prevent these conflicting effects from arising. We can nevertheless rely on the productivity criterion to find out which of the winning candidates is the oldest or the current marker. In other words, the older marker on the one hand, if not lost, will be very frequent and thus have a relatively wide distribution across the languages. But because it has been replaced functionally by newly grammaticalized items, it will range very low in productivity. On the other hand, the current marker will be as frequent and widely distributed, yet will also be very productive. The productivity criterion thus provides a way out of the competition of oldest versus current presence. Yet another point that can help distinguished between older versus current presence is the distributional criterion. As frequent as the older presence among the languages may be, it is expected if it is productive for it to be restricted in non main clause environments. On the contrary, the current marker will not be subject to such a restriction. Against this background, we look into the negation system of closely related Grassfield languages in search of shared negators.

### 3.3. *A micro-comparative view of negation in the Grassfield<sup>6</sup>*

The strength of micro-comparison is assumed to lie in the possibility of isolating a variable from external interfering factors. This is possible only if the set of languages taken into consideration differ from one another only minimally, thus making it possible to observe the effect of changing a single variable. The variable to be considered in the present comparison is the distribution of negative strategies as we shift from one language to the other. Hence, the starting point is the fact that these languages have a common ancestor, and must have developed to the different realisation and distribution of negative strategies that they have in their present state from a common system. Hence, we intend to trace what the evolution into

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<sup>6</sup> The focus here is on Bamileke languages. I broaden the group to Grassfield because of the inclusion of some languages of the Ngemba and Nun sub-groups which historically have been set apart because of administrative divisions.

the present diverging states could have stemmed from. In this respect, we will start by introducing the reader to the sub language group under consideration.

The Grassfield zone is subdivided into four major groups: Western Grassfield (Bamileke, Northeast, Ngemba, and Nun); Menchum; Momo; Ring. Due to administrative divisions, some languages of the Western Grassfield branch such as Ngemba and Bamoun (Nun), which according to Voorhoeve (1971) are linguistically closely related to Bamileke languages, have been traditionally classified as non-Bamileke. However, the close genetic and synchronic similarities of these languages provide, according to Hyman (1972:2), evidence for certain historical changes. Hence, *Júpámùm*<sup>7</sup> (Nun) and some Ngemba languages are included in micro-comparison provided below. Bamileke as a branch comprises Feʔfeʔ, Ghomalaʔ (Bafounda/Bandjoun/Bamoungoum, etc), Yemba (Bangwa/Foto, etc), Ngiembong (Batcham, and related dialects), Ngombale (Babadjou and related dialects), Ngwe (Nweh) and Mengaka (Mengaka). Before proceeding, I would like to provide the reader with a list of cognate forms across the languages in the table, as the morpho-phonological form of the same morpheme varies as one moves from one language to the other: *si* ~ *ti* ~ *te* ~ *ʃə*; *bá* ~ *bə* ~ *wo* ~ *po* ~ *pa* ~ *a*; *páʔ*/*Mbáʔ* ~ *Mbɛʔ* ~ *mbe* ~ *Maʔ* ~ *Pa* ~ *ŋwäʔä/wäʔä* ~ *maŋ/maa*; *Lɛ* ~ *la* ~ *Laa* ~ *dɛm* ~ *di* ~ *duʔ* ~ *lɔ*; *Kaʔ* ~ *ke* ~ *kə* ~ *Kaa* ~ *kää* ~ *Ga*.

|          | Imperative | Infinitive | Modal Comp | Consecutive | Perspectival | Perfect   | P 2 / 3  | Non-past | Future   |
|----------|------------|------------|------------|-------------|--------------|-----------|----------|----------|----------|
| Awiŋ     | ko po      | kə..po     |            | ke po       |              | ke ka po  | ke po    | ke po    | ke po    |
| Babadjou | ko         | e..po      | po         | kaa         | kaa e        | kaa e     | kaa e    | kaa ..e  | po       |
| Bafounda | kə         | te         | le         | le/te wə    | däʔ/ kaʔ     | kaʔ       | te wə    | te wə    |          |
| Bafut    | tsúù       | ŋwäʔä      | kaa wäʔä   | kaa wäʔä    |              | kaa si    | kaa wäʔä | kaa si   | kaa wäʔä |
| Baham    | ka         | ʃə         |            | la          | laʔ          | kaa (pa)  | ʃə       | ʃə pa    | ʃə pa    |
| Bangwa   | maʔ        | kɾ.. a     | le         | le/kaʔ      | kaʔ          | kaʔ       | kɾ       | kɾ bə    |          |
| Batcham  | te ɔ       |            |            | te ɔ        | te ɔ         | ka/te.. ɔ |          | te ..ɔ   | te ɔ     |
| Feʔfeʔ   | páʔ/si     | mbáʔ/si bá | lɛ         | lɛ          | láʔ          | káʔ       | Si       | si..bá   | si bá    |
| Foto     | duʔ        | tí         |            | tí          | laʔ          | kaa       | tí       | tí a     | tí a     |
| Mengaka  | dɛm        | po         | mbe po     | le po       | ka kaʔpo     | (kaʔ) po  | po       | po       | po       |
| Nweh     | mbɛʔ       | te bə      | ga         | dí te       | lɛɛ/dɛɛ      | te bə     | te bə    | te bə    | gà/te bə |
| Jupamem  | maŋ        | pa         | fa         | ʃi          |              | maŋ       |          | pa /di   | pa ..lɔ  |

Table 5: Negative strategies in the Grassfield.

### 3.4. The relative presence of different markers across the Grassfield

The search for shared negators in table 5 provides the result in table 6: *bá* is found in eleven languages out of twelve, *lɛ* in nine languages, *páʔ* in six languages, *káʔ* in eleven languages, and *si* in seven languages. As predicted, there is a conflict between the distribution of the marker that has been in the languages longer and the one that is more productive across the languages. Hence, *bá* is found in all the languages represented in the sample, at the exception of Bafut. I will assume that this morpheme has been lost to this language. *Káʔ* is the more productive across the languages in the sample. As a consequence, it has wide distribution and productivity. We can clearly state that the high distribution of *bá* and *káʔ* across the languages in the sample are motivated by two different factors. While *bá* for instance is widely distributed across the languages, it is not productive with regard to contributing negation at LF. Hence, the only languages where it can express negation on its own are the more conservative languages such as Babadjou, Mengaka and *Júpámùm*. Elsewhere, *bá* is always dependent on another marker to be able to contribute to the expression of negation. Hence, we

<sup>7</sup> *Júpámùm* is a dialect of Bamun.

can conclude that by being represented in all the languages, it proves to be the oldest marker in the system.  $K\grave{a}\grave{?}$  on its own is widely distributed as the result of being the most productive across the languages. At the exception of Mengaka, where it is still being introduced and as such is used only optionally in a bipartite configuration with  $po$ ,  $k\grave{a}\grave{?}$  is productive as a free standing negator in all the other languages.

|                          | $B\grave{a}\grave{?}$ | $L\grave{e}\grave{?}$ | $P\grave{a}\grave{?}$ | $K\grave{a}\grave{?}$ | si |
|--------------------------|-----------------------|-----------------------|-----------------------|-----------------------|----|
| Awiñ                     | X                     |                       |                       | X                     |    |
| Babadjou                 | X                     |                       |                       | X                     |    |
| Bafounda                 | X                     | X                     |                       | X                     | X  |
| Bafut                    |                       | X                     | X                     | X                     | X  |
| Baham                    | X                     | X                     |                       | X                     | X  |
| Bangwa                   | X                     | X                     | X                     | X                     |    |
| Batcham                  | X                     |                       |                       | X                     | X  |
| $Fe\grave{?}fe\grave{?}$ | X                     | X                     | X                     | X                     | X  |
| Foto                     | X                     | X                     |                       | X                     | X  |
| Mengaka                  | X                     | X                     | X                     | X                     |    |
| Nweh                     | X                     | X                     | X                     | X                     | X  |
| Jupamum                  | X                     | X                     | X                     |                       |    |

Table 6: The relative presence of different markers across the Grassfield.

Moreover, it is possible that the form /fa/ that is found in  $\acute{J}up\grave{a}m\grave{u}m$  alone is also a cognate of  $k\grave{a}\grave{?}$ . This is subject to finding out if there is any phonological process that can derive /f/ into /k/ or vice-versa, or alternatively, if /f/ and /k/ could both derive from another phoneme via different phonological processes. We will leave this as an open question for the time being.

Besides the most productive and the oldest marker, the next winner is  $l\grave{e}\grave{?}$ , which is represented in nine languages out of twelve. On this basis, we can consider this marker to be the second oldest. Then comes  $si$ , with seven out of twelve languages. We cannot however consider this marker as old, because it does not occur in languages such as Babadjou, and Mengaka which are considered to be more conservative in virtue of their use of the oldest marker as an autonomous negator. So we will consider the fact that  $si$  has wider distribution than  $p\grave{a}\grave{?}$  as the result of the conflicting requirements of productivity versus older presence in the system, just as with  $b\grave{a}\grave{?}$  versus  $k\grave{a}\grave{?}$ . To conclude this section, we have been able to confirm the markers identified as current/newer in  $Fe\grave{?}fe\grave{?}$  across the Grassfield. Hence,  $si$  and  $k\grave{a}\grave{?}$  are the new markers. While  $k\grave{a}\grave{?}$  is the most productive across the Grassfield, it is however not the most recent marker. It has spread to all the languages. On the contrary,  $si$  is found only in more innovative languages. For instance, none of the languages that still use the oldest negator as an autonomous negative marker has  $si$ . Furthermore, we have been able to determine with more certainty what the oldest marker across the languages is, and finally to decide on the basis of the family lineage concept which of the other older marker should be considered second oldest. Therefore, we propose the following order of introduction of the negative markers into the system:

- (10)  $b\grave{a}\grave{?} > l\grave{e}\grave{?} > p\grave{a}\grave{?} > k\grave{a}\grave{?} > si$ .

### 3.5. Interim summary

Having proposed an order of introduction of negative markers in the Fe?fe? system, we are now in the position to state whether the tendencies observed in Indo-European can be extended to Fe?fe? in particular and the Bamileke or the Grassfield languages in general. The first observation to make here is that at the exception of very conservative languages such as Babadjou and Mengaka, which have the oldest marker as an active negator, the very oldest negator in Fe?fe? and across the languages considered is no longer productive for negation. This places it in a position similar to expletive negation in Indo-European languages. However, the tendency we observed for Indo-European languages, and according to which older negators are mostly found in subordinate and non indicative environments holds only for markers which are still productive for negation. Hence, we will now consider for Fe?fe? the markers which are productive for negation though in a restricted distribution, with the aim of finding out whether the distributional patterns advocated for Indo-European languages holds for Fe?fe?. In this regard, the oldest marker that is productive for negation in Fe?fe? is *lɛ*. This marker is restricted to subordinate environments, more specifically, to consecutive clauses and complement clauses to the modal *páʔ*. As such, this marker in its distribution correlates with productive older markers of Indo-European in combining subordinate environments with environments associated with modality. The second older and productive marker in Fe?fe? is *páʔ*. This marker is found in imperatives, infinitives, directive subjunctives, purpose clauses, hortative/optatives. This correlates with a class of older markers in Welsh. Of particular interest is the fact that *bedio* and *pedio/paid* that in Welsh are found in imperatives and infinitives in are not the oldest markers in an absolute term. The Welsh *na* in subordinate clauses is much older than these markers. Therefore, it follows that the markers found in non indicative in both Fe?fe? and Welsh are not the very oldest markers. They belong to the class of older markers but are not the oldest. We can therefore conclude that the distributional tendencies encountered in Indo-European languages, and according to which older markers correlate with clauses with a modal, as well as with subordinate and non-indicative environments is not the result of some properties specific to Indo-European languages. Rather, an independent reconstruction of the Fe?fe? negation system provides us with similar results. It follows that this should be taken seriously, as it appears to result from more general underlying principles shaping the architecture of the grammatical system in general. We can therefore take this beyond the level of a mere tendency and restate it in terms of a descriptive generalisation according to which the grammatical system of human language imposes a restricted distribution to older markers that happen to co-exist with newer ones.

### 4. Capturing the JC structurally

From the discussion in the previous sections, we have observed that the JC involves the co-existence of multiple strategies. The triangular mapping (2) proposed to capture the evolution of the cycle shows that a single strategy for negation is available only at the very beginning and at the very end of the cycle. In between these two poles, there are always at least two co-existing strategies for the expression of negation in the language. This means that the language user has a clause structure that is able to accommodate the variation thus involved. The aim of this section is to propose a clause structure able to capture the variation thus observed. Adopting the cross-linguistic view according to which negative reinforcers start up either as NPs (minimisers) or verbal items, while despondent/decaying older negators end up either as polarity or discourse items, I propose that the JC stems from within the VP and ends

up in the discourse related CP domain. In this respect, I adopt a clause structure with four NegPs, arguing that the JC lives to meet up with these structural positions that are spread along the clausal spine. This however is not random. I propose a **negative attraction threshold (NAT)** which any negator must reach to be able to take a reinforcer.

(11) **Negative Attraction Threshold (NAT)**

An element A that starts climbing up the clausal layer cannot attract yet another element B as reinforcer in a Neg construction of which A takes the lead, unless A has raised beyond a certain threshold.

*NAT* corresponds at least to the second NegP and to the third position in the succession of base positions (including the VP area) available for negation on the clausal spine. The theoretical assumption behind *NAT* is that the JC, (just like most change processes) proceeds through a series of structural reanalyses, with the elements associated to the expression of negation being reanalysed into higher structural positions as they change in their feature make up and in their function in the overall system. Before proceeding further, I define the notion of reanalysis and lay down my assumptions regarding the feature make up of negative markers as they evolve in the JC and along the clausal spine.

#### 4.1. *The notion of reanalysis*

De Smet (2009:3) defines reanalysis as taking place ‘on the syntagmatic level of language, causing a single surface sequence to receive a new syntactic and semantic interpretation [...] The immediate result is a split between an old representation and a new one for the same surface sequence.’ Hence, reanalysis has the effect of attributing an alternative structural position (and interpretation) to the same surface form. The syntactic distribution of the reanalysed form may also be subject to change. Hence, the only constant element is the morpho-phonological form at stake. The result of reanalysis is the availability of ambiguity for a single surface form. This ambiguity can be displayed in the variable uses of the same form, since the source structure for change survives in its old form after it has been reanalysed. This results in variation between the old and new usages or analyses. In order to avoid the postulation of syntactic innovations by users to handle each case of ambiguity as it arises, I follow De Smet (2009) in assuming the existence of an innate UG repository of representations available to the language user prior to the innovations resulting from reanalysis. In this respect, De Smet (2009:6) argues that ‘The explanatory value of syntactic reanalysis improves considerably if it is assumed, first, that language users have more syntactic representations than they actually implement in usage and, second, that there is some point when language users can select the representations they will implement from the options they have at hand.’

Following Roberts & Roussou (2003) and Roberts (2007), I assume that reanalysis is always upwards. In this respect, Roberts & Roussou (2003:36) state that ‘the diachronic movement of a given morpheme, possibly tracked over many centuries through successive reanalyses, is always upwards in the structural hierarchy of functional categories’. Against this background, I argue that negative markers start up in the JC low in the structure by a process of association made possible via attraction by an already well established negator. The new element (not yet a negative marker at the starting point) is attracted in the specifier of a negative marker and is thus given the opportunity to associate with negation. I call this recruitment by association. Subsequently, this element (now a new member of the closed

class of negative markers) is merged directly in a negative phrase. This constitutes the first step of reanalysis. It is worth noting however, that the source element, from which the new negative marker is reanalysed, does not disappear as the result of the reanalysis. Rather, it is still present in the system. Hence, after the first reanalysis, we have two surface versions of the original element. Yet the two versions associate with two different structural positions and also differ in their feature make up. The scenario is repeated every time that reanalysis takes place. Therefore, if a surface form has been reanalysed three times, we end up having a single surface morpho-phonological form, and yet four different structural positions. Beyond structural differences, I posit that each reanalysis also brings along a difference in feature make up. As a consequence, the JC is driven by the combination of structural and featural changes that results from successive reanalyses. Furthermore, the consequence of feature change resulting from reanalysis imposes on the system the need to recruit new members in the closed class of negative markers.

#### 4.2. *The feature make up of negative markers in the JC*

Following Zeijlstra (2004), I adopt the *i-neg* and *u-neg* features to express the association of a negative marker with a semantic value for negation. When a negative marker is marked *i-neg*, this implies that it has an interpretable negative feature. On the contrary, a negative marker marked *u-neg* is not interpretable for negation. Such a marker cannot express negation on its own, and needs to enter into a bipartite configuration with another element for the expression of negation at LF. It is in this respect that the result of feature change subsequent to successive reanalyses imposes on the system the need to recruit new member in the negation class. In other words, the elements that have undergone multiple reanalyses have been subjected to decay or fissure and, as a result, have been deprived of expressive content even with respect to their ability to continue being functional elements. As a consequence, the need for new elements that can potentially take over the vacant function arises. The consequence of this state of affairs is that a negative marker that has an *u-neg* feature cannot attract a reinforcer from the VP domain, because the element from the VP domain does not have a negative feature. Thus, a higher *u-neg* negator can only enter into a bipartite relation with an element that has already acquired the negative feature as the result of a first reanalysis from the VP to the lowest NegP. Alternatively, a negator that has reached NAT and has the *i-neg* feature can attract a reinforcer from the VP domain and thus associates it to the expression of negation. We thus have two types of bipartite constructions in the JC:

- Bipartition resulting from a higher negator with *u-neg* feature in need of *i-neg* feature to continue to express negation despite its fissure as the result of multiple reanalyses and bleaching.
- Bipartition resulting from a negator with *i-neg* feature attracting an element from the VP domain for the sake of associating the later to the expression of negation.

Furthermore, we also have two types of negators with *u-neg* feature in the system: those that have *u-neg* as the result of fissure and decay subsequent to multiple upwards reanalyses, and hence bleaching, and those that have *u-neg* feature because they are still associating with the class of negative markers via attraction by an element with *i-neg* feature. In the same vein, there are two types of elements with *i-neg* feature. Those that have recently been reanalysed into the negation class and those that have reached NAT and can attract new elements from the

VP domain. Below, I propose how these different negators or negative strategies are accommodated within the clause structure.

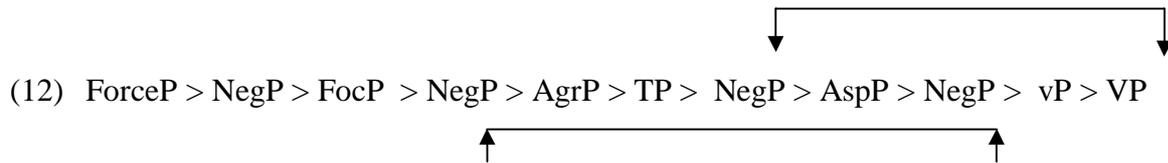
#### 4.3. Accommodating the JC on the clausal spine

We have seen so far that the multiplicity of co-existing strategies for the expression of negation encountered throughout the JC is made possible via successive reanalyses resulting in feature and structural changes. Against this background, it is important to establish where each combination of feature and structural change is hosted on the clausal spine. In this respect, I will take *NAT* to be the central point of the system, because it constitutes the entry point of new elements in the closed class of negative markers. Hence, I will locate *NAT* on the clausal spine and define the other NegPs in relation to it. Furthermore, I will associate to each position in the system a label that somehow correlates with its function or lack thereof in the system. The negative attraction threshold (*NAT*) corresponds to the structural height that any negator must reach to be able to attract a reinforcer. The negative marker in this position is labelled a *Free Attract Neg*. This tells us that such a negator does not depend on any other item to be able to express negation (free) and that it is able to attract another element as a reinforcer (attract). This negator is hosted in the NegP immediately above the Aspectual phrase (*AspP*). The negator in this Neg projection has an *i-neg* feature and thus contributes negation at LF. As a consequence, it attracts to its specifier an element that does not have an interpretable negative feature. Hence, when this negator looks down in its *c-command* domain, it searches for an element that it can attract to associate to the expression of negation. Below the *Free attract Neg* is the *Free Neg*. This tells us that such a negator can express negation on its own, hence, has an interpretable negative feature (*i-neg*) at LF. This negator is hosted by the NegP immediately below *AspP*. This negator cannot attract a reinforcer, but can be attracted by a higher negator with *u-neg* feature to contribute the semantics of negation at LF. Below the *Free Neg* is found the VP, the recruitment field of new reinforcers. The elements found here are labelled *no-Neg*. This tells us they are not negative markers and, thus are not interpretable for negation. Hence, they have an *u-neg* feature with respect to their relation to the negation system, and are attracted by *Free attract Neg* markers for association with the expression of negation.

Having defined the positions below *NAT*, it is worth restating that an element that is recruited from the VP domain will be reanalysed first from the VP to the lowest NegP in which it will be directly merged. At this point, it becomes a *Free Neg* with *i-neg* feature. From the lowest NegP, this element can be subsequently reanalysed into a higher NegP where it acquires the status of *Free Attract*. A significant difference between the elements below *NAT* and those above *NAT* lies in the fact that the former acquire virtue as the result of any reanalysis, while the latter lose virtue as the result of any reanalysis. Hence, below *NAT*, reanalysis results into gain of strength, while reanalysis above *NAT* results into loss of strength.

From *NAT*, that is, the *Free Attract* negative phrase, a negator can be reanalysed higher in the clause structure. Its new merging point will be the NegP above TP. The negator in this projection is labelled *-value Neg*. A negator in this position has an *u-neg* feature. Hence it does not on its own contribute negation at LF. As a consequence, it attracts into a bipartite configuration an element with *i-neg* feature from the *Free Neg* projection below *AspP*. If a negator is further reanalysed from the *-value Neg* projection, it is merged in a NegP immediately above the Focus phrase. Here, it associates with the expression of emphasis, contrastive focus, and can serve other functions associated with negative polarity or other

discourse function. Below, the respective negative projections thus described are represented in their relation with other phrases on the clausal spine. The arrows link the projections that enter into bipartition.



#### 4.4. The implementation

For present purposes, I restrict my implementation of *NAT* to a single language, Feʔfeʔ. The first difficulty in an attempt to implement the *NAT* hypothesis in Feʔfeʔ lies in the apparent fixed position for both clause final and middle field negative markers in this language. Yet, it can be perceived through the co-existence of the free standing *si* and *si* in a bipartite configuration with the clause final negator that there is change at stake with respect to the status of *si* and, as a consequence, to its structural position. This said, it follows that the *bā* that stands in a bipartite configuration with *si* should be considered as differing from a free standing *bā*. Other middle field markers are involved here as well. In order to provide the most links to the structural change advocated here, and thus show with specific steps how it work, I will appropriate the data of closely related Grassfield languages in table 5, thus holding fast to the micro-comparative method (Kayne 2005). This shows that all the NegPs advocated for the JC are potentially available in a reconstructed Feʔfeʔ language that would display all the missing stages of its evolution.

Starting with the no-Neg position, there is no evidence for the clause final negator in this position in any of the Grassfield languages in the sample. Yet there is evidence for a reinforcing negator in this position in Mengaka. This is illustrated with the bipartite construction *kàʔ.pó*, which *kàʔ* is an optional reinforcer. This suggests that *kàʔ* does not yet have a valued negation feature. Hence, it is still in the VP base-generated position.

- (13) a. Mèn zó màkàbò  
 1sg eat cocoyam  
 'I have eaten cocoyam.'
- b. Mèn (**kàʔ**) zó màkàbò **pó**  
 1sg Neg eat cocoyam neg  
 'I haven't eaten cocoyam.'
- c. Mèn zó màkàbò **pó** Mengaka  
 1sg eat cocoyam neg  
 'I haven't eaten cocoyam.'

For *pó* to be in a bipartite configuration with an item from the no-Neg position, it must be a *free-attract* Neg. Hence, the bipartite construction in (13b) provides evidence for the older negator as a *free-attract* Negator. Yet, there is evidence for this negator in yet a lower position, namely the *free-Neg* position. In the perfective, the bipartite construction in (13b) is in free variation with a monopartite construction with *pó* alone (13c). This provides us with the lowest position for the oldest negation in the Grassfield sample. Hence, the Mengaka examples provide evidence for the reanalysis from the *free-Neg* position immediately above



- (20) B̀aseŋ é - kèʔ te nzhó pfét  
 Birds Agr - past Neg palm-nuts eat  
 ‘The birds did not eat palm-nuts.’

The above data provide us with three versions of *te* and two versions of *gà*. Assuming that the *gà* and *te* that are in a bipartite construction with the clause final negator in fact surface in the specifier position of the said clause final negator, we can thus identify two different structural positions for the latter: Above TP in (16) and below TP in (17). In both cases the middle field negator, *te* and *gà* respectively are hosted in the specifier position of *bɔ́*. Hence they are not in their base position. Following the proposal made in section 3, a Negator that is above TP has lost the interpretable negation feature. Hence, it attracts a lower negator with interpretable negation feature. This implies that *te* in (16) is generated in the *free-Neg* position above VP. Alternatively, a negator that is below TP still has the interpretable negative feature and, as a consequence, attracts an element from the *no-Neg* position in the VP domain. Hence, *gà* in (17) is a reinforcer that is still associating with negation and, as such does not have an interpretable negation feature. We however have a second version of *gà* in (18). The latter can express negation on its own. This shows that it has been reanalysed from the VP domain into a higher position. We however do not have additional evidence to specify the position of *gà* in (18). Hence, it could be a *free-Neg* in the NegP immediately above VP, or a *free-attract* Neg above AspP. Example (19) confirms the point according to which *te* is based in a lower NegP below TP. Hence, it cannot express negation above TP unless it is hosted in the specifier of a higher negator. From (20), we see that *te* can express negation on its own from a lower position. Here, below TP. This position could be, just as with *gà* either the *free-neg* position or the *free-attract* position. We do not have detailed data to make a more specific claim in this respect.

From the ongoing discussion, we have been able to find further evidence for ambiguity in the structure and interpretation of a single surface form as the result of structural reanalysis. Hence, the same clause final negator is demonstrated to actually associate with two structural positions and with different feature make up. In the first case it is a *free-attract* negator with an interpretable negative feature and, as a consequence, is located in a NegP below TP and above AspP. In the second case, it is a negator with uninterpretable negative feature located above TP. Furthermore, we have also found two versions of *gà* and *te* in Nweh. The former comes in a *no-Neg* element belonging to the VP domain, and the second as a *free-Neg* element. The inability of *te* to stand alone in a NegP above TP has shown that this element is much lower in the clause structure, and is either a *free-Neg* or a *free-attract* Neg element. Therefore, we have been able to identify for the clause final negator a *free-Neg* position in Bamoun and Mengaka, a *free-attract* Neg position in Mengaka, and Nweh, and a *-value* Neg position in Nweh.

The only possible instance of the *free-attract* Neg in Feʔfeʔ can be found in the bipartite construction *si..bã*. However, the need to relativise a statement with respect to *si..bã* arises, because at the emergence of *si*, *bã* is already involved in a bipartite construction with both *kàʔ* and other middle field markers such as *lɛ̀* and *páʔ/mbáʔ*. Against this background, we could either assume that *bã* is already a *-value* Neg at the introduction of *si*, or that it still has a *free-attract* version. The possibility for both versions of *bã* to be available at the emergence of *si* is also to be entertained. Moreover, the existence in Feʔfeʔ of a negative preposition *sì* suggests that *si* might have been grammaticalized directly from this marker into a negative marker. If this is right, then *si* may not have needed to go through the *no-Neg* position, as it already has a negative connotation before being grammaticalized as negative marker. Assuming the later hypothesis to be most probable, *si* starts up directly as a *free-Neg*. Hence it has a valued

negative feature even in the bipartite construction *si..bā̄*. This implies that *bā̄* in this construction is not a *free-attract* Neg with a valued negative feature, but a *-value* Neg instead. If on the right tract, then we can postulate that Feʔfeʔ does not have any instance of the older negator in the *free-attract* position. Hence, the lowest *bā̄* in present days Feʔfeʔ belongs to the *-value* Neg position, that is in the NegP above TP.

The next question is whether there is any evidence for a reinforcer in a *free-attract* Neg position or even higher. From their position between the tense and aspect markers, the free standing middle field negators are all in the *free-attract* NegP. Hence, their position seems to be fossilised because of the persistence of the oldest clause final negator in the system. Contrary to Bafut (Ngemba) in which the loss of the cognate for *bā̄* has resulted in *kää* taking over, all the Bamileke language languages I have come across so far have preserved the oldest negator *bā̄*. Of course, its gradual reduction into a vowel as seen in Foto, Bangwa, Batcham and more and more in teenagers' speech in Feʔfeʔ can be considered a prelude to its loss. Notwithstanding the preservation of the clause final negator, we however encounter a situation where one of the middle field negator has attracted a reinforcer. This is seen in Nweh with the consecutive clause negator which is now rendered as a bipartite *di te*. This could be the result of its weakening into *-value* Neg. Alternatively, it could also be the simple result of having reached NAT, which places it in the position to attract a reinforcer. If the later position is correct, then it follows that the oldest negator does not need to be lost to the system before other negators that have been in the system long enough can attract a reinforcer. If however, the former hypothesis holds, then the emergence of multiple parallel developments within one and the same language is what is being deployed at the time being in Nweh. Hence, this could be the prelude of situations involving tripartite negation as encountered in Mendankwe, Mambena, Awij and to some extent also in Bafut.

The ongoing discussion has shown the parallel development of the oldest negator starting from the *free-Neg* position up till and including the *-value* Neg position, that is, a position above TP. We have also seen the reanalysis of reinforcing negative markers starting from the *no-Neg* position within the VP domain up to the *free-attract* position, hence in between AspP and TP. It is not clear to us whether the bipartition involved in consecutive clauses in Nweh is a reflection of a yet higher position or not. So we leave this as an open option. We are now in the position to consider whether the highest position advocated as the ending point of JC holds in Feʔfeʔ and related languages. There are at least three instances in Feʔfeʔ where the clause final negator should be interpreted in yet a higher NegP than considered so far. These include the emphatic use of *bā̄* when in a bipartite construction with *kā̄ʔ*, the free standing use of *bā̄* in tag questions, and the use of *bā̄* in the bipartite construction involving contrastive focus. These cases are illustrated below.

The first use of *bā̄* ((21) – (24)) that is not specifically meant to express negation can be found in tag questions. Here, *bā̄* is used in isolation, i.e. without a middle field negator. In the first case ((21) and (22)), this involves a real question and the relevant construction ends with a discourse particle serving the purpose of grounding the expression in the here and now.

- (21) Mú yéʔ bā̄ lā̄  
 Child cry Tag grounding  
 'The child has cried, hasn't he?'

- (22) Mén á mbéé pe bā̄ lā̄  
 Child 1sg house 2pl Tag grounding  
 'My child is in your house, isn't he?'

In the second case ((23) and (24)), we are not dealing with a question but with a reaction to a previous statement or the answer to a question. In this case, the negator is really at clause final position. In both cases, I argue that there is some focus involved here and, as such, the clause final negator is hosted by a much higher NegP.

- (23) a. Pú mà tʃè ó  
3pl prog call 2sg  
'You are being called.'
- b. Ɔgá pé bā ǎ?  
1sg answer Neg Q  
'I have answered, haven't I?'
- (24) a. Vóp fú mà há ná mú bá ǎ?  
Dust come from where on child that Q  
'Where does dust come from on that child?'
- b. Á táp syé bā ǎ?  
3sg fall down Neg Q  
'He has fallen, hasn't he?'

Besides, *bā* is used in association with *ká?* in single bipartite negation: there are two contexts where *ká?* which is otherwise used alone to express negation, is used in the bipartite construction *ká?...bā*: First, in a situation involving strong emphasis: If an interlocutor is insisting on saying that 'Siani went to the farm', while Siani did not, then adding *bā* to enforce the *ká?* negation becomes necessary, as in (25).

- (25) Siani *ká?* fú ηgέ kò bā  
Siani Neg P1 go farm Neg  
'Siani did not go to the farm.'

The second case involves negative emphatic questions, which is one of the ways to express emphasis: If grandma who is quite old has been asking for Siani for some time and, though she has been told that Siani went to the farm, she keeps on asking. At some point, her interlocutor will respond (26), which is a way of restating that 'Siani went to the farm' and in some way also saying 'please stop asking'. The contrast between (26) and (27) comes from the fact while (27) is a simple question, (26) emphatically restates a previously uttered statement as if it were a question. The speaker however does not expect an answer, because s/he is not actually asking a question.

- (26) Siani *ká?* fú ηgέ kò bā ǎ?  
Siani Neg P1 go farm Neg Q  
'Did Siani not go to the farm?' (Emphasis) / 'Siani did go to the farm.'
- (27) Siani *ká?* fú ηgέ kò ǒ?  
Siani Neg P1 go farm Q  
'Did Siani not go to the farm?'

Both (25) and (26) involve emphasis. Hence the clause final negator here is an emphatic marker and, as far as I can tell, such markers share the position of polarity markers, namely in a very high position in the left periphery. Hence, I assume that this negator will be hosted either in FocP itself, or in the NegP above FocP.

Finally, in contrastive focus constructions, the middle field negator *si* raises to a position immediately at the left of the focused argument. Assuming that such an argument is in the focus phrase, the negator could be considered to be in the specifier of FocP. In this instance, the clause final negator that is assumed to be higher can only be in the NegP above FocP.

- (28) Siani má lɛ́ yé́ nté  
 Siani that P3 go market  
 'It is Siani who went to the market.'
- (29) Si Siani má lɛ́ yé́ nté bā́  
 Neg Siani that P3 go market Neg  
 'It is not Siani who went to the market.'

A similar situation is found in Bafut. Bafut however differs from Feʔfeʔ because the oldest negator corresponding to *bā́* in Feʔfeʔ and *bó* in Nweh has been lost to the Bafut language. Hence the cognate of *káʔ/ga* is now the oldest negator in Bafut. Bafut further differs from both Feʔfeʔ and Nweh in the fact that *kää* is clause initial instead of being clause final. This implies the heavy pied-piping that results into the C-domain oldest negator ending up at the bottom of the clause does occur in Bafut. In this respect, Bafut patterns more closely with the traditional Bantu patterns than Feʔfeʔ and Nweh. Finally, Bafut differs from Feʔfeʔ in exhibiting an object verb inversion in negative sentences. Hence, while a positive sentence has the verb preceding the object, a negative sentence displays the reverse order, that is, with object preceding the verb. The verb is therefore at clause final position in Bafut's negated clauses. The Bafut's parallel of the Feʔfeʔ contrastive focus constructions are given in examples (30) to (34) as seen below.

- (30) À Sùù mó kì kó mbä yá  
 Foc Suh that P2 catch meat the (subject Foc)  
 'It was Suh (not Ambe) who killed the animal.'
- (31) Kää (à) sí Sùù bə́ mó kì mbá yá kó  
 Neg Foc Neg Sùùt be that P2 meat the catch  
 'It is not Suh (but Ambe) who killed the animal.'
- (32) Bó tùʔù ŋkì  
 3pl carry water  
 'They have carried water.'
- (33) Kää bó sí ŋkì tūʔü  
 Neg 3pl Neg water carry  
 'They have not carried the water.'

When we compare the negation patterns in the contrastive focus construction (31) to the negation patterns in the simple construction (33), we can clearly see a change in the structural position of *kää*. While it immediately precedes the subject in the non focus construction (33), it is much higher than the focus phrase hosting the contrastively focused subject in the focus construction (31). Such a position above the FocP can only be the NegP above ForceP. So the only phrase that is higher than our fourth NegP is the phrase responsible for indicating the type of the clause. Evidence for force being higher than the highest NegP can be found in the position of the question particle with respect to the clause final negation particle. In Ngangoum (2008) it is argued that the series of clause final particles as seen in example (34) belong to the C-domain in their reverse order at clause final position.

- (34) Siani kà? fú ŋgé kò bā ǎ?  
 Siani Neg P1 go farm Neg Q  
 'Did Siani not go to the farm?'

So while the question particle is found at the right of the negation particle at clause final position, they are reordered in their mirror position in the C-domain. Hence, in the left periphery, the question particle is at the left and hence structurally higher than the negative particle. Therefore, the word order in example (35) captures the different position of negation.

- (35) ForceP > NegP > FocP > FinP > NegP > AgrP > TP > NegP > AspP > NegP > VP

It is possible to advocate a different analysis for the surface position of *si* in (29) and (31). One might want to argue that *si* scopes from a lower position and, as a consequence, there should be no need for postulating that it is hosted in a separate and higher NegP in these two examples. Were we to agree with this line of argumentation, we would still have to admit a difference in the position of *kaa* as we compare (31) to (33). In (31), *kaa* is immediately at the left of the subject, while there is an intermediate phrase separating the subject from *kaa* in (33). This leads to two possible alternatives: either *kaa* as seen in (31) is already very high, namely above the FocP, in which case it still attests the highest position for negation postulated in the present proposal, or there are two different structural positions involved here. In both cases, the proposal made here holds until the NegP above FocP. Assuming the first alternative implies that *kaa* in (31) is much higher than it appears to be, and only by inserting intermediate phrases are we able to determine how high it really is. If right, then this provides evidence for a NegP above FocP in Bafut. If the second alternative is more accurate, then it simply points to the need of differentiating between the NegP immediately at the left of the subject and the NegP at the left of the FocP. All in all, we have evidence for a position for negation as high as in between FocP and ForceP.

#### 4.6. Conclusion

From the ongoing discussion, we have been able to show that the structural account proposed to accommodate the evolution of co-existing negative strategies on the clausal spine is empirically tenable. Basing our discussion on different language states of the Grassfield area, we have shown that the positions advocated as hosting negative markers or elements associated with the expression of negation are all attested, starting from the VP domain up till and including the CP. We have shown how structural reanalysis is implemented, with cases of a single surface form correlating to different structural positions and interpretations, thus resulting in ambiguous uses of the same surface form. Most importantly, we have seen how different negative strategies can each have their separate evolution alongside co-existing strategies.

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# Split topicalization as symmetry-breaking predicate fronting

Dennis Ott

In this paper, I argue against the standard view of split topics as discontinuous noun phrases. Instead, I show that split topics involve two autonomously generated noun phrases that are predicatively related. This predication is syntactically unstable, however: Merge of two XPs within a single argument or adjunct position yields a structure for which no label ('head') can be detected by Minimal Search ('for any  $\{\alpha, \beta\}$ ,  $\alpha$  is the head if  $\alpha$  is a lexical item'). Therefore, one of the two noun phrases has to move, yielding the 'split' in overt form. By providing a principled explanation for the split topicalization in German (and most likely other languages) in these terms, the analysis furnishes empirical evidence for an architecture in which Merge operates freely, and as an asymmetricizing device when applying internally.

## 1. Introduction

Split topicalization (henceforth, ST) is the name of a crosslinguistically widespread construction that seemingly 'tears apart' a noun phrase into two discontinuous parts.<sup>1</sup> The following is a simple case of ST (data are from German unless indicated otherwise):

- (1) Bücher hat Peter leider erst drei gute gelesen.  
books has Peter unfortunately only three good read  
'As for books, unfortunately Peter has only read three good ones.'

I will refer to the underlined parts as TOP (for topic, fronted) and REM (for remainder, stranded) for convenience.

*Prima facie*, (1) could be taken to be a simple instance of subextraction, i.e. a discontinuous surface linearization of an underlyingly continuous constituent. Here I will argue, following Fanselow (1988), that this is in fact not the case (at least not generally): ST relates two independent noun-phrase constituents, rather than subparts of a single noun phrase. In section 2 I

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<sup>1</sup>This statement is a simplification in two respects: not only noun phrases, but also PPs can be split by ST, and moreover ST can relate more than two parts in multiple splits. Both these variants will be set aside for the purposes of this paper, but are shown in Ott (2011) to be unproblematic for the analysis proposed in section 3.

adduce various pieces of empirical evidence in support of this claim. In addition to morpho-syntactic properties revealing the structural autonomy of TOP and REM, the fact that REM need not contain a gap militates most decisively against an extraction analysis:

- (2) a. Seltene Raubvögel hat Jürgen nur ein paar Bussarde gesehen.  
 rare birds of prey has Jürgen only a few buzzards seen  
 ‘As for rare birds of prey, Jürgen only saw a few buzzards.’  
 b. \*ein paar Bussarde seltene Raubvögel)

I will therefore suggest in section 3 that TOP and REM are directly merged as subject and predicate internal to an argument/adjunct position. The following is a simplified version of the derivation of (2b) according to this proposal:

- (3) [<sub>NP</sub> seltene Raubvögel ]<sub>i</sub> ... [<sub>VP</sub> [[<sub>DP</sub> ein paar Bussarde ] *t<sub>i</sub>* ] gesehen ]

I will argue that the original configuration relating the two noun phrases is locally unstable, in that a structure of the type {XP, YP} has no detectable head (label). Therefore, movement must apply to the NP predicate, yielding the ‘split’—now understood as the syntactic separation of NP and DP—in overt form. I will spell out and confirm various predictions of this approach.

Finally, section 4 concludes and summarizes the broader implications of the analysis.<sup>2</sup>

## 2. Properties and Problems

Simple cases of ST like (1) seem to be amenable to a straightforward extraction analysis. On this view, defended in van Riemsdijk 1989, (1) has the derivation given below:

- (4) Bücher<sub>i</sub> hat Peter leider erst [<sub>DP</sub> drei gute *t<sub>i</sub>* ] gelesen

A first theoretical worry arising from (4) is that it requires movement of an NP segment, assuming that the stranded AP *gute* is adjoined to NP; such movement of segments is arguably not allowed by the grammar, however (Kayne 1994; Büring & Hartmann 1997). Setting aside this theory-internal issue, it turns out that the extraction analysis is problematic for a variety of empirical reasons as well (see also Fanselow 1988, Fanselow & Ćavar 2002, and van Hoof 2006 for the relevant facts).

### 2.1. ST ≠ subextraction

Fanselow & Ćavar (2002) emphasize the fact that ST is insensitive to constraints that apply to regular instances of (PP-)subextraction (on which see Müller 1995). In German, dative and genitive objects consistently disallow subextraction but productively participate in ST, as shown

<sup>2</sup>For reasons of space I will only occasionally mention previous proposals in this paper; a thorough discussion of the existing literature on ST can be found in Ott 2011.

in (5) and (6).<sup>3</sup> Definite DPs, too, disallow subextraction but freely undergo ST (7).

- (5) a. \*Worüber<sub>i</sub> wurde schon [DP mehreren Büchern *t<sub>i</sub>*] ein Preis verliehen?  
 about what was already several books.DAT a prize awarded  
 b. Büchern über Polen wurde schon mehreren guten ein Preis verliehen.  
 books.DAT about Poland was already several good.DAT a prize awarded  
 ‘As for books about Poland, several have been awarded a prize.’
- (6) a. \*An Studenten<sub>i</sub> habe ich ihn [DP schrecklicher Morde *t<sub>i</sub>*] bezichtigt  
 of students have I him horrible murders.GEN accused  
 b. Schrecklicher Morde an Studenten wurde er vieler bezichtigt.  
 horrible murders.GEN of students was he many accused  
 ‘As for horrible murders of students, he has been accused of many.’
- (7) a. \*Worüber<sub>i</sub> hast du [DP die Bücher *t<sub>i</sub>* von Grass] gelesen?  
 about what have you the books by Grass read  
 b. Bücher über Liebe habe ich bisher nur die von Grass gelesen.  
 books about love have I so far only those by Grass read  
 ‘As for books about love, so far I’ve only read those by Grass.’

These contrasts cast serious doubt on the general validity of the derivation in (4); at the very least, proponents of such an analysis would be hard put to explain the discrepancy between PP-subextraction and the putative cases of NP-subextraction.

An aggravating factor is that ST does not only productively apply to opaque argumental categories, but also to adjuncts, which are standardly assumed to be inaccessible for subextraction for principled reasons. In the following case, ST splits a so-called ‘free dative,’ i.e. an optional (unselected) dative with a beneficiary interpretation:

- (8) Kindern hat Peter nur den besonders netten einen Kuchen gebacken.  
 children.DAT has Peter only the particularly nice.DAT a cake baked  
 ‘As for children, Peter only baked cakes for those that were particularly nice.’

Free datives, like other adjuncts, never allow for subextraction (see Vogel & Steinbach 1998). As before, the burden is on the proponents of the extraction theory to provide an explanation for why extraction out of adjuncts is possible in ST but not otherwise. (A denial that any movement is involved in ST is not an option, as will be shown in section 2.4 below.)

## 2.2. Antecedent–gap mismatches

While at present no such explanation exists, there are further, insurmountable obstacles to the simple extraction analysis. If ST is subextraction from a noun phrase, we expect each TOP and REM to reflect morphosyntactic properties of the source constituent. As it turns out, however,

<sup>3</sup>The same is true for subjects, which show a mixed behavior with respect to subextraction in German (cf. Haider 1993 vs. Müller 1995).

this is not the case: each TOP and REM are morphosyntactically *autonomous* constituents.<sup>4</sup> (Note that this autonomy holds only with regard to inherent properties, not those reflecting structural relations; in particular, TOP and REM cannot differ in case. This will be further discussed in section 2.4.)

As already noted in Fanselow 1988, adjectival inflection in TOP and REM differs from the continuous pattern in that a modifier in TOP must realize strong inflection even when it is simultaneously realized in REM:<sup>5</sup>

- (9) a. Polnische Gänse gekauft hat sie keine.  
 Polish.STRONG geese bought has she none  
 ‘As for Polish geese, she didn’t buy any.’  
 b. \*keine polnische Gänse, ✓keine polnischen Gänse

This double realization of strong inflection is expected if TOP and REM are independent constituents. An extraction analysis has to resort to a postsyntactic view of inflectional morphology that yields the observed surface properties (as anticipated by van Riemsdijk 1989).

The morphosyntactic autonomy of TOP and REM is further corroborated by the fact that TOP can contain an additional indefinite article (van Riemsdijk’s 1989 ‘determiner overlap’):

- (10) a. Eine Katze habe ich nur eine ganz kleine gesehen.  
 a cat have I only a very small seen  
 ‘As for cats, I’ve only seen a very small one.’  
 b. \*eine ganz kleine eine Katze

The emergence of the ‘extra’ article is mysterious from the point of view of an extraction analysis, especially since it is not obviously a repair effect or morphological adjustment: for most speakers, presence of the article in TOP is optional or at least not strictly obligatory.<sup>6</sup>

That morphosyntactic mismatches between TOP and its putative base position next to REM are not repairs invoked to accommodate surface constraints but merely reflections of the syntactic autonomy of TOP and REM is also brought out by modifiers inside TOP and REM:

- (11) a. Bücher, die erfolgreich waren, kennt er keine von Maria.  
 books that successful were knows he no by Maria  
 ‘As for successful books, he doesn’t know any by Maria.’  
 b. \*keine Bücher, die erfolgreich waren, von Maria

As indicated, the continuous constituent postulated by the extraction theory (11b) violates the structural requirement that the relative clause be located higher than (to the right of) the PP-modifier. By contrast, if TOP and REM are taken to be independent constituents, it is expected

<sup>4</sup>Some of the facts mentioned below were already observed by van Riemsdijk (1989) and identified as problematic for his extraction theory of ST. Van Riemsdijk’s solution was to devise a mechanism of ‘regeneration’ that adds morphological material to the extracted NP in order to render it compliant with X-bar-theoretic requirements. Such a mechanism is not only stipulative and non-explanatory, it also fails to account for those mismatches that are clearly not ‘repairs’ of this kind but are simply due to the syntactic autonomy of TOP and REM. See below for the relevant facts and discussion.

<sup>5</sup>On the German weak/strong alternation, see Roehrs (2006) and Schoorlemmer (2009), among others.

<sup>6</sup>See section 2.5 below on why article doubling only occurs with the indefinite article, not definite determiners.

that they need not conform to constraints on the internal order of elements within a single constituent.

As a final problem for the extraction theory, notice that TOP and REM can mismatch in number, with TOP plural and REM singular (but not vice versa):

- (12) a. Zeitungen kenne ich nur eine gute.  
 newspapers know I only one good  
 ‘As for newspapers, I know only one that’s good.’  
 b. \*eine gute Zeitungen

This is certainly not expected if TOP and REM are constituents of a single underlying base constituent.

The morphosyntactic autonomy of TOP and REM in ST constructions is not an idiosyncratic quirk of German, but appears to hold crosslinguistically, as documented in Fanselow & Féry (2006). Let us briefly review some representative examples (see the aforementioned paper for further facts and discussion).

As observed by Fanselow & Féry (2006), it is crosslinguistically very common for REM to bear nominalizing morphology:

- (13) a. Pedro-e’ ts’o’k u xokik ya’bkach áanalte’o’b.  
 Pedro-TOP term A.3 read.INCOMPL many book.PL  
 b. Áanalte’o’b-e’ Pedro-e’ ts’o’k u xokik ya’bkachi’.  
 book.PL-TOP Pedro-TOP term A.3 read.INCOMPL many.NMNLZ  
 ‘Pedro read many books.’ (Yucatec Maya)

The difference between the continuous form and the ST construction indicates straightforwardly that the latter is not a simple transformational variant of the former as construed in (4).

Fanselow & Féry further observe that it is common for TOP and REM to surface with case or number morphology that could not occur in the non-split form. Two examples are the case-marking on REM in Hungarian and plural marking on TOP in Nogai shown below:

- (14) a. Láttam nagy bicikliket.  
 I saw big bike.ACC  
 b. Bicikliket láttam nagyokat.  
 bike.ACC I saw big.ACC  
 ‘I saw a big bike.’ (Hungarian)
- (15) a. Köp noRaj kitapdy ul aldy.  
 many Nogai book.SG he bought  
 b. NoRaj kitaplardy ul köp aldy.  
 Nogai book.PL he many bought  
 ‘He bought many Nogai books.’ (Nogai)

The anonymous reviewer points out a similar example from Hebrew. In this language, numeral quantifiers obligatorily surface with so-called construct-state morphology when combining with nouns, as in *šney banim* ‘two.CS boys.’ However, if a numeral is stranded as REM such mor-

phology is absent, suggesting that a continuous DP is not the underlying source of the split:

- (16) Banim ani ra'iti {šnayim / \*šney}.  
 boys I saw two two.CS  
 'As for boys, I saw two.' (Hebrew)

Fanselow & Féry further show that various languages allow for number mismatch and article doubling in ST constructions, echoing the German facts in (10) and (12) above.

- (17) Libra kam lexuar vetëm një.  
 books have I read only one  
 'I have read only one book.'
- (18) Një makinë nuk kam një amerikane.  
 a car not has an American  
 'He does not have an American car.' (Albanian)

Taken together, the facts presented so far strongly indicate that a subextraction analysis of ST is misguided, in German and crosslinguistically: ST involves two autonomous noun phrases.

Before moving on, I would like to briefly spell out what exactly the problem for the extraction theory in (4) is (and what it is not), in light of the facts just reviewed. The problem is *not* that such a theory would require base generation of 'quirky' underlying constituents, such as noun phrases in which different subconstituents bear different number specifications. There is no convincing reason to believe that syntax is somehow constrained such as to only base-generate 'acceptable' constituents. The problem, rather, is that the extraction theory provides no reason for why TOP in the cases just reviewed could not surface *in situ*, i.e. why topicalization in this case is obligatory. As already indicated above, all counterparts to the examples in (9)–(12) with TOP *in situ* (according to (4)) are unacceptable:

- (19) a. \*Sie hat keine polnische Gänse gekauft.  
 b. \*Ich habe nur eine ganz kleine eine Katze gesehen.  
 c. \*Er kennt keine Bücher, die erfolgreich waren, von Maria.  
 d. \*Ich kenne nur eine gute Zeitungen.

Notice that we cannot simply resort to the claim that movement is obligatory to create rule-conforming surface constituents, as this reasoning is clearly circular. Rather, some independent reason must be found that necessitates the syntactic separation of the quirky base constituent's subparts. (I have not yet demonstrated that movement is involved at all in ST; see below for the relevant facts showing that it is.)

### 2.3. Gapless splits

To solve the puzzle that arose in the preceding section, I will follow Fanselow (1988) in assuming that REM (as well as TOP) is a syntactically complete and autonomous noun phrase, and that the illusion of a syntactic 'split' arises due to NP-ellipsis internal to REM. From this assumption all facts reviewed above follow straightforwardly: in each case, the morphosyntactic

shape of REM is that of a free-standing, elliptical DP.

If REM in simple cases of ST is an elliptical DP, we expect there to be non-elliptical counterparts, since NP-ellipsis is (virtually) free in German (cf. Lobeck 1995). That such *gapless splits* exist is acknowledged in most works on ST (e.g., Fanselow & Ćavar 2002; Puig Waldmüller 2006; Nolda 2007; Ott 2011), but few discuss them explicitly (the exceptions being Nolda 2007 and especially Ott & Nicolae in press; Ott 2011). Consider the following examples:<sup>7</sup>

- (20) a. Französische Bücher habe ich noch nie welche gelesen.  
 French books have I so far never any read  
 ‘As for French books, I’ve never read any.’  
 b. \*welche französische Bücher
- (21) a. Seltene Raubvögel hat Jürgen nur ein paar Bussarde gesehen.  
 rare birds of prey has Jürgen only a few buzzards seen  
 ‘As for rare birds of prey, Jürgen only saw a few buzzards.’  
 b. \*ein paar Bussarde seltene Raubvögel
- (22) a. Zeitungen liest Maria nur die junge Welt.  
 newspapers reads Maria only the *junge Welt*  
 ‘As for newspapers, Maria only reads the *junge Welt*.’  
 b. \*die *junge Welt* Zeitungen

In (20a), REM is an indefinite existential *wh*-pronoun; in (21a) and (22a), it is a full, overtly headed DP. (Notice that (22a) exhibits the number mismatch already encountered in (12) and (17).) As indicated, there is no acceptable continuous surface constituent comprising TOP and REM, irrespectively of morphological properties. Thus, gapless splits, like the antecedent–gap mismatches reviewed in the previous section, show that TOP and REM are not parts of a discontinuous surface DP, but rather independent noun phrases.

As we will see below, gapless splits and ‘regular’ splits have all central empirical properties in common, hence are clearly variations of the same phenomenon.<sup>8</sup> In the ‘regular’ case, where REM contains a gap, the result happens to look like a discontinuous noun phrase, although we already saw in section 2.2 that this is true only at first glance.

Somewhat surprisingly, Fanselow & Féry (2006), who survey ST phenomena in more than a hundred languages, adhere to the traditional view of ST as creating discontinuous noun phrases; consequently, they are forced to conclude that gapless splits are an altogether different phenomenon. This conclusion is hardly satisfying, however, in light of their own observation that ‘Constructions in which two lexical nouns appear in a discontinuous noun phrase are [. . .] quite

<sup>7</sup>Some speakers of German find gapless splits with non-pronominal REMs awkward, but this seems to be largely a reflection of stylistic preferences. Speakers that are hesitant to accept such gapless splits as fully acceptable typically still perceive relevant contrasts and degradations, e.g. in connection with island violations, the reverse order of the two noun phrases, etc.

<sup>8</sup>This is a serious problem for approaches that rely on the presence of an empty category in REM, such as Fanselow’s (1988) and its extension in Roehrs (2009). Since the empty category is taken to be the head of REM, gapless splits like those in (20a)–(22a) are falsely predicted to be impossible. In these approaches the empty category inside REM is A-bar-bound by TOP, establishing the semantic link between the two categories. Below we will see a different explanation for the predicative relationship between TOP and REM that does not rely on REM containing an empty category.

widespread' and 'may be considered a typical companion of discontinuous noun phrases involving a single lexical noun only' (Fanselow & Féry 2006:66).

Some examples of gapless splits from various languages are given below (all taken from Fanselow & Féry's survey):

- (23) a. Vogels kent hij alleen maar nachtengalen.  
birds knows he only but nightingales  
'As for birds, he only knows nightingales.' (Dutch)
- b. Lintuja hän tuntee vain satakielen.  
birds (s)he knows only nightingale.SG  
'As for birds, he only knows nightingales.' (Finnish)
- c. Satamashoebi, icis mxolod lurji burtebi.  
toy knows only blue ball  
'As for toys, he only knows blue balls.' (Georgian)
- d. Pinnussanit nalunngilai tungujortut arsat.  
toys knows he blue balls  
'As for toys, he only knows blue balls.' (Greenlandic)
- e. Madarat csak csalogányt látott.  
bird only nightingale saw  
'As for birds, he only saw a nightingale.' (Hungarian)
- f. Tori-wa kare-wa kanaria-dake(-o) sitteru.  
birds-TOP he-TOP canary-only know  
'As for birds, he only knows canaries.' (Japanese)
- g. Catongcha-nun ku-ka Toyota-man santa.  
car-TOP he Toyota-only buys  
'As for cars, he only buys Toyotas.' (Korean)
- h. Bilar köper han bara Toyota.  
cars buys he only Toyota  
'As for cars, he only buys Toyotas.' (Swedish)

We thus have substantial reason to assume that ST constructions relate autonomous noun-phrase constituents, a conclusion that is independently suggested by the mismatch phenomena reviewed in section 2.2. Let us now turn to the demonstration that movement is involved in all types of splits, focusing again on facts from German.

#### 2.4. Connectivity

In light of the facts discussed in sections 2.2 and 2.3, one might entertain the hypothesis that there is no direct syntactic relation between TOP and REM at all, and that TOP is base-generated in its peripheral surface position. Indeed, this is the position taken by several researchers (e.g. Haider 1990; Pafel 1996); Fanselow & Féry (2006) consider a base-generation the only viable analysis of gapless splits.

There are both conceptual and empirical reasons to dismiss this position as inadequate. Conceptually, the idea that TOP is base-generated in the left periphery clashes with the assumption

that External Merge (EM) and Internal Merge (IM; movement) contribute to the duality of interpretation in distinct ways, EM providing thematic relations and IM discourse properties of an expression (Chomsky 2008, 2007). If this view is correct, TOP ought to be moved to the left periphery by IM, yielding its topical discursive role (to which we will return below). Moreover, if TOP were base-generated in the left periphery its thematic status would remain unclear, and so would the semantic relation between it and REM.<sup>9</sup>

ST shows all central properties of  $\bar{A}$ -movement.<sup>10</sup> TOP can move across finite-clause boundaries, i.e. ST is a (seemingly) unbounded dependency:

- (24) a. Bücher glaubt Maria dass Peter schon viele gute gelesen hat.  
books thinks Maria that Peter already many good read has  
'As for books, Maria thinks that Peter has read many good ones.'
- b. Nagetiere hat Peter behauptet dass Maria nur Eichhörnchen gesehen hätte.  
rodents has Peter claimed that Maria only squirrels seen had  
'As for rodents, Peter claimed that Maria had seen only squirrels.'

Moreover, ST is sensitive to islands, i.e. TOP and REM may not straddle an island boundary. This is shown below for adjunct and relative-clause islands:

- (25) a. \*Bücher war Peter traurig [nachdem seine Mutter viele weggeworfen hatte]  
books was Peter sad after his mother many thrown away had
- b. \*Neue Autos kennt Peter [einen Typen [der bisher nur Toyotas gekauft hat]]  
new cars knows Peter a guy who so far only Toyotas bought has

Long scrambling of TOP is possible 'out of' coherent infinitives only, as expected given the clause-boundedness of scrambling in German (Grewendorf & Sabel 1994):<sup>11</sup>

- (26) a. weil er Bücher bisher nur wenige zu lesen {versucht / \*gezögert} hat.  
because he books so far only few to read tried hesitated has  
'because as for books, so far he tried/hesitated to read only a few.'
- b. weil er Autos bisher nur teure Toyotas zu verkaufen {versucht / \*gezögert} hat.  
because he cars so far only expensive Toyotas to sell tried  
hesitated has  
'because as for cars, so far he tried/hesitated to sell only expensive Toyotas.'

TOP reconstructs to some VP-internal base position for interpretive purposes. This is shown in the following examples for Condition A, bound-variable pronouns, and scope, respectively:

<sup>9</sup>Taking TOP to be a non-theta-marked adverbial adjunct is not a tenable option, see footnote 19 and the discussion of Fanselow (1988) in Ott (2011). That the interpretive relation between TOP and REM is not merely pragmatic (as Puig Waldmüller 2006 has it) will be shown in section 3.3.2.

<sup>10</sup>Although not all of the traditional diagnostics can be used, due to the fact that TOP may not be quantified (see below).

<sup>11</sup>(26) are instances of split scrambling, a general option in addition to topicalization of TOP. To streamline the discussion and for reasons of space I do not discuss the scrambling variant of ST in this paper any further, but see Ott (2011).

- (27) a. Bücher über einander<sub>i</sub> haben die Männer<sub>i</sub> noch nie welche geschrieben.  
 books about each other have the men yet never any written  
 \*‘As for books about each other, so far the men haven’t written any.’
- b. Nagetiere aus seinem<sub>i</sub> Heimatland kannte jedes Kind<sub>i</sub> nur Eichhörnchen.  
 squirrels from his home country knew every child only squirrels  
 \*‘As for rodents from his home country, every child only knew squirrels.’
- c. Bilder seiner<sub>i</sub> Kinder hat ja jeder<sub>i</sub> mehrere im Portemonnaie.  
 pictures of his children has PRT everyone several in the wallet  
 \*‘As for pictures of his children, everyone has several in his wallet.’
- (28) Ein Buch hat jeder Schüler nur ein kurzes gelesen. ( $\forall > \exists, * \exists > \forall$ )  
 a book has every student only a short read  
 ‘As for books, every student read only a short one.’

Notice that reconstruction can be detected independently of whether or not REM contains an overt gap, as shown by the gapless splits in (27a) and (27b). Such cases most transparently pinpoint the paradox presented by ST: TOP shows connectedness with the interior of the clause, which however does not offer any obvious base position for it.

Finally, ST (gapless or not) licenses parasitic gaps, indicating the presence of an A-bar dependency:

- (29) a. \*Sonja hat [ohne *pg* zu kennen] schon viele Gäste begrüßt.  
 Sonja has without to know already many guests greeted
- b. ?Gäste hat Sonja [ohne *pg* zu kennen] schon viele begrüßt.  
 guests has Sonja without to know already many greeted  
 ‘As for guests, Sonja has greeted many without knowing them.’
- (30) ?Gebrauchte Autos hat Peter [ohne *pg* probegefahren zu haben] bisher nur Toyotas  
 used cars has Peter without test driven to have so far only Toyotas  
 gekauft.  
 bought  
 ‘As for used cars, so far Peter only bought Toyotas without having done a testdrive.’

We conclude that TOP is moved to the left periphery from some vP-internal base position, in both regular and gapless splits.

Moreover, we are forced to adopt the seemingly incoherent assumption that TOP and REM in fact occupy the *same* structural base position, given that both surface with the same case. Notice how this crucial property of case agreement distinguishes ST from HT constructions as in (32), where the HT bears default nominative case:

- (31) Wetterberichten traue ich keinen mehr.  
 weather forecasts.DAT trust I none.DAT anymore
- (32) Wetterberichte, ich traue keinen mehr.  
 weather forecasts.NOM I trust none.DAT anymore  
 ‘As for weather forecasts, I don’t trust them anymore.’

Hanging topics, unlike TOP in ST, show no connectivity effects with the matrix (Frey 2004;

Grewendorf 2008) and are thus plausibly analyzed as base-generated outside the clause. Clearly, then, no such base-generation analysis is tenable for ST.

### 2.5. A TOP–REM asymmetry

Having established the structural autonomy of TOP and REM as well as the presence of an A-bar dependency in ST, let us now take a closer look at a peculiar constraint on the construction not explicitly discussed so far. As originally noted by Fanselow (1988), there is a robust asymmetry between TOP and REM: the former, but not the latter, is always a bare, property-denoting NP. Thus we find the following contrasts:

- (33) a. Ein neues Auto kann ich mir leider kein richtig schickes leisten.  
a new car can I me unfortunately no really fancy afford  
'As for a new car, unfortunately I can't afford a fancy one.'
- b. \*Das Auto kann ich mir nur das neue von BMW leisten.  
the car can I me only the new by BMW afford  
\*'As for the new car, I can only afford the new one by BMW.'
- (34) a. Raubvögel hat er gestern drei Bussarde gesehen.  
birds of prey has he yesterday three buzzards seen  
'As for birds of prey, yesterday he saw three buzzards.'
- b. \*Drei Raubvögel hat er gestern Bussarde gesehen.  
three birds of prey has he yesterday buzzards seen  
\*'As for three birds of prey, yesterday he saw buzzards.'

Note that DPs like *das Auto* and *drei Raubvögel* freely undergo non-split topicalization, showing that the constraint is specific to ST.

If TOP is a property expression, we expect it to exhibit no 'referential' qualities whatsoever. That this prediction is indeed borne out is shown by the fact that in an ST construction, only REM can be resumed by a pronoun in subsequent discourse. To demonstrate this, we need to consider cases in which TOP and REM mismatch in number, which allow for unambiguous identification of the pronoun's antecedent. What we find is the expected result:<sup>12</sup>

- (35) Reptilien<sub>k</sub> hatten sie nur eine Schlange<sub>i</sub>. { \*Sie<sub>k</sub> waren / Sie<sub>i</sub> war } im Terrarium.  
reptiles had they only a snake they were it was in the terrarium  
'As for reptiles, they only had a snake. \*They were/ She was in the terrarium.'

Let us adopt, then, the following descriptive generalization:

- (36) TOP–REM Asymmetry

<sup>12</sup>Notice how (35) differs from non-split (i), showing that the topic has different properties in each case.

- (i) Reptilien<sub>i</sub> hatten sie. Sie<sub>i</sub> waren im Terrarium.  
reptiles had they they were in the terrarium  
'They did have reptiles. They were in the terrarium.'

TOP is a property-denoting bare NP; REM is a full DP.

We are now in a position to combine the various pieces of the puzzle that is ST into a coherent whole. In order to do this, so I will suggest in the following section, it is necessary to approach the problem from the perspective of non-phrase-structural, Merge-based grammar.

### 3. Local instability

The discussion in the preceding section established that appearances are deceptive: ST does *not* produce discontinuous noun phrases; rather, it relates two autonomously generated noun-phrase constituents by movement—one of them a predicate, the other one a term.

The two immediate questions that arise now are, a) where does the TOP constituent originate?, and b) why does it necessarily surface *ex situ*?

#### 3.1. Merge and (a)symmetry

In the traditional conception of grammatical architecture, base rules determine the form of phrase markers to which transformations apply.<sup>13</sup> The model in Chomsky (1965), for instance, assumed a categorial component that comprised rewrite rules such as ‘VP → V NP’. For familiar reasons, the categorial component was dramatically simplified in later versions: according to X-bar Theory (Chomsky 1970; Jackendoff 1977), all rewrite rules follow the by-now standard schema in (37):

- (37) a.  $XP \rightarrow \dots \bar{X} \dots$   
 b.  $\bar{X} \rightarrow \dots \bar{X} \dots$   
 c.  $\bar{X} \rightarrow \dots X \dots$

By adopting the stipulated schema in (37), rewrite rules necessarily produced hierarchy ( $XP > \bar{X} > X^0$ ), precedence (order of heads and complements/specifiers), and projection/headedness ( $X^0$  ‘projects’ XP, via the recursive bar-level).

More recently, Chomsky (2000 *et seq.*) has argued that phrase-structure grammar ought to be abandoned and replaced by the computationally primitive operation *Merge*, which combines two syntactic objects into a binary set. Applying recursively and to both objects drawn from the lexicon and objects already in the work space, Merge yields hierarchical structure and transformations. In short:

- (38) Merge(X, Y) = {X, Y}  
 a. X, Y distinct: *External Merge, EM*  
 b. X, Y non-distinct: *Internal Merge, IM*

While Merge implies hierarchy, its outputs are linearly unordered sets; Chomsky’s assumption is that linear order arises only in the mapping to the phonetic interface. Assuming this to be

<sup>13</sup>See Lasnik (2000) and Carnie (2010) for historical overviews of the development of phrase structure.

correct,<sup>14</sup> this leaves us with the question of headedness. Plainly, sets do not have heads; hence a set, say, {V, DP}, by itself is no more a VP than it is a DP (or anything else). However, Chomsky argues that this piece of information about a syntactic object should still be recoverable in some natural way from a given set:

‘If an element Z (lexical or constructed) enters into further computations, then some information about it is relevant to this option [...]. The optimal assumption is that this information is provided by a designated minimal element of Z, a lexical item W (Z itself, if it is an LI), which is detectable by a simple algorithm; the *label* of Z [...]. The label W of Z enters into EM in selection in various ways as well as into interpretation of Z.’  
(Chomsky 2007:8f.)

Assuming, then, that we want to know the category of an object formed by Merge,<sup>15</sup> how can the label of such a set be determined in a principled and non-stipulative way? Chomsky’s suggestion is that labeling is a simple effect of the notion of *Minimal Search*, i.e. that the head of a set can be detected by merely ‘looking at’ the two Merge mates while not probing into their internal structure. According to (39), if this Minimal Search procedure yields a lexical item (LI), that element will be the designated label (category) of the overall object:

- (39) *Labeling by Minimal Search* (adapted from Chomsky 2008)  
For any syntactic object  $K = \{\alpha, \beta\}$ ,  $\alpha$  is the label if  $\alpha$  is an LI and  $\beta$  is an XP.

Thus, Merge(X, YP) yields {X, YP}, which is XP according to (39)—the correct result, in many cases. As originally observed by Moro (2000) (elaborating on remarks in Chomsky 1995:337), the interesting question is what happens when Merge produces an object for which (39) cannot detect a head, i.e. an object that contains either two LIs or two non-LIs. Let us set aside the former case here<sup>16</sup> and focus on the latter. Following the general spirit of Moro (2000, 2007) and Chomsky (2011), I assume that whenever Merge combines two complex objects (non-LIs), the resulting configuration is *locally unstable*:

- (40) Merge(XP, YP) = {XP, YP} = ?

The set {XP, YP} cannot be identified as a constituent of some category X or Y, as it does not exhibit the structural asymmetry required for Minimal Search to detect its head. Being unlabeled, {XP, YP} is unable to enter into local interpretive relations, such as selection. Again following Moro and Chomsky, I assume that IM of either XP or YP renders the original object asymmetric in the required sense:

- (41) YP ... {XP, ⟨YP⟩} = XP

<sup>14</sup>See Kayne (2010) for objections, and Zwart (2011) for an alternative, asymmetric definition of Merge.

<sup>15</sup>This is certainly true for the arguments and adjuncts under consideration here: in order to be locally composed with their predicates and hosts, respectively, such categories require a label. The necessity for a label might not arise for *all* structures, however (as pointed out by Noam Chomsky in class lectures, fall 2011): those structures that do not enter into any further computation, such as root CP, may not be identified by a label at all. I will leave an exploration of these issues to future work, since matters seem reasonably clear for the cases discussed here.

<sup>16</sup>See Yang (1999); Moro (2000) and Barrie (2005) for some relevant discussion.

To see why this is so, consider what it means for YP to undergo IM. While IM does not manipulate the original object {XP, YP}, it does yield a configuration in which YP occupies two positions; more specifically, YP after IM is a set (chain) containing two occurrences, one within the original set {XP, YP}, and another one outside of it. This implies that after movement, discontinuous YP is no longer properly contained in the original set, since it now only contains one of YP's occurrences (but not YP, a chain, as a whole). This leaves XP (strictly speaking, X) as the only remaining object properly contained in the original set, which is consequently labeled by XP (X).<sup>17</sup>

### 3.2. Predication and symmetry-breaking movement

Returning now to the question mentioned above, *viz.* Where does TOP originate?, I will suggest that its is a predicate of REM in underlying structure. Structurally, this means that DP and NP are merged directly, as argument and predicate, yielding the structure {DP, NP} (akin to more familiar structure of this kind, in particular {DP, vP}). In graph-theoretic terms:

$$(42) \quad \begin{array}{c} \diagup \quad \diagdown \\ \text{DP} \quad \text{NP} \end{array}$$

I suggest that structures of this type can be generated freely in any argument or adjunct position. This is not a stipulation but the null hypothesis on the assumption that Merge applies freely (Chomsky 2004). The only condition is that structures generated are legible at the interfaces. At the C–I interface, (42) has the straightforward interpretation of a predication, i.e. NP expresses a property of (the individuals denoted by) DP.<sup>18</sup>

The TOP–REM asymmetry described in section 2.5 follows automatically from this proposal: TOP is non-definite and non-quantified simply because it is a predicate. The idea to deduce the TOP–REM asymmetry stated in (36) from TOP's status as a logical predicate is not new; in fact, it goes back to the earliest work on the topic, i.e. Fanselow (1988). However, Fanselow did not assume the structure in (42) but rather analyzed TOP as an adverbial modifier of V. I diverge from this implementation for various reasons; most importantly, because it offers no rationale for the second question mentioned above, *viz.* Why does TOP necessarily surface *ex situ*?<sup>19</sup>

<sup>17</sup>Notice that IM necessarily differs in repeated EM of an LI in this way, rendering objects in the workspace discontinuous. The net result is equivalent to a stipulation that traces 'do not count' for purposes of labeling, but follows for the principled reasons given above from the copy theory of movement assumed here. The implementation proposed here also avoids the conceptual problems pointed out by Boeckx (2008:81).

<sup>18</sup>I am assuming here the standard view of predicative noun phrases as containing some kind of 'open position' (see Higginbotham 1987; Holmberg 1993), which is saturated by D when a DP is constructed from NP. In the cases discussed here, the same saturation takes place, but by DP, not D.

<sup>19</sup>To provide for a base position for TOP while avoiding a theta-theoretic conflict, Fanselow (1988) proposes to analyze TOP as an adjunct to V, i.e. and underlying adverbial modifier. While recognizing the structural autonomy of TOP and REM, this analysis predicts neither case agreement nor obligatory fronting of TOP, two core properties of ST. Furthermore, it is shown in Ott (2011) does not behave like an adjunct syntactically, in particular with regard to extraction from *wh*-islands.

Note that no theta-theoretic problems arise on the present account, where a single thematic role is assigned to an internally symmetric argument {DP, NP}.

By contrast, the structure in (42) offers a straightforward and principled answer to this question: in light of the reasoning outlined in section 3.1, we expect (42) to be locally unstable: either DP or NP must move in order for the argument/adjunct to be labeled. Assume for the moment that NP (the predicate) must move; we will return to the reason for this below. We now have a principled explanation for the fact that ‘mismatching’ cases of ST have no acceptable counterparts with TOP *in situ* (despite the fact that TOP reconstructs to that position, as shown in section 2.4). Some relevant pairs are repeated below:

- (43) a. Polnische Gänse gekauft hat sie keine.  
 Polish.STRONG geese bought has she none  
 b. \*Sie hat keine polinische Gänse gekauft.
- (44) a. Eine Katze habe ich nur eine ganz kleine gesehen.  
 a cat have I only a very small seen  
 b. \*Ich habe nur eine ganze kleine eine Katze gesehen.
- (45) a. Bücher, die erfolgreich waren, kennt er keine von Maria.  
 books that successful were knows he no by Maria  
 b. \*?Er kennt keine Bücher, die erfolgreich waren, von Maria.
- (46) a. Zeitungen kenne ich nur eine gute.  
 newspapers know I only one good  
 b. \*Ich kenne nur eine gute Zeitungen.
- (47) a. Französische Bücher habe ich noch nie welche gelesen.  
 French books have I so far never any read  
 b. \*Ich habe noch nie welche französische Bücher gelesen.
- (48) a. Seltene Raubvögel hat Jürgen nur ein paar Bussarde gesehen.  
 rare birds of prey has Jürgen only a few buzzards seen  
 b. \*Jürgen hat nur ein paar Bussarde seltene Raubvögel gesehen.

The structure in (42) requires displacement of NP in order to be labeled. If a derivation fails to raise NP, no local sisterhood relation between DP and v/V (or the XP to which (42) is adjoined) is obtained, yielding the deviance of the b-examples in (43)–(48) above.

I will assume, with Chomsky (2000 *et seq.*), that derivations proceed in phases, corresponding to the domains of argument structure (vP) and propositionality (CP). I will also assume that all operations take place at the phase level (Chomsky 2008, 2007). For our discussion here, this means that movement of NP and subsequent detection of labels takes place at the relevant phase level.<sup>20</sup>

Let us assume, then, that the general schema for the derivation of ST of objects and subjects is as follows:

- (49) a. [<sub>VP</sub> ... [<sub>? DP NP</sub>] ...] →  
 b. [<sub>CP</sub> NP<sub>i</sub> ... [<sub>VP</sub> ... [<sub>DP DP t<sub>i</sub></sub>] ... ]]

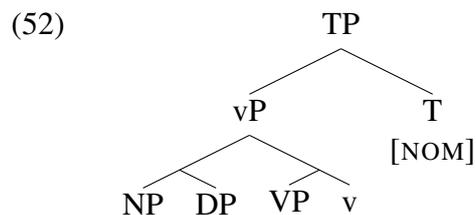
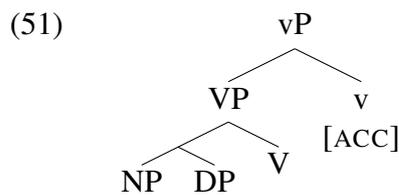
<sup>20</sup>Note that asymmetricizing movement cannot apply immediately after construction of {DP, NP}, yielding {NP, {DP, NP}}, which still ends up label-less. It follows that movement must be anti-local in Abels's (2003) sense, applying at the phase level.

If the {DP, NP} structure to be split up originates in internal-argument or VP-internal adjunct position, the derivation involves an additional, intermediate movement step through the vP edge:

(50) [CP NP<sub>i</sub> ... [vP t'<sub>i</sub> [vP ... [DP DP t<sub>i</sub>] ... ]]

ST is thus the syntactic solution to a paradox: to be predicated of DP, NP must locally merge to it; but syntactically, this configuration is unstable and must be asymmetricized by movement, explaining the ban on *in situ* TOPs.<sup>21</sup>

Moreover, case agreement of TOP and REM is also expected given (49), assuming that *Multiple Agree* (Hiraiwa 2001, 2005) or some equivalent mechanism allows for simultaneous agreement of v or C/T with both DP and NP.<sup>22</sup> Schematically:



(53) *Multiple Agree* (Hiraiwa 2001)

Multiple Agree with a single probe is a single simultaneous syntactic operation; Agree applies to all the matched goals at the same derivational point *derivationally simultaneously*.

Notice that some such mechanism is independently required for case assignment to conjuncts in coordinate structures, hence no extra machinery must be invoked.

Finally, let us see how the theory presented here explains ST's circumvention of standard constraints on subextraction, as shown in section 2.1. The question, from the present perspective, is why the structure in (42) allows for extraction of NP (or DP, see below) irrespective of the position in which it is merged, whereas a DP in the same position can be a barrier for material it dominates.

I suggest that this question has a straightforward answer: the predication structure in (42) can never act as a barrier, for the simple reason that it is not a labeled constituent when extraction takes place (recall that it can only be labeled *after* being asymmetricized by movement). Let us assume the simple descriptive statement in (54), setting aside the deeper question of what exactly it is that accounts for the barrierhood of certain constituents.

(54) In a syntactic object [ZP ... XP ... ], ZP can be a barrier for extraction of XP.

<sup>21</sup> By extension, the same should be true for other {XP, YP} structures, as partly explored by Chomsky (2011). Chomsky suggests that some of the obligatory-VP-externalization effects described in Alexiadou & Anagnostopoulou (2001) might follow from symmetry-breaking movement, however German appears to be particularly problematic in this regard (cf. Wurmbrand 2006). As also suggested by Chomsky, successive-cyclic movement creates locally unstable {XP, YP} configurations in intermediate positions, forcing the moving element to raise further (see Blümel 2011 on this idea). An investigation of these important issues is left to future research.

<sup>22</sup>I leave open here the unresolved issue of how case is assigned to adjuncts. Note, however, that on the present approach TOP and REM always originate in the same structural 'slot', which presumably predicts case agreement irrespectively of which theory of case-assignment to adjuncts will eventually be found to be correct.

Evidently, the unlabeled {DP, NP} structure argued here to underlie ST, falls outside of the scope of (54). When symmetry-breaking movement takes place, there is no label (corresponding to ‘ZP’ in (54)) that could impose barrierhood. Therefore, {DP, NP} can be asymmetricized by movement regardless of the position in which it is generated.<sup>23</sup>

### 3.3. Movement and frame-setting

We now have a principled reason for the obligatory syntactic separation of TOP and REM in ST constructions: they originate in a locally unstable predication structure that requires movement at the phase level. So far, the discussion has simply presupposed that it is NP, rather than DP, that moves. This does not follow, however, from the instability of the configuration: movement of *either* NP *or* DP ought to resolve the problematic symmetry. Two questions arise at this point, then: a) what forces movement of NP in the case considered so far?, and b) is movement of DP ever detectable?

#### 3.3.1. ST and topic–comment structure

Concerning the first question, I suggest that movement of NP is enforced by pragmatic considerations pertaining to topic–comment structure. To see this, let us first recapitulate the relevant facts. Extraction of NP from {DP, NP} yields a standard ST configuration:

- (55) a. Nagetiere hat Peter nur zwei Eichhörnchen gesehen.  
 rodents has Peter only two squirrels seen  
 ‘As for rodents, Peter only saw two squirrels.’  
 b. Gute Zeitungen kennt Fabian nur eine aus Berlin.  
 good newspapers knows Fabian only one from Berlin  
 ‘As for good newspapers, Fabian knows only one from Berlin.’

By contrast, fronting of DP yields strong deviance:

- (56) a. \*Zwei Eichhörnchen hat Peter nur Nagetiere gesehen.  
 two squirrels has Peter only rodents seen  
 \*‘As for two squirrels, Peter only saw rodents.’  
 b. \*Eine aus Berlin kennt Fabian nur gute Zeitungen.  
 one from Berlin knows Fabian only good newspapers  
 \*‘As for one from Berlin, Fabian only knows good newspapers.’

To see how the contrast between (55) and (56) follows from general pragmatic constraints, consider the role of the fronted NP in (55). As a fronted predicate, it acts as a frame-setting

<sup>23</sup>We thus derive Fanselow & Ćavar’s generalization:

‘A movement barrier  $\Sigma$  does not block the formation of a split XP if and only if  $\Sigma$  itself is the barrier to be split up.’ (Fanselow & Ćavar 2002:82)

expression (in the sense of Jacobs 2001) when fronted.<sup>24</sup> That is, it introduces a conceptual frame relative to which the following proposition is interpreted. In other words, by introducing the set of individuals of which this property holds, a fronted predicate restricts the interpretation of the following comment (see Jacobs 2001 for discussion).

One way of making the frame-setting role of NP transparent is by comparing a case of ST like (55a) to its hanging-topic (HT) counterpart (*as for X*). We find that both cases are pragmatically equivalent, with an interpretation of the comment relative to the topic *Nagetiere* ‘rodents’. Notice that the case in (58b), which lacks the frame-setter, is non-equivalent both pragmatically and truth-conditionally:

- (57) Nagetiere hat Peter nur zwei Eichhörnchen gesehen.  
rodents has Peter only two squirrels seen
- (58) a.  $\equiv$  Was Nagetiere angeht, Peter hat nur zwei Eichhörnchen gesehen.  
as for rodents Peter has only two squirrels seen  
‘As for rodents, Peter only saw two squirrels.’  
b.  $\neq$  Peter hat nur zwei Eichhörnchen gesehen.  
Peter has only two squirrels seen  
‘Peter only saw two squirrels.’

Turning now to (56a), repeated in (59a), we find that its free-topic counterpart in (59b) is equally deviant.<sup>25</sup> This shows that fronting of DP yields no coherent topic–comment organization.

- (59) a. \*Zwei Eichhörnchen hat Peter nur Nagetiere gesehen.  
two squirrels has Peter only rodents seen  
b.  $\equiv$  \*Was zwei Eichhörnchen angeht, Peter hat nur Nagetiere gesehen.  
as for two squirrels Peter has only rodents seen  
‘As for two squirrels, Peter only saw rodents.’

Note that the free-topic construction in (59b) does not involve any movement; the topical XP is base-generated outside the clause (as brought out by the absence of connectivity). The fact that it patterns with (59a) in acceptability shows that the unacceptability of the latter need not be accounted for by reference to any syntactic constraint, restricting the movement; rather, it is the pragmatic import of the output structure that accounts for the deviance of DP-fronting in ST.

The parallel (un-)acceptability of ST constructions and their free-topic counterparts, which holds generally, thus transparently shows that discourse properties of the expressions resulting from movement of NP or DP alone suffice to constrain this movement. No syntactic constraints need to be stipulated; we can assume that symmetry-breaking movement applies freely, constrained only indirectly by pragmatic factors governing topic–comment organization more

<sup>24</sup>Jacobs’s definition of frame-setting is as follows:

- (i) *Frame-setting*  
In (*X Y*), *X* is the *frame* for *Y* iff *X* specifies a domain of (possible) reality to which the proposition expressed by *Y* is restricted. (Jacobs 2001:656)

<sup>25</sup>Compare also the English translations in (55) vs. (56), illustrating the same point.

generally.

### 3.3.2. Frame-setting and predication—redundant or complementary?

The present analysis assigns NP a dual role in interpretation: predicate and frame-setter. It directly reflects what Chomsky (2008, 2007) calls the ‘duality of semantics’ (thematic vs. discourse-related aspects of interpretation), implemented by EM and IM, respectively.

Given that TOP in ST constructions acts as a frame-setter, one might question the necessity of my assumption concerning its ‘deep-semantic’ role, i.e. its role as a logical predicate to DP/REM in underlying structure. Could it be that the TOP–REM asymmetry as described in section 2.5 is simply the result of the requirement that one noun phrase be a frame-setter for the other? And could frame-setting be the only relevant interpretive relation between TOP and REM, rather than the underlying predication postulated here?<sup>26</sup>

It can be shown that such an alternative scenario is too weak, and that NP/TOP indeed enters into the interpretation of ST constructions in the dual way predicted by the present approach. To see this, consider the following example, adapted from Nolda (2007).

- (60) a. \*Bergsteiger kennt Lilli nur Schauermärchen.  
           mountaineers knows Lilli only horror stories  
       b. Was Bergsteiger angeht, Lilli kennt nur Schauermärchen.  
           as for mountaineers      Lilli knows only horror stories  
           ‘As for mountaineers, Lilli only knows horror stories.’

Here, we have a mismatch in acceptability between the ST construction in (60a) and its HT counterpart in (60b). If the only requirement on ST constructions was that TOP be an appropriate frame-setter for the comment, the unacceptability of (60a) would be unexpected, given that (60b) shows that *Bergsteiger* ‘mountaineers’ properly establishes an interpretive frame for the comment involving *Schauermärchen* ‘horror stories’. But once the deep-semantic role of TOP in ST constructions as proposed here is taken into account, the discrepancy follows: (60a) is deviant simply because it would require an underlying structure in which the property MOUNTAINEER is predicated of *horror stories*, which is clearly infelicitous. No such illicit predication is involved in the base-generated HT construction in (60b).

### 3.3.3. Movement of DP

Based on a comparison with pragmatically equivalent HT constructions, I have argued in section 3.3.1 above that symmetry-breaking movement is constrained by syntax-external factors only. This makes the prediction that movement of DP (instead of NP) ought to be possible in principle, provided that subsequent operations yield a pragmatically appropriate output configuration.

<sup>26</sup>In the same vein, the anonymous reviewer asks why TOP and REM could “not just [be] two [noun phrases] with some anaphoric relation between them.” Whatever “some anaphoric relation” would be (cf. Puig Waldmüller’s (2006) mysterious notion of ‘pragmatic control’), the facts discussed below clearly bring out a predicative relation.

This prediction is borne out.

The relevant evidence is provided by instances of ST in which TOP is contained in a fronted VP, as illustrated below:<sup>27</sup>

- (61) [<sub>VP</sub> Bücher gelesen] hat Peter erst drei gute  
 books read has Peter only three good  
 ‘As for books, Peter only read three good ones.’

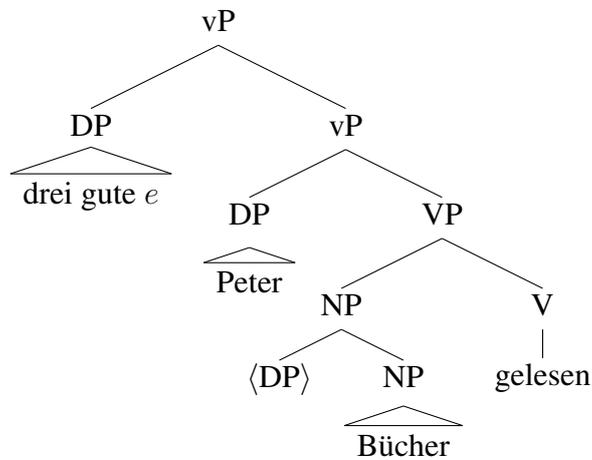
This VP-fronting variety of ST defies analyses in terms of subextraction. If TOP and REM were underlyingly a single constituent, the evacuation movement required to derive (61) would either have to move a non-constituent (the remnant *drei gute*), an option we can exclude, or else apply in two steps (first extracting NP, then raising the remnant [<sub>DP</sub> *drei gute t*]), clearly an *ad hoc* solution.

By contrast, cases like (61) pose no challenge to the present analysis. REM is the elliptical DP *drei gute e*, which is free to raise to the edge of vP at the phase level. If DP were to move on, the result would be a pragmatically ill-formed output (as shown in section 3.3.1). If, however, VP is fronted after evacuation movement of DP, we derive the well-formed topic–comment structure of (61). The derivation is illustrated below:

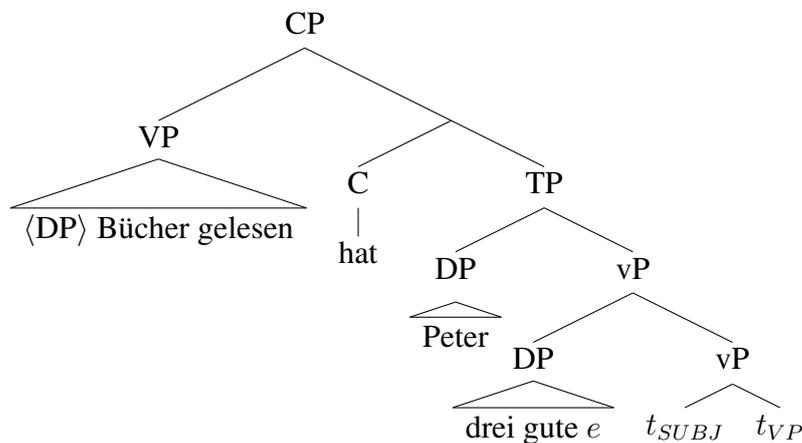
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<sup>27</sup>Since the meaning is very similar to a ‘simple’ ST construction, I use the same English translation.

(62) a.



b.



The fact that the present analysis predicts this type of ST to exist lends strong support to my claim that symmetry-breaking movement applies freely. It just so happens that in the standard cases only fronting of NP yields a proper topic–comment structure (frame-setting), however nothing in principle prevents movement of DP.<sup>28</sup>

#### 4. Conclusion

Split topics have been a long-standing conundrum, and in fact an embarrassment, for syntactic theory. Here I have argued that this crosslinguistically wide-spread phenomenon, which indeed makes very little sense from a traditional perspective invoking notions of phrase-structure gram-

<sup>28</sup>It thus follows that the present analysis ‘overgenerates’ quite massively, in that it allows for DP fronting even when it yields a pragmatically deviant result. I fail to see a problem with this consequence, however. Criticisms based on ‘overgeneration’ are typically based on the assumptions a) that there is a  $\pm$ grammatical distinction and b) that syntax should ‘care about’ (and be able to foresee) the eventual acceptability of an expression. I see no reason to adopt either assumption.

mar, receives a principled explanation when phrase-structural assumptions are dropped in favor of a Merge-based system with labeling. Specifically, I have argued—building on proposals by Moro (2000) and Chomsky (2011)—that such a system requires symmetrical configurations to be asymmetricized at the point where labels are computed, as summarized below:

- (63) *Phase level:*
- a. \*{XP, YP}
  - b. ✓YP ... {XP, ⟨YP⟩}

Note that the proposed local instability of {XP, YP} configurations derives the fact that only a single XP can occupy any given argument (or adjunct) position. In phrase-structural grammars, this seemingly obvious fact must be stipulated; if the reasoning proposed here is correct, it receives a principled explanation in the framework of Merge-based, non-phrase-structural grammar. Furthermore, if thematic roles are assigned configurationally (Hale & Keyser 2002; Chomsky 2004), then (63) effectively derives the Theta Criterion of Chomsky (1981). In other words, we derive why (64a) does not have some coherent interpretation alongside (64b), where the conjoined structure receives a single thematic role:

- (64) a. \*Mary saw Bill Peter.  
b. Mary saw Bill {and/or} Peter.

Displacement is not a panacea for {XP, YP} structures: in situations like (64a) fronting of either *Bill* or *Peter* is of no help, unlike what was argued for the {DP, NP} configurations discussed above. The reason is clear: traces enter into interpretation, and {Bill, Peter} (with either one a ‘reconstructed’ trace) has no coherent interpretation at the semantic interface. By contrast, a {DP, NP} structure does have a coherent interpretation, *viz.* that of a predication.

To conclude, the analysis of ST presented here furnishes evidence in favor of the general idea that grammar tolerates points of symmetry up to the phase level, where symmetry must be broken; Merge operates freely, constrained only indirectly by syntax-external factors. No teleology is implied, only failing derivations, i.e. grammar cannot be ‘crash-proof’, an unproblematic conclusion (cf. Chomsky 2004). It is noteworthy that other recent proposals bar the generation of {XP, YP} structures (esp. Kayne 2010; Narita 2011), but they appear to do so by stipulation. Unless some principled reason is provided for intrinsic constraints on Merge (and hence for the corresponding enrichment of UG), such proposals should be met with skepticism. At the same time, the alternative approach advocated here, while receiving substantial support from the broad empirical domain constituted by ST (see also note 21), awaits fuller elaboration.

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## It's Hebrew clefts that this paper is about

Ilona Spector

In this paper a new analysis is proposed for Modern Hebrew (*ze-*) clefts. Evidence is provided for analyzing clefts as copular sentences containing a maximalizing free relative adjunct with a null head. Thus, the exhaustivity and uniqueness presuppositions of clefts are explained, as they follow from the operation of maximalization in the RC. The RC is argued to have a Raising structure and to be merged in situ, contra extraposing it from subject position. The initial cleft pronoun *ze* is then argued to be a non-expletive subject, while the constituent in focus is the predicate of the copula, and not the head of the relative clause raised to its left periphery.

### *1. Introduction*

#### *1.1. Data*

Cleft sentences have received much attention in the literature since the pioneering work of Jespersen (1927), dealing primarily with English and other European languages in various frameworks. Unfortunately, no attempt has been made to analyze clefts in Semitic languages, including Modern Hebrew, in the generative framework of Chomsky (1981, 1993, 1995). It is this lacuna that this paper intends to fill. Modern Hebrew, unlike other Semitic languages, exhibits two main types of cleft sentences, namely *ze*-clefts and focus-initial clefts, exemplified in (1), (2) respectively:<sup>1</sup>

- (1) *ze* AVIV    *še*        *ohev lir'ot*    *hisardut*.  
it Aviv     that        likes to-see Survivor  
'It's Aviv who/that likes to watch 'Survivor'.'
- (2) AVIV    *hu (ze)* *še*    *ohev lir'ot*    *hisardut*.  
Aviv     is it     that likes to-see Survivor  
'Aviv is the one who/that likes to watch 'Survivor'.'

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<sup>1</sup> As far as I know, other Semitic languages have only focus-initial clefts.



Heggie (1993), Kayne (1994), Rizzi (1997), Kiss (1998, 1999), Ambar (2005), Belletti (2008), *int.al.* According to these approaches, taking into account the differences between them, the initial pronoun and the copula are expletive.<sup>5</sup> The copula takes the rest of the cleft as its predicate, where the focused constituent has raised to the left periphery of the CP and occupies a focus/topic projection. Thus, no extraposition takes place here, but rather the CP is base-generated in situ as a complement to the copula with the focused constituent as the head of the CP. Thus, clefts are derived from their verbal counterparts and their resemblance to specificational copular sentences is accidental. As an example, an analysis of Kiss (1999) is given in (4):

- (4) a. It is EACH OTHER that they trust the most.  
 b.  $[_{IP} it [_I 3SG [_{FP} each\ other_i [_F BE [_{CP} t_i [_C that [_{IP} they [_I [_{VP} trust\ t_i\ the\ most]]]]]]]]]]]$

There are also mixed analyses in the recent literature, which combine certain key elements from both the expletive and the extraposition approaches (Hedberg 2000; Reeve 2010; Frascarelli 2010; Frascarelli and Ramaglia *in press*). For example, Frascarelli and Ramaglia assume that clefts have the form of a SC with the focused constituent as its main predicate, and the CP is a free relative<sup>6</sup>, merged in subject position. The free relative is a definite description headed by either a *pro* or a generic NP of a restricted class ('person', 'thing', etc.), which has been dislocated to the right periphery via IP-inversion. The exact derivation is given in (5):<sup>7</sup>

- (5) a. It is ME that you saw.  
 b.  $[_{FocP} [NP\ ME] [_{FamP} [DP [SC [NP\ PRO] [_{CP} that\ you\ saw]]] [_{IP} it\ is [SC\ t_{it}\ t_{NP}]]]]]$   
      $\wedge$ -----  
 c.  $[_{GP} [IP\ it\ is [SC\ t_{it}\ t_{NP}]] [_{FocP} [NP\ ME] [_{FamP} [DP [SC [NP\ PRO] [_{CP} that\ you\ saw]]] t_{IP}]]]$   
      $\wedge$ -----

My analysis is in the spirit of Frascarelli (2010), Frascarelli and Ramaglia (*in press*), notwithstanding significant differences. In this paper I focus primarily on *ze*-clefts, as in (1). I will present evidence in favor of a non-expletive status of the initial pronoun *ze*. After showing that *ze* is the subject of the copular sentence, I will argue that the XP in focus does not belong to the CP and is in fact a predicate of the SC. The CP, in turn, is argued to be a maximalizing free relative, merged in situ. The presuppositions of clefts, to be presented in the next sections, follow from the maximalizing status of the relative clause (henceforth RC) for free, without assuming the CP to form a constituent (a definite description) with the initial pronoun at any level of representation. This goes against extraposition of the CP from subject position. Subsequently, the analysis of e.g. *ze*-cleft in (1) will receive the derivation (6):<sup>8</sup>

<sup>5</sup> Merged on top of the large CP as 'focus markers', i.e. in order to allow the focalization strategy of the cleft.

<sup>6</sup> On the raising relative clause analysis, the CP is actually a DP relative with CP as a complement of D (cf. Kayne 1994).

<sup>7</sup> Frascarelli and Ramaglia assume the cartographic approach to phrase structure (Rizzi 1997), which posits various functional projections in the left CP periphery, such as GP (Ground Phrase) and FamP (Familiar Topic Projection). They assume that right-hand topics are merged in the left periphery, and their position on the right is derived via 'IP-inversion'. Thus, in (5a), the clefted *ME* moves to Spec FocP and followed, in (5b) by IP raising to Spec GP to derive the right dislocation of the relative clause, which is assumed to be the right hand topic.

<sup>8</sup> A detailed tree is given in ex. (56).

- (6) [IP [IP ze<sub>i</sub> BE [SC t<sub>i</sub> AVIV]][DP [CP pro<sub>k</sub> še [IP t<sub>k</sub> ohev lir'ot hisardut]]]]  
 ze Aviv that likes to-watch Survivor

## 2. Semantic facts

It has been noted in the literature (cf. Rooth 1995; Percus 1997; Kiss 1999; Frascarelli 2010, int. al.) that clefts carry presuppositions. First, there is a presupposition of existence of the element in focus, i.e. the existence of an individual such that Dana saw ((7a) presupposes (7b)), which is preserved under negation and question (8):

- (7) a. ze ET DAN še Dana ra'ata  
 it ACC Dan that Dana saw  
 'It was Dan that Dana saw.'  
 b. Dana saw somebody.
- (8) a. ze LO ET DAN še Dana ra'ata  
 it NEG ACC Dan that Dana saw  
 'It wasn't Dan that Dana saw.'  
 b. ha'im ze ET DAN še Dana ra'ata?  
 Q it ACC Dan that Dana saw  
 'Was it Dan that Dana saw?'

Frascarelli and Ramaglia (in press) also show that no NPIs are licensed in focused position, since they contradict the existence presupposition of clefts:

- (9) a. haim hu haya šam ey pa'am?  
 Q he was there ever?  
 'Was he ever there?'  
 b. \*haim ze EY PA'AM še hu haya šam?  
 Q it ever that he was there  
 'Was it ever that he was there?'

Second, clefts carry presupposition of uniqueness/exhaustivity of the element in focus (Rooth 1995; Percus 1997; Kiss 1999). Thus, clefts are incompatible with adverbs such as *even* and *also* (Rooth 1995) and redundant with *only*.<sup>9</sup> Note that these adverbs are usually compatible with focus, so it must be something about clefts:

- (10) a. It was even/also/only the case that JOHN saw Mary.  
 b. ??it was even/??also/?only the case that it was JOHN who saw Mary.

<sup>9</sup> Edit Doron (p.c.) notes that in modal contexts, *rak* 'only' is perfectly acceptable, although I find it redundant :

- (i) ze rak Dani še haya xayav la'asot ši'urim  
 it only Dani that was obligated to-do homework  
 'It was only Dani who had to do homework.'

- (11) a. *afilu/gam/rak* IM RUTI *dibarti* al *ha-mesiba*  
 even/also/only with Ruti spoke.I about the-party  
 'Even/also/only with Ruti I spoke the party.'  
 b. *ze \*afilu/\*gam/?rak* IM RUTI *še* *dibarti* al *ha-mesiba*  
 it even/also/only with Ruti that spoke.I about the-party  
 'It was even/also/only with Ruti that I spoke about the party.'

The existence and uniqueness presuppositions will follow naturally by the analysis presented in this paper. Namely, I will show that they are derivable from the operation of maximalization in the RC.

Third, it has been noted by Percus (1997) that clefts exhibit certain 'semantic partition effects'. Thus, in structures in which there is an indefinite in subject position (even when it is focused) and an individual level predicate (Kratzer 1995), the interpretation is generic (12). However, this is not the case in clefts (13):

- (12) a. *kabai hu tamid xaxam*  
 fireman.is always intelligent  
 'A fireman is always intelligent.'  
 b. *tamid kabai hu xaxam*  
 always fireman is intelligent  
 'It is always the case that a fireman is intelligent.'  
 c. *KABAI hu tamid xaxam*  
 fireman is always intelligent  
 '[A FIREMAN] is always intelligent.'  
 =  
 d. *kol ha-kabaim xaxamim*  
 all the-firemen intelligent  
 'All the firemen are intelligent.'
- (13) a. *ze tamid KABAI še xaxam*  
 it always fireman that intelligent  
 'It is always [A FIREMAN] who is intelligent.'  
 b. *tamid ze KABAI še xaxam*  
 always it fireman that intelligent  
 'It is always the case that it's [A FIREMAN] who is intelligent.'  
 =/=
- c. *kol ha-kabaim xaxamim*  
 all the-firemen intelligent  
 'All the firemen are intelligent.'  
 ==
- d. *tamid ze še xaxam hu KABAI*  
 always that that intelligent is fireman  
 'It is always the case that the one who is intelligent is [A FIREMAN].'

This is predicted by the analysis proposed in this paper, since it shows that *xaxam* 'intelligent' is not predicated of *kabai* 'fireman', but a predicate in the relative clause which modifies the

null head. In other words, this goes against the claim that *kabai* has raised from the relative clause.

A full analysis of clefts should be able to capture these presuppositions. In the next sections I will show how the analysis proposed here is able to derive these presuppositions by analyzing the relative CP<sup>10</sup> as a maximalizing free relative with a null head.

### 3. The CP of clefts

#### 3.1. Maximalization

As was shown in (1), clefts contain a CP with a gap. In this section I will argue that this CP is best analyzed as a maximalizing relative, following the typology of Grosu and Landman (1998). This analysis enables us to explain the semantic facts outlined in the previous section and to account for the presuppositions of clefts previously assumed to arise from features of the focus (e.g. Kiss 1999), or from the definiteness of the initial pronoun (Percus 1997), by assuming that exhaustivity and uniqueness follow from the properties of the CP itself. This line of analysis is advantageous in that it spares the postulation of a separate FocP projection for clefts, a desired step by Economy of Interpretation (Chomsky 1995).

The typology of restrictive/non-restrictive relative clauses has been extended by Grosu and Landman (1998) to a third type of RC (cf. Bianchi 2002): *Restrictive relatives* are interpreted as intersective modifiers of the nominal head and contribute to determining the restriction of the determiner. *Non-restrictive relatives* modify the whole NP head, not contributing to the restriction. *Maximalizing relatives* do not modify the head; the head is interpreted within the RC, where it provides a degree variable and an operation of maximalization applies at the level of CP:

- (13) The books that there were *e* on the table  
 MAX [ $\lambda d$ .there were [ $d$  many books] on the table]

According to Grosu and Landman, the class of maximalizing relatives includes amount relatives, correlatives, free relatives and internally headed relatives. Although superficially maximalizing relatives look like restrictive relatives, the distinction is semantic; they all are characterized by application of maximalization at the CP level, where the head is interpreted CP-internally and the relative CP denotes the maximal degree or amount that satisfies the property described within the CP. The set of degrees can be turned also to the set of maximal individuals, i.e. maximalization can be applied not only to amounts or degrees.

More specifically, Grosu (2002) argues that in maximalizing RCs, the complementizer bears 3 features: [REL], which is responsible for the CP being a proposition with a free variable which needs to have value from the matrix. [PRED] indicates that the variable needs to be abstracted over, so that the CP will denote a property, and [DEF], which has an import of a definite article, i.e. a uniqueness operator MAX which maps a set to its unique maximal member. As Grosu further claims, the CP itself cannot be a definite description – an individual, since external determiners would be unable to bind into CP because they apply to sets. Thus, he proposes that the CP is not interpreted as an output of MAX, but as a singleton set whose unique member is the output of MAX. i.e. the CP is a singleton predicate (cf. also

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<sup>10</sup> Cf. fn. 3.

Jacobson 1995). Instead of shifting a set into an individual, as the definite article does, [DEF] maps the set into a singleton set, preserving the type input.<sup>11</sup>

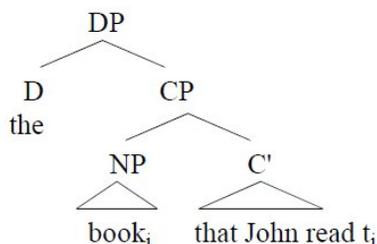
Grosu and Landman (1998) also maintain that if the head is semantically CP-internal, no semantically independent CP-external material is allowed. Maximalization, then, is an operation which allows syntactically CP-external material to occur, while satisfying this constraint. A head NP, a numerical and a definite determiner can be CP-external, since they can be recovered from the CP meaning due to maximalization.

The semantic motivation to analyze the CP of clefts as a maximalizing relative is that semantically, clefts carry presuppositions of uniqueness and exhaustivity of the individual bearing the property of the CP. This straightforwardly follows from the application of maximalization which turns the CP into a singleton set, with unique maximal individual, thus deriving exhaustivity and uniqueness of clefts, without the need in focus projection. Moreover, there is also independent syntactic evidence in favor of the maximalization analysis, which will now be presented.

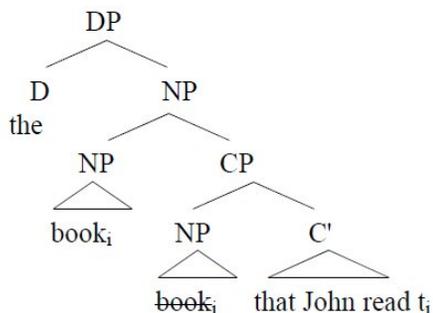
### 3.2. *The CP is a Raising RC*

As Sauerland (2002), Hulsey and Sauerland (2006), show, restrictive relatives can be associated with Matching or Raising<sup>12</sup> structures:

(15) Raising: the head NP is interpreted only in the relative clause internal trace position.



(16) Matching structure: the head NP is interpreted inside and outside of the relative clause:



<sup>11</sup> In other words, the operation of determiner binding of a variable is broken into two steps, one internal and one external to CP.

<sup>12</sup> In the sense of Kayne (1994).

There are several diagnostics to show that a relative has indeed a Raising structure. Restrictive relatives with a Raising structure (17) and clefts (18) exhibit similar behavior in terms of interpretation of the head inside the RC, i.e. ‘connectivity’ phenomena (cf. Akmajian 1970; Higgins 1979, int.al.); namely Principle A, variable binding, scope reconstruction and *de dicto* reading in intensional contexts respectively:

- (17) a. [ha-tmuna šel acmo<sub>i</sub>]<sub>k</sub> še Dani<sub>i</sub> ciyer t<sub>k</sub> maršima meod  
 the-picture of himself that Dani painted impressive very  
 ‘The picture of himself that Dani painted is very impressive.’  
 b. [ha-tmuna šel ima šelo<sub>i</sub>]<sub>k</sub> še kol yeled<sub>i</sub> ciyer t<sub>k</sub> maršima meod  
 the picture of mother his that every boy painted impressive very  
 ‘The picture of his mother that every boy painted is very impressive.’  
 c. dibarti im šney metupalim<sub>i</sub> še kol rofe yivdok t<sub>i</sub> > / >  
 spoke.I with two patients that every doctor will-examine  
 ‘I spoke with two patients that every doctor will examine.’
- (18) a. ze et ha-tmuna šel acmo<sub>i</sub> še hu ciyer t<sub>i</sub>  
 it ACC the-picture of himself that he painted  
 ‘It was the picture of himself that he painted.’  
 b. ze [et ha-yeled šela<sub>i</sub>]<sub>k</sub> še kol ima<sub>i</sub> ohevet t<sub>k</sub>  
 it ACC the-boy her that every mother loves  
 ‘It’s her child that every mother loves.’  
 c. ze xad keren še Ron mexapes *de re / de dicto*  
 it unicorn that Ron searches  
 ‘It’s a unicorn that Ron is looking for.’  
 d. ze haya axbar še kol xatul axial > / >  
 it was mouse that every cat ate  
 ‘It was a mouse that every cat ate.’

However, restrictive relatives do not always allow reconstruction for Condition C. In cases where there is no expected violation of Condition C, the structure of the relative cannot be Raising, but only Matching (Sauerland 2002). Sichel (2011) shows that Hebrew is similar in this respect:

- (19) a. This is the picture of John<sub>i</sub> that he<sub>i</sub> likes.  
 b. zot ha-tmuna šel Dani<sub>i</sub> še hu<sub>i</sub> cilem.  
 this the-picture of Dani that he photographed  
 ‘This is the picture of Dani that he took.’

Thus, the absence of Condition C violation in relatives is a diagnostic for the Matching structure, while relatives which violate Condition C can only have the Raising structure (Hulsey and Sauerland 2006). Notice that clefts do violate Condition C, pointing towards a Raising analysis:

- (20) \*ze et ha-kelev šel Dani<sub>i</sub> še hu<sub>i</sub> ohev  
 it ACC the-dog of Dani that he likes  
 ‘It’s Dani’s dog that he likes.’

I will follow Sichel (2011), who arrives at the generalization that maximalizing Relatives are Raising relatives. This follows from the definition of maximalizing RC as a relative whose head is interpreted inside the CP.

Another diagnostic for a Raising maximalizing RC comes from the distribution of resumptive pronouns. It is known that in Hebrew there exist optional resumptive pronouns and obligatory resumptive pronouns (Doron 1982; Borer 1984; Shlonsky 1992; Bianchi 2004; Sichel 2011). Optional resumptive pronouns alternate with traces and appear in object relativization (21). Obligatory resumptive pronouns appear when the relativization is out of PP (22):

- (21) a. raiti et ha-yeled še/ašer Rina ohevet **oto**  
 saw.I ACC the-boy that Rina loves him  
 b. raiti et ha-yeled še/ašer Rina ohevet  
 saw.I ACC the boy that Rina loves  
 'I saw the boy that Rina loves' (Borer 1984)

- (22) a. raiti et ha-yeled še Rina xolemet al-\*(av)  
 saw.I ACC the-boy that Rina dreams about-him  
 b. raiti et ha-yeled še Rina xolemet  
 saw.I ACC the boy that Rina dreams  
 'I saw the boy that Rina dreams about.'

Bianchi (2004) shows that in Hebrew, optional resumptive pronouns are allowed in restrictive and non-restrictive relatives, but not in maximalizing ones, where the amount/free head is interpreted inside the RC:

- (23) ha-ben dod šeli, še Rina ohevet (oto), haya baxur nexmad. *NRRC*  
 the-cousin my, that Rina loves him was guy nice  
 'My cousin, that Rina loves (him), was a nice guy.'
- (24) ha-iš še Rina ohevet (oto) haya ha-ben dod šeli. *RRC*  
 the-man that Rina loves him was the-cousin my  
 'The man that Rina loves (him) was my cousin.'
- (25) a. ani micta'er al ha-zman še bizbazi (\*oto) *Maximalizing*  
 I sorry about the-time that wasted.I it  
 'I regret the (amount of) time I wasted.'  
 b. samti ba-kis et kol ha-kesef še yaxolti lasim (\*oto)  
 put.I in-the-pocket ACC all the-money that could.I to-put it  
 'I put in my pocket all the (amount of) money that I could.'  
 c. kaniti et ma še rait (\*oto)  
 bought.I ACC what that saw.you it  
 'I bought what you saw.'

Maximalizing RCs allow obligatory resumptive pronouns:

- (26) ata lo yaxol leta'er et ha-mekomot še hu biker \*(bahem)  
 you NEG can imagine ACC the-places that he visited in-them  
 'You can't imagine the (amount of) places that he visited.'  
 (Sichel 2011)

This is exactly what happens in clefts. They allow only obligatory resumptive pronouns:<sup>13</sup>

- (27) a. \*ze DANI še raiti oto /še oto raiti /oto raiti *optional*  
 it Dani that saw.I him/ that him saw.I/ him saw.I  
 b. ze ET DANI<sub>i</sub> še raiti t<sub>i</sub>  
 it ACC Dani that saw.I  
 'It was Dani that I saw.'
- (28) a. ze RUTI še xašavti aley-ha *obligatory*  
 It Ruti that thought.I about-her  
 b. ze AL RUTI še xašavti  
 it about Ruti that thought.I  
 'It was Ruti that I thought about.'

As noted by Sichel (2011), obligatory resumptive pronouns allow reconstruction. This being so, it is unsurprising that they can be found in Raising maximalizing RCs. As shown in (27), (28), clefts show the same distribution of resumptive pronouns, strengthening the maximalization analysis.

Yet another diagnostic for the maximalization analysis of clefts comes from Grosu and Landman (1998), who show that restrictive and non-restrictive relative clauses can be stacked but maximalizing relatives cannot. This is predicted by the singleton status of the CP, since if singletons contain distinct members, their intersection is vacuous:

- (29) a. # The one sailor that there was on the boat that there had been on the island died in the explosion.  
 b. The one sailor who was on the boat who had been on the island died in the explosion.

Clefts cannot stack either:

- (30) \*ze DANA še haya la se'ar blondini še hegi'a la-mesiba  
 It Dana that was to-her hair blond that came to-the-party  
 'It was Dana that had blond hair that came to the party.'

### 3.3. Against extraposition

The evidence presented show that the relative clause of clefts is indeed a Raising maximalizing RC. Now it is important to establish whether it can be reconciled with either the extraposition analyses or the raising analyses, namely, has it been extraposed from subject position or merged in situ. Hulsey and Sauerland (2006), following Fox and Nissenbaum

<sup>13</sup> According to Postal (1994), clefts are associated with a (null) resumptive pronoun at the 'extraction cite', i.e. the position of the gap inside the RC.

(1999), claim that relatives which force the Raising derivation cannot be extraposed, since extraposition blocks reconstruction:

- (31) a. \*I saw the picture of himself<sub>i</sub> yesterday [that John<sub>i</sub> liked *e*].  
 b. \*Mary discovered the book about himself<sub>i</sub> yesterday [that Bob<sub>i</sub> wrote *e*].

Fox and Nissenbaum (1999) show that with extraposed adjuncts there is no Principle C violation, supporting a Matching analysis for RC extraposed adjuncts:

- (32) I gave him<sub>i</sub> [an argument t<sub>k</sub>] yesterday [that supports John's<sub>i</sub> theory]<sub>k</sub> .

However, clefts do obey Principle C, and are assumed to have a Raising structure, as was shown earlier:

- (33) \*ze ha-kelev šelo<sub>k</sub> [še sone et Dani<sub>k</sub>]  
 it the-dog his that hates ACC Dani  
 'It's his dog that hates Dani.'

On these grounds, the extraposition analysis of clefts (cf. section 1), in which the relative clause is extraposed from the subject position to the right periphery, must be rejected. Extraposition is incompatible with the behavior of clefts in terms of principle C and other reconstruction phenomena.

### 3.4. *XP<sub>FOC</sub> and RC is not a constituent*

After establishing the status of the CP of clefts as a maximalizing Raising relative, I will now show that the focus of clefts is not a head risen from the, contra the expletive analyses (cf. section 1). I will argue, following Frascarelli (2000), Frascarelli and Ramaglia (in press) that the focused constituent and the relative clause do not form a constituent, thus the constituent in focus is not the head of the RC. I will further argue that the RC of Hebrew clefts is a free relative with a null head<sup>14</sup>, further supporting Frascarelli and Ramaglia's observations.

There are number of arguments that show the lack of agreement or feature matching between elements inside the relative clause and the constituent in focus. First, the verb inside the relative can agree or, alternatively, have a default 3RD.PRS. agreement with the focused constituent, when the latter is 1ST.PRS. personal pronoun (cf. also Frascarelli and Ramaglia in press):

- (34) a. ze ANI še axalti /axal et ha-orez  
 It 1SGL that ate.1SGL/3SGL.MASC ACC the-rice  
 'It is me who ate the rice.'  
 b. ze ANAXNU še axalnu /axlu et ha-orez  
 it 1PL that ate.1PL /3PL ACC the-rice  
 'It's us who ate the rice.'

<sup>14</sup> I will not discuss here various theories of free relatives.

Also, pronouns and reflexives inside the RC can optionally not agree with the focused constituent, making it implausible to have risen from inside the relative (cf. also Frascarelli 2000):

- (35) a. zot AT še eyn lax/ la sigariyot  
 it.FEM 2.FEM.SGL that NEG to-you/to-her cigarettes  
 ‘It’s you who doesn’t have cigarettes.’  
 b. ze LO ANI še mistakel al acmi/ acmo ba-mar'a  
 it NEG 1SGL that look.SGL.MASC on myself/ himself in-the mirror  
 ‘It’s not me who looks at himself in the mirror.’

Secondly, the relative itself can be elided, while the constituent in focus remains (Frascarelli and Ramaglia in press).<sup>15</sup> Given the Raising structure that I am adopting for the CP of clefts, it is impossible that the head would be separated from the RC when the RC is elided, once again supporting the idea that the element in focus is not the head of the RC:<sup>16</sup>

- (36) A: tagidi, ze haya HURIKAN še paga be-yapan?  
 Say, it was hurricane that hit in-Japan  
 ‘Say, was it a hurricane that hit Japan?’  
 B: lo, ze haya CUNAMI (elided: še paga be-yapan)  
 No, it was tsunami that hit in-Japan  
 ‘No, it was a tsunami (that hit Japan).’

Another argument from Frascarelli and Ramaglia concerns negation. They claim that since the focused XP does not belong to the CP, it is possible to have negation scoping over a focus and negation scoping over the relative-clause verb. Hebrew clefts confirm this observation:

- (37) ze LO HA-YELED HA-ZE še lo medaber ivrit  
 it NEG the-boy the-that that NEG speaks Hebrew  
 ‘It is not that boy who doesn’t speak Hebrew.’

Interestingly, in Hebrew, the focused XP can be of almost any category and also a proper name. This would be an argument against analyzing the CP of clefts as a restrictive relative (as in e.g. Reeve 2010), since it is redundant to further restrict a proper name with this type of relative clause. For now it is implausible to assume that these categories can constitute a head of maximalizing relative clause, especially with clefts whose RC does not involve a gap (e.g. an adverbial in focus):<sup>17</sup>

<sup>15</sup> According to Frascarelli and Ramaglia (in press), the RC receives a low tone and can be elided, confirming that it is a given/presupposed information, i.e. a right-hand Topic.

<sup>16</sup> An anonymous reviewer points out that in German, RCs can undergo ellipsis independently of their head XPs:

(i) A: Hast du einen MANN getroffen der eine Katze hatte?  
 have you a man met that a cat had

B: Nein, eine FRAU (die eine Katze hatte)

No a woman

<sup>17</sup> Although it is possible that clefts involving focused categories other than NP/DP would end up receiving a different analysis.

- (38) a. ze ČARLI še pacu'a kaše ve-lo yod'im ma yeš lo  
 it Charlie that hurt hard and-NEG know what exist to-him  
 'It's Charlie who's severely hurt and it's unknown what's with him.'
- b. ?ze MUŠXETET še ani mesarevet lihyot, aval eyn li beaya im i-musariyut<sup>18</sup>  
 it corrupted that I refuse to-be but NEG to-me problem with immorality  
 'It's corrupted that I refuse to be, although I don't have a problem with immorality.'
- c. ze LE'EXOL XAVITA še raciti ha-boker  
 it to-eat omelet that wanted.I the-morning  
 'It was to eat an omelet that I wanted this morning.'
- d. ze KI BA LI še ani yocet ito  
 it because comes to-me that I go-out with-him  
 'It's because I want to that I date him.'
- e. ze PIT'OM še hu po loveš adom  
 it suddenly that he here wearing red  
 'It's suddenly that he's here wearing red.'
- f. ze ME-HA-RUAX še dom'ot li ha-eynayim  
 it from-the-wind that tear to-me the-eyes  
 'It's from the wind that my eyes tear/water.'

In Hebrew there are clefts with NegP in focus. Once again, it is strange to assume that NegP is the head of a maximalizing relative clause:

- (39) ze LO še raciti lalexet la-mesiba, aval hayiti xayevet.  
 it neg. that wanted.I to-go to-the-party but was.I obligated  
 'It's not that I wanted to go to the party, but I had to.'

Another point comes from the distribution of adverbs. It is possible to realize right-dislocated adverbials between the focused XP and the CP (Frascarelli and Ramaglia in press). On the analysis of a Raising structure for the relative clause of clefts, it is impossible to have an 'interfering' adverbial between the head and the rest of the clause:

- (40) a. ze ANI, ba-sof, še holaxet.  
 it me in-the-end that goes  
 'Eventually it's me who goes.'
- b. ze DANI, be-ecem, še diber im Rina.  
 it Dani in-fact that spoke with Rina  
 'In fact, it was Dani who spoke with Rina.'

To sum up, the evidence presented above forces me to conclude that the head of the CP of clefts has not risen from the relative clause. In the next section I will argue that the head of the RC is a null head of a free relative.

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<sup>18</sup> Although not all speakers accept APs in the focused position of clefts, some APs are much better than others. It seems that stage level predicates are more acceptable than individual level predicates (cf. Kratzer 1995), although other factors might be involved, such as a ban on focusing an AP which is interpreted in a postcopular predicative position of the embedded copular RC. I leave this issue for further research.

## 3.5. The RC of cleft is a free relative

Recall that Grosu and Landman (1998) include free relatives in the class of maximalizing RCs. The relative of clefts has been analyzed before as a free relative (Den Dikken 2006, 2008; Frascarelli 2010, etc.). With the data we have up until now, it is indeed plausible to analyze the RC of cleft as a maximalizing free relative merged in situ, which involves a null head. Independent support for this analysis comes from Hebrew, in which clefts pattern with free relatives<sup>19</sup>, as opposed to restrictives and appositives, in terms of choice of the complementizer:

- (41) a. ha-yeled ha-xamud še/ašer hegia la-hofa'a nehena me'od *RRC*  
 the-boy the-cute that came to-the-show enjoyed very much  
 'The cute boy that came to the party had a great time.'
- b. ha-yeled ha-xamud, še/ašer hegi'a la-hofa'a, nehena me'od *NRRC*  
 the-boy the-cute that came to-the-show enjoyed very much  
 'The cute boy, who came to the party, had a great time.'
- c. mi še/\*ašer hegi'a la-hofa'a nehena me'od *free RC*  
 who that came to-the-party enjoyed very much  
 'The one who/whoever came to the party had a great time.'
- d. ze HA-YELED HA-XAMUD še/\*ašer hegi'a la-hofa'a *cleft*  
 it the-boy the-cute that came to-the-show  
 'It was the cute boy that came to the show.'

Hebrew RRCs and NRRCs may use the complementizer *ašer* instead of *še* in high registers (cf. Borer 1984). However, free relatives may not use *ašer*<sup>20</sup> and nor do clefts.

So far I have shown that the head of the RC is not the focused constituent, but rather a null head. I will follow Frascarelli and Ramaglia's (in press) proposal to treat this null head as *pro*. However, this null head needs to match in features and semantic content to the focused constituent, which can be achieved via co-indexing, following Frascarelli (2000).

<sup>19</sup> Prima facie, the CP of clefts may appear as a complement, since in Hebrew both CP complements and relatives have the complementizer *še* (cf. also Kiss 1999). However, it appears that Hebrew clefts pattern with RCs and not with CP complements in allowing complementizer deletion:

- (i) ha-yalda še / ota raiti *RC*  
 the-girl that her saw.I  
 'The girl (that) I saw.'
- (ii) ani yode'a še / \* hu kan *CP complement*  
 i know that he here  
 'I know that he's here.'
- (iii) ze biglalxa še / hu yošev ba-kele *cleft*  
 it because.you that he sits in-the-prison  
 'It's because of you (that) he is in prison.'

<sup>20</sup> Free relatives also exhibit an overt wh-word *mi* in addition to the complementizer *še*. I am not analyzing *mi-še* as one word in C, as would also be possible.

#### 4. The pronoun *ze* and the relative clause

In this section I will tie up the different parts of the analysis argued for so far and present a complete picture of *ze*-clefts. I will argue that the relative clause is an adjunct and not a complement of the copula, as confirmed by the thematic status of the pronoun *ze* and extraction. Thus, the analysis that emerges will include *ze* and the focused XP as a copular sentence with *ze* as the subject and the focused constituent as the predicate, with a free relative maximalizing adjunct merged in situ.

After reaching the conclusion that the CP of clefts is a maximalizing free relative, the question that remains is the attachment site of this CP/DP. There are two options: i) The relative clause is an argument of the copula, extraposed from subject position. Since the copula must take two semantic arguments, one of them is the relative clause and the other is the constituent in focus, the pronoun *ze* must be expletive. ii) The RC is an adjunct, while the arguments of the copula are the pronoun *ze* and the constituent in focus. On this analysis, *ze* is not expletive, but thematic or referential. The RC, in turn, is an adjunct to the pronoun *ze*, extraposed to the right, or an adjunct to the whole matrix clause *ze XP<sub>FOC</sub>*, adjoined in situ. I will argue for the latter option, in which the pronoun *ze* is not expletive and the RC is an adjunct. Furthermore, relying on what I have already shown, I will argue that the RC cannot be the adjunct to the pronoun *ze*, since extraposition and Raising RCs cannot go hand in hand (cf. section 3.3).

##### 4.1. The RC is an adjunct

First, the CP of clefts is an adjunct and not a complement of the copula, as confirmed by extraction (cf. also Reeve 2010). If the CP is a relative adjunct, it is a strong island for argument and adjunct extraction. If the CP is a complement, it is a weak island, permitting argument but not adjunct extraction:

- (42) a. \**eyze maške<sub>i</sub> ze haya DANI [še kana t<sub>i</sub>]* ?  
       which drink it was Dani that bought  
       ‘Which drink it was Dani who bought?’  
       b. \**eyx ze haya DANI<sub>i</sub> [še kana et ha-maške t<sub>i</sub>]*?  
       how it was Dani that bought ACC the-drink  
       ‘How was it Dani that bought the drink?’

Moreover, if the RC is an adjunct, then the initial pronoun is not an expletive, otherwise it would violate the  $\theta$ -criterion. I will now provide evidence for the non-expletive status of the pronoun *ze*, as well as arguments in favor of *ze* being a subject and not a copula or the predicate in clefts.

##### 4.2. The pronoun *ze* is not expletive

First, the pronoun of clefts alternates with demonstratives and does not pattern with expletives of raising verbs in English and other European languages (Hedberg 2000; Reeve 2010):

- (43) a. *it/this/that* was John that I saw.  
 b. *it/\*this/\*that* seems to me that you're wrong.
- (44) a. *c'est/\*il* jean que j'ai vu<sup>21</sup>  
 this/it is John that I have seen  
 'It's John that I saw.'  
 b. *il/?ce/??cela* me semble que tu as tort  
 it/this to.me seems that you have wrong  
 'It seems to me that you're wrong.'
- (45) a. *ze* ET DANI še raiti  
 it ACC Dani that saw.I  
 'It was Dani that I saw.'  
 b. (*\*ze*) *nir'a* li še ata to'e.  
 it seems to-me that you mistaken.  
 'It seems to me that you're wrong'.<sup>22</sup>

Second, the cleft pronoun can be a controller of PRO (Reeve 2010):

- (46) a. *It<sub>i</sub>* was THE FURNITURE that annoyed John on Sunday [despite PRO<sub>i</sub> being the décor the day before].  
 b. On Sunday, [what annoyed John]<sub>i</sub> was THE FURNITURE [despite PRO<sub>i</sub> being the décor the day before].
- (47) a. *ze* DANI<sub>i</sub> še halax iti la-mesiba [kedey PRO<sub>i</sub> lehoci le-kol ha-banot et ha-eynayim].  
 'It was Dani who went to the party with me to make all the girls jealous'.  
 Dani makes all the girls jealous.  
 b. *ze<sub>i</sub>* DANI (še halax iti la-mesiba)<sub>i</sub> [kedey PRO<sub>i</sub> lehoci le-kol ha-banot et ha-eynayim].  
 'It was Dani who went to the party with me (and by doing that) to make all the girls jealous'.  
 Dani's going to the party makes all the girls jealous.

One of the readings of (47) is (47b), an instance of semantic event control (Williams 1994), in which the event denoted by the RC *še halax iti la-mesiba*, namely the fact of Dani's going to the party with me, is the reason for the girls being jealous, i.e. it seems that the RC adjunct controls the purpose clause. However, the adjunct RC of clefts cannot be the controller of the purpose clause adjunct, following Landau (2009) in that only arguments can control into adjuncts. Thus, one possibility is to claim that the RC of clefts is a complement and thus it can control the purpose clause adjunct. However, I have already shown that the RC of clefts is not a complement but an adjunct. Since *ze* is the argument of the SC [*ze Dani*], and by elimination, the controller of the purpose clause on this reading is *ze*.

<sup>21</sup> It has already been claimed that *cela* is referential and *il* is expletive (cf. Kayne 1983; Pollock 1981,1982; Jaeggli 1981).

<sup>22</sup> Although Hebrew has raising predicates which are compatible with *ze*. It may be the case that Hebrew has expletive *ze* in these cases, but uses a different, homophonous *ze* with clefts and demonstratives. This should not come as a surprise, since it is known that Hebrew has various different copular and pronominal uses of *ze* (cf. Sichel 1997).

In addition, *ze* inflects for gender and number, an unexplained fact on the expletive analysis:

- (48) a. **ze**                    DANI    še   hegi'a            la-mesiba  
           it.MASC.SGL    Dani    that arrived.MASC   at-the-party  
           'It was Dani who arrived at the party.'  
       b. **ze/zo(t)**                RINA    še   hegi'a            la-mesiba  
           it.MASC/FEM.SGL   Rina    that arrived.FEM   at-the-party  
           'It was Rina who arrived at the party.'  
       c. **ze/ele**                    DANI VE-DINA    še   hegi'u            la-mesiba  
           it.MASC.SGL/PL    Dani and Dina    that arrived.PL   at-the-party  
           'It was Dani and Dina who arrived at the party.'

However, from the fact that *ze* inflects (48), it may follow that *ze* is a copula PronZ (Sichel 1997), a pronominal copula which appears in predicate nominal sentences and is homophonous to the *ze* pronoun of clefts:

- (49) a. rina **zot**    giveret kohen  
           Rina PronZ mrs.    Cohen  
           'Rina is Mrs.Cohen.'  
       b. dani **ze**    mar kohen  
           Dani PronZ mr.    Cohen  
           'Dani is Mr.Cohen.'

Since Hebrew is a pro-drop language, it is possible to claim that the subject of clefts is an expletive pro while the pronoun *ze* is the copula. I will argue that *ze* is not the copula but the subject, based on subject properties that *ze* exhibits.

#### 4.3. The pronoun *ze* is not a copula

First consider the fact that *ze* appears in raised positions (Hazout 1994):

- (50) a. ze<sub>i</sub> carix            lihyot t<sub>i</sub> DANI še    halax la-makolet  
           it should    be            Dani that went    to-the-grocery-store  
       b. \*DANI<sub>i</sub> carix            lihyot t<sub>i</sub> še    halax la-makolet  
           Dani    should    be            that went    to-the-grocery-store  
       c. \*pro carix            lihyot DANI    še    halax la-makolet  
           should be    Dani    that went    to-the-grocery-store  
           'It must have been Dani that went to the grocery store.'

Moreover, *ze* exhibits subject-like behavior with respect to coordination. It is known that in coordination, only subjects can be elided, and this is what we see in clefts:

- (51) ze DANI še    ra'a seret ve \_\_ YOSI    še    sixek    ba-maxšev  
           it Dani that    saw movie and    Yossi that    played in-the-computer  
           'It was Dani who saw a movie and Yossi who played computer games.'

In addition, Hebrew has a second type of pronominal copula, namely PronH. The nature of PronZ and PronH has been extensively discussed in the literature (Doron 1983, 1986; Rapoport 1987; Rothstein 1995; Sichel 1997; Heller 2002; Falk 2004; Greenberg 2008). Both pronominal copulas are restricted to copular sentences in the present tense, while in future and past tenses Hebrew uses the verbal copula *h.y.y.* Naturally, the two (pronominal) copulas cannot appear in the same sentence together.<sup>23</sup> Thus, if *ze* is a PronZ copula in clefts, it should be mutually exclusive with PronH copula in the present and with the verbal copula *h.y.y.* in the past/future. However, *ze* does appear with PronH or with *h.y.y.*, making it implausible to be a copula PronZ:

- (52) a. *ze hu DANI še ba*  
       it/PronZ PronH Dani that came  
       b. *ze haya DANI še ba*  
       it/PronZ BE.PAST Dani that came  
       ‘It was Dani who came.’

Another argument comes from what has been known as Copula-Predicate Inversion in Hebrew (Borer 1995). The predicate can invert with past tense copula in extraposition contexts. If we assume that *ze* is a PronZ copula and the constituent in focus is the predicate in clefts, we would expect the same type of inversion. However, this is not so:

- (53) a. *barur haya /haya barur še Itamar yeaxer* *Copula-Predicate Inversion*  
       clear was/ was clear that Itamar will.be.late  
       ‘It was clear that Itamar will be late.’  
       b. *ze DANI/\*DANI ze še ba la-mesiba* *cleft*  
       it Dani/ Dani it that came to-the-party  
       ‘It was Dani who came to the party.’

In the context of Triggered Inversion, the subject can invert with the past tense *h.y.y.* copula in a presence of an adverbial trigger (Borer 1995; Shlonsky and Doron 1992). The same happens in past tense clefts, where *ze* inverts with the copula:

- (54) *ba-avar ha-raxok, Dani haya/haya Dani metapel be-axoto.*  
       in-the-past the-distant, Dani was/was Dani taking-care in-sister.his  
       ‘In the distant past, Dani was taking care of his sister.’
- (55) *ba-avar ha-raxok, ze haya/haya ze DANI še tipel ba-xatulim*  
       in –the-past the-distant, it was/was it Dani that took-care in-the-cats  
       ‘In the distant past, it was Dani who took care of the cats.’

<sup>23</sup> As for apparent violations of this generalization, where *ze* and *hu* do appear together in nominal sentences, Doron (1986) analyzes *ze+hu* as *ze* being the subject and *hu* as a pronominal copular clitic:

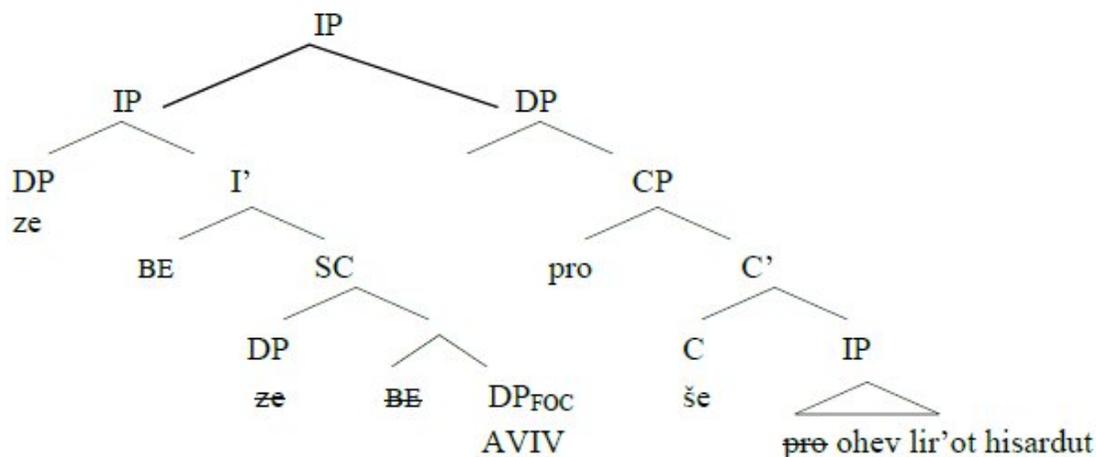
(i) *zehu Dani*  
       ‘This is Dani.’

4.4. *Tying up the parts*

The arguments presented above argue for analyzing the initial pronoun *ze* of clefts as a thematic subject. From this follows that semantically, *ze* and the constituent in focus<sup>24</sup> are arguments of the copula BE, which, in Hebrew, is phonologically null in clefts and other copular sentences in the present tense. After establishing this fact, what is left is to establish how this matrix copular sentence is connected with the relative clause.

As already mentioned, if the RC is indeed an adjunct, it can be an adjunct to the pronoun *ze*, forming together a definite description and then extraposed to the right (Percus 1997), or it can be an IP-level adjunct<sup>25</sup> merged in situ. As argued by Fox and Nissenbaum (1999), Chomsky (2001), adjuncts do not extrapose but Late-Merged in situ. Moreover, following Sauerland (2002, Hulsey and Sauerland 2006), Raising relatives are incompatible with extraposition (cf. section 3). Since I have established that the RC of clefts is indeed a Raising relative, I will reject the possibility of its extraposition. The only option left is to claim that the RC is indeed an adjunct, however not to the pronoun *ze* but rather to the whole matrix sentence, as an in-situ merged predicate relative. Thus, a cleft as in (56a) would have the structure as in (56b):

- (56) a. *ze AVIV še ohev lir'ot hisardut.*  
 it Aviv that likes to-see Survivor  
 'It's Aviv [(the one) that likes to watch 'Survivor'].'  
 b.



5. *Conclusion*

In this paper I have argued that *ze*-cleft constructions in Hebrew involve a maximalizing Raising free relative. Maximalization operation creates a unique singleton set, which is

<sup>24</sup> I have not presented arguments for the constituent in focus being a predicate of the copula, since, by elimination, after establishing that the pronoun *ze* is the subject and the RC is an adjunct, the constituent in focus must be the predicate. For additional arguments for the predicative status of the focused DP, see Frascarelli (2010).

<sup>25</sup> Cf. Baltin (2006).

responsible for the exhaustivity and uniqueness presuppositions of clefts,<sup>26</sup> without postulating a dedicated Focus projection. I have also argued against the extraposition analysis of the relative clause, claiming it to be an adjunct merged in situ. In addition, I provided evidence against the expletive analysis of the initial cleft pronoun *ze*. Thus, on my analysis, clefts are specificational copular sentences, semantically similar to specificational copular sentences or inverted pseudoclefts:

- (57) a. *ze DANI [še šafax et ha-xalav]*  
 it Dani that spilled ACC the-milk  
 'It is Dani [the one who spilled the milk].'  
 b. *ze še šafax et ha-xalav hu DANI*  
 it that spilled ACC the milk is Dani  
 'It [the one who spilled the milk] is Dani.'

However, this being a work in progress, several issues have remained untouched while others are open to further research beyond the scope of this paper. One of them is the nature of the focus and the need for a separate focus projection in light of the fact that presuppositions of uniqueness and exhaustivity are provided by the maximalizing relative CP. It is possible that instead of positing features on the FP head (e.g. Kiss 1999), focus can be derived via directly merging the CP and assigning focus intonation at PF. Alternatively, it might be the case that what has been previously assumed to be a contrastive focus in cleft, is in fact a contrastive topic (Erteschik-Shir, p.c.).

Another point left unaddressed is the structure of clefts with an XP other than DP in focus, i.e. PP, AdvP and other clefts (see ex. (38)). It is possible that the present proposed analysis will not be tenable for these kinds of clefts and they will have a different derivation.

Finally, the paper has not gone into the details of focus-initial clefts (2), concentrating primarily on *ze*-clefts. Ultimately, the goal of this research would be to provide a unified account to clefts, pseudo-clefts and inverted pseudo-clefts, them being semantically and syntactically similar copular constructions.

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<sup>26</sup> I remain agnostic to the possibility of deriving also the existential presupposition of clefts via maximalization. It is possible that clefts do not, in fact, carry any such presupposition, as pointed by Edit Doron (p.c.):

(i) *ze rak Dani še yaxol la'azor lax, im bixlal*  
 it only Dani that can help you if at-all  
 'It's only Dani who can help you, if at all'.

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# Epistemic Modality and the Subjective-Objective Distinction

Lavi Wolf

Epistemic modals exhibit behaviors that on the one hand support classical theories, which view these modals as truth-conditional while on the other support traditional theories, which view these modals as non truth-conditional modifiers of assertion. The reason for this divide is that epistemic modals are ambiguous between subjective and objective readings – the former are non truth-conditional and the latter are truth-conditional. The formal account provided in this paper draws insight from Lyons (1977), improves it and solves problems inherent in the classical theories of Kratzer (1981) and Papafragou (2006) and their solutions to the subjective-objective distinction.

## *1. Introduction*

### *1.1. Evidence against classical theories of modality*

The vast literature on epistemic modality has been longtime divided between classical theories (cf. Kratzer 1981, 1991; Lewis 1986; Brennan 1993) that view epistemic modals as truth-conditional and within the propositional content of assertions, and traditional theories (cf. Halliday 1970; Palmer 1986; Bybee & Fleischman 1995) that view epistemic modals as modifiers of assertion whose effect lies beyond the content.

There is substantial amount of evidence against classical theories and in favor of the traditional ones. This evidence is found, for example, in the behavior of epistemic modals in various embedding environments such as conditionals, factives or verbs of reporting (cf. Papafragou 2006):

- (1) a. ?If Max must/might be lonely, his wife will be worried.  
b. ?It is surprising that Superman might/must be jealous of Lois.  
c. ?Spiderman told me that Superman might/must be jealous of Lois.

The fact that epistemic modals resist being embedded indicates that either there is some syntactic principle that bars epistemic modals from positions that are lower in the syntactic tree than the position of conditionals/factives/verbs of reporting (an option that would be

examined and rejected in the following sub-sections) or that they are beyond the semantic bounds of the propositional content.

Other evidence comes from *Assent-Dissent* diagnostics, in which the speaker's assertion is assented to or dissented from by the hearer (cf. Papafragou 2006):

- (2) This professor must be smart.
- a. Is that so?
    - ≠ is it the case that this professor must be smart?
    - = is it the case that this professor is smart?
  - b. I don't believe it.
    - ≠ I don't believe that this professor must be smart.
    - = I don't believe that this professor is smart.
  - c. I agree
    - ≠ I agree that this professor must be smart.
    - = I agree that this professor is smart.

As can be seen, the content to which the hearer replies does not include the epistemic modal. This is an indication that the modal is not asserted alongside the rest of the utterance material (the *prejacent*) and therefore lies outside the propositional content.

Yet another piece of evidence which supports the traditional view is that epistemic modals seem to systematically take wide scope over various quantifiers (cf. von Stechow and Iatridou 2003):

- (3) a. #Every candidate might win.  
 b. #Every student might be the tallest person in the department.  
 c. #Every student may have left but not every one of them has.

The infelicity of (3.a) goes hand in hand with the well known fact that only one candidate can win, which renders the reading in which the modal takes wide scope (i.e. 'it is possible that all the candidates win') unacceptable. Of course, if the modal had the option of taking narrow scope (i.e. 'for every candidate<sub>i</sub>, it is possible that she<sub>i</sub> wins') the sentence would have been felicitous. The fact that it isn't is an indication that the modal can't scope narrowly. The same principle is at play in (3.b) – it's not possible for all the students to be the tallest person, rendering the sentence infelicitous. It is possible, though, for each student individually to be the tallest, so if the modal could scope narrowly the sentence would have been felicitous. (3.c) is contradictory only if the modal scopes widely, but not narrowly. The fact that this sentence is reliably judged as a contradiction again indicates that the narrow scope is not an option.

Von Stechow and Iatridou propose a syntactic principle, the *Epistemic Containment Principle* (ECP), that prohibits epistemic modals from being lower in the syntactic tree than the quantifiers they interact with. More specifically, the principle dictates that a quantifier cannot bind its trace across an epistemic modal. This is an attempt to reconcile one aspect of epistemic modals' behavior with the classic theory, and had it been successful it could have been expanded to also explain the (lack of) embedability data. However, as we shall see in the next sub-section, it is not successful.

## 1.2. Evidence against traditional theories of modality

The previous section has shown that epistemic modals resist being embedded under various linguistic constructions, take wide scope over various quantifiers and seem to be generally outside the propositional content of assertions. All these pose problems to the classical theory in which epistemic modals are part of the content and have no special status with regards to embeddings or other quantifiers. Von Stechow & Iatridou (2003) have tried to explain why epistemic modals resist taking narrow scope when interacting with other quantifier by proposing the ECP. However, as it turns out, the ECP does not work for all uses of epistemic modals, as shown below:

- (4) a. Objectively speaking every candidate might win. (Tancredi 2007)  
 b. (It is widely known that in our fund-raising events) every person might be the richest person in the country.  
 c. (The center for disease control has data which indicates that) every student may have contracted the disease, but not every one of them has.

Contra to (3.a), (4.a) is felicitous. This is the case although there can only be one winner, meaning that the modal can take narrow scope. Contra to (3.b), (4.b) is felicitous although only one person can be the richest person in the country, again meaning that the wide scope reading is possible, and contra to (3.c), (4.c) is felicitous as well.

So the ECP doesn't work, and the classical theory loses one of its explanatory devices, but things do not fare well to the traditional theory either. As recalled, this theory views epistemic modals as non truth-conditional modifiers of assertion and therefore not part of the propositional content. Thus the following example, which is the opposite of (2) constitutes evidence against it (cf. Papafragou 2006):

- (5) (As reported by the weather forecast,) It might rain tomorrow.  
 a. Is that so?  
   = Is it the case that it might rain tomorrow?  
   ≠ Is it the case that it will rain tomorrow?  
 b. I don't believe it.  
   = I don't believe that it might rain tomorrow.  
   ≠ I don't believe that it will rain tomorrow.  
 c. I agree.  
   =I agree that it might rain tomorrow.  
   ≠I agree that it will rain tomorrow.

Here the speaker's claim is dissented from or assented to by the hearer, just as in (2), but this time the content to which the hearer replies *does* include the modal.

What happens that causes epistemic modals to behave so differently? Let's have a closer look at the embedding cases. Imagine the following conversation between Carmela and Meadow:

- (6) Carmela: Toni might be sad.

Meadow: # If Toni might be sad, let's go and talk with him.

Carmella's assertion is interpreted, by default, as her own opinion. The use of the epistemic modal is assumingly supported by personal evidence which Carmela has. Importantly, this evidence is not available to Meadow. However, it turns out that if the context is constructed differently, in such a way that would make clear or at least plausible that the evidence supporting the use of the epistemic modal is not private, the modal can be embedded. Imagine an ongoing FBI investigation in which various items of evidence are accumulated by the team of agents. This evidence raises the possibility that Toni Soprano got promoted to be the head of a crime organization:

- (7) FBI agent #1: Toni might be the new boss.  
 FBI agent #2: We spent years trying to bring down the 'family'. If Toni might be the new boss, let's go and arrest him right now.

Necessity modals exhibit the same differences under different contexts:

- (8) Carmela: Look at Toni, he's talking with Christopher and getting very angry. From the look on his face he must hit Christopher soon.  
 Meadow: #Oh my, if Toni must hit Christopher we should go there and break it up.
- (9) Carmela: I've heard the news and saw the weather forecast on several channels. They all agreed that hurricane Irene is approaching New-Jersey. It must hit the city soon.  
 Meadow: Oh my. If hurricane Irene must hit New-Jersey we should pack our things and leave immediately.

As can be gathered from these examples, the difference lies in the properties of the context, not the modal. The context can steer the reading toward subjective or objective, which affects felicity. This leads us to the main claim of this paper, which is that epistemic modals are ambiguous between a *subjective* and an *objective* reading.

The next section opens with Lyons (1977) and the subjective-objective distinction for epistemic modals, and proceeds with classical theories that try to account for this distinction. Section 3 presents the formal account of this paper and shows how it explains the data presented above, and section 4 provides diachronic evidence that supports the subjective-objective distinction. The paper concludes in section 5.

## 2. *The subjective-objective distinction*

### 2.1. *Lyons, 1977*

The dual nature of epistemic modality is discussed in Lyons (1977) who claims that there are two types of epistemic modals, subjective and objective. For instance, (10) can be read in one of two ways – either the speaker states her uncertainty about Alfred's marital status, or the speaker states, with certainty, that there is some chance that Alfred is unmarried:

(10) Alfred may be unmarried.

The subjective reading is salient if we imagine a context in which the speaker knows some facts about Alfred which imply but not entail that Alfred is unmarried, e.g. Alfred does not wear a wedding ring, Alfred has never mentioned that he has a wife, etc. Thus the speaker asserts that she is uncertain about Alfred's marital status and that her knowledge does not preclude Alfred's unmarried status as a possibility. The objective reading is salient if we imagine a context in which the speaker knows Alfred to be a member of a community in which about third of the men are unmarried. In this case the speaker can safely report that there is an actual chance that Alfred is unmarried. In this case the speaker is fully certain of her assertion, based on objective knowledge. Compare that with the first reading and you get an ambiguity that stems from two possible options that are open for *might* to modify – either the speaker's degree of belief or the actual state of events.

Lyons suggests that the speech act of assertion has two layers of meaning and each one can be modified independently by a modal operator. The first layer, I-say-so or 'neustic', corresponds to the speaker's confidence in what she asserts and is modified by subjective epistemic modals. Thus a use of a subjective weak epistemic modal such as *might* indicates that the speaker's confidence is low and a use of a strong epistemic modal such as *must* signals a high confidence. The second level, It-is-so or 'tropic', corresponds to how things are in the world and is modified by objective epistemic modals. Thus a use of an objective *might* indicates that the speaker claims (with full confidence) that there is an objective possibility and a use of an objective *must* signals an objective necessity.

Lyons' suggestion about the subjective-objective drew some criticism. Kratzer (1981), whose account is discussed shortly, remarks that Lyons' theory is problematic since it deals with a 'very debated issue on the border of semantics and pragmatics'. Portner (2009), in the same vein, states that the nature of the speech act underlying the use of subjective epistemic modals is unclear. It is also not clear, by Portner, whether the subjective possibility raised by subjective *might* and the objective possibility, which is located at a different layer of the speech act, have anything in common. These problems are solved by the formal account presented in section 3.

## 2.2. Kratzer (1981)

The main theory of modality is due to Kratzer's (1981, 1991) influential work. This classical theory views epistemic modals as quantifiers over a context-dependent set of possible worlds. This set is determined and characterized according to two conversational backgrounds, a modal base and an ordering source, when the modal base determines the set of worlds against which the modal operates (in the case of epistemic modals this set is determined according to what is known) and the ordering source imposes an ordering on this set.

Kratzer (1981) discusses Lyons and the subjective-objective distinction, and tries to account for it using the following scenario:

(11) 'Lenz, who often has bad luck, is going to leave the Old World by boat, today, on Friday thirteenth.'

## a. Subjective use of an epistemic modal:

Wahrscheinlich sinkt das Schiff  
 Probably sinks the boat  
 "Probably, the boat will sink"

## b. Objective use of an epistemic modal:

Es ist wahrscheinlich daß das Schiff sinkt  
 It is probable that the boat sinks  
 'It is probable that the boat will sink.'

Kratzer explains the difference between the subjective and the objective readings by employing different conversational backgrounds. The subjective reading gives rise to a 'subjective ordering source' while the objective reading calls for an 'objective ordering source'. As recalled, different ordering sources are composed of different sets of propositions and therefore give a higher priority to different types of worlds. An objective stereotypical ordering source will contain commonly held conceptions about the normal course of events that are acceptable in a world reigned by science and technology. Therefore facts about the boat, the technical equipment used on the boat or the weather will be accepted in this ordering source. A subjective stereotypical ordering source, on the other hand, can also include superstitions in addition to the objective facts, which cannot be part of the former.

There are two problems with Kratzer's explanation: the first is that this theory relies on cultural conventions in order to account for the subjective reading. These conventions (e.g. superstitions) may differ from society to society. But even if we accept this example as it is and assume that this type of scenario occurs with minor differences across languages, there are certainly cases in which subjective readings arise in which the ordering source still contains propositions that are defensible in an educated society. For example, a context in which a certain student of some professor has personal knowledge that the professor has been exhibiting signs of the flu (e.g. sneezing, coughing, etc.). Moreover, it is currently 'flu season' and many individuals have contracted the disease. If this professor is late to one of his classes, the student can now felicitously assert:

(12) Probably, the professor is sick.

This is of course a subjective reading of the modal, which is based on evidence that is known to the student, some of which from personal experience. As a subjective reading, (12) patterns with the other subjective epistemic modals and behaves the same in embedding environments and assent-dissent tests, as can be easily verified.

The second and more important problem of Kratzer's account is that it is dedicated to the claim that epistemic modals are truth-conditional. Therefore, it can't explain the embeddability data. It also can't account for the wide scope readings of subjective epistemic modals, except through the ECP, which has been shown to be invalid in section 1.2.

### 2.3. Papafragou (2006)

Another attempt to resolve the subjective-objective distinction in the classical framework has is made by Papafragou (2006). This theory explains subjectivity and objectivity in terms of

subtypes of epistemic conversational backgrounds. According to Papafragou, an epistemic modal is true iff for every individual who is a member of the contextually-supplied group of ‘knowers’ there is some epistemically accessible world in which the prejacent is true:

- (13)  $[[ \textit{might } \varphi ]]^{c,i} = 1$  iff  $\forall x \in G_c: \exists w' \in f_x(i): [[\varphi]]^{c,<w',ti>} = 1$   
 $G_c$ : contextually based group of individuals whose knowledge is relevant.  
 $f_x$ : the set of worlds compatible with what x knows.

The first problem with this account, (cf. Portner 2009), is that the truth conditions require for *every* individual to be epistemically aware of the possibility that  $\varphi$ . Therefore, the objectively-modalized sentence ‘it might rain tomorrow’ will turn out false if one particular meteorologist fails to have access to a crucial piece of data (because, for example, his internet connection is down).

The second problem arises again from the problems mentioned in section 1.1. For example, how can this account explain subjective modals’ resistance to embedding? Papafragou tries to answer this question by suggesting that ‘The environment inside the antecedent of a conditional cannot be an environment in which the speaker performs a mental evaluation of a proposition with respect to her belief-set’ (Papafragou 2006:1696), and provides the following example:

- (14) ?If I conclude that the Earth is flat, then I’m in trouble.

However, consider the following in a context in which Columbus, on his way to the new world, utters the following:

- (15) If it’s clear to me that the earth is not flat, I should proceed with my journey.

Columbus certainly performs a mental evaluation which is done with respect to his belief set, as specifically stated by the prepositional phrase ‘to me’. So this explanation does not hold.

With regards to factives, Papafragou states that ‘The complement of (factive) attitude verbs...not environments in which the speaker’s evaluation of a proposition with respect to her current beliefs could feature’ (Papafragou 2006:1697). But the following example shows otherwise:

- (16) It is surprising that this cake is tasty to me (but it is).

Here, the complement of the factive *surprising* contains the speaker’s evaluation (done with the evaluative ‘tasty’) with respect to her beliefs, and again the subjectivity is specifically stated by using the PP “to me”.

### 3. A probabilistic account of epistemic ambiguity

The formal account proposed in this paper is probabilistic in nature. There are, of course, many advantages to a probabilistic semantic theory independently from the topic of epistemic

modals (cf. Cohen 2009). But as we are concerned with a specific topic, there are also good reasons to use a probabilistic account which are directly related to epistemic modals.

One of them is the matter of gradable epistemic modals such as *likely*, *possible*, *probable*, and *certain*, as discussed in Lassiter (2010) and Yalcin (2010), where it is shown that the classical theory yields wrong predictions for epistemic modals in various inference patterns while a probabilistic account gets it right.

Another reason is the need to account for degrees of belief, which are essential for representing subjective epistemic modals. Degrees of belief are already being represented, very successfully and across many scientific disciplines by Bayesian probability, a.k.a subjective probability.

And yet another reason concerns the parallel between the subjective-objective distinction for epistemic modals and subjective vs. objective interpretation of probability statements. The following sentence, for example has two different interpretations:

(17) There is a 50% chance that it would rain tomorrow.

The first interpretation is that the speaker is not sure whether it would rain or not, is undecided, has half a mind regarding each consequence. This kind of probability statement expresses the subjective belief of the speaker, and therefore is best represented as *subjective* or *Bayesian Probability* (cf. Ramsey 1926; de Finetti 1937).

The second interpretation is that the speaker *is sure* that there is a 50% chance that it would rain. This kind of probability statement is different from the former in that here it is not the belief of the speaker but the objective probability that exists in the world, and therefore is best represented as *propensity probability* (Popper 1957, 1959) i.e. the world is such that it is 50% disposed towards raining. These probabilities are different in that the first is subjective and the second is objective but moreover, the evidence that leads to the formation of the first is mostly private and based on the beliefs of the speaker while the evidence that leads to the formation of the second is public and based on knowledge. Therefore, a probabilistic account for epistemic modals is well motivated.

The account is a variation of Halpern's (1990) logic of probability, in which the structure is a tuple  $\langle D, W, \pi, F \rangle$  where  $D$  is a domain,  $W$  is a set of possible worlds,  $\pi$  is a valuation function such that for each world  $w \in W$ ,  $\pi(w)$  assigns to the symbols of the language appropriate extensions and  $F = \{f_1, f_2, \dots\}$  is a set of discrete probability functions over  $W$ .

$P_i(\varphi)$  is a distinguished propositional function whose interpretation is the probability of  $\varphi$  as judged by  $i$  (a probability judgment without an index defaults to the probability judgment of the speaker) such that for any proposition  $\varphi$ , set of worlds  $W$ , model  $M$ , world  $w$  and assignment function  $g$ :

(18)  $[[P_i(\varphi)]]_{M,w,g} = f_i(\{w \in W \mid (M,w,g) \models \varphi\})$

In order to represent Lyons' two layers of meaning, an assertion operator is introduced, with two arguments:  $A(C,S)$ . The first argument,  $C$ , is the content of the asserted proposition. The second argument,  $S$ , is its degree of strength (i.e. the speaker's degree of belief) in terms of a probabilistic inequality. The second argument has scope over the first because it operates at the level of the speech act, which is above the level of the content. (19) is an example of a non-modalized utterance and its representation by the assertion operator:

- (19) a. Alfred is unmarried.  
 b.  $A_i [ \text{unmarried}(\text{Alfred}), P(\text{unmarried}(\text{Alfred})) \geq \text{high}]$

This is an assertion made by the speaker  $i$ , that has the standard type of content, i.e. the proposition corresponding to set of worlds in which Alfred is unmarried. The strength of this speech act is stated in the second argument of the assertion operator, in terms of a probabilistic inequality which represents the (subjective) degree of belief of the speaker. The subjective probability is the value of the probability measure over the set of worlds that compose the epistemic modal base in which "Alfred is unmarried" is true. The value 'high' is a default threshold value, which corresponds to some numerical probability. As a norm of assertion, in order for a speaker to felicitously assert anything she has to believe it to at least a high degree. But what happens when a modalized assertion occurs? It depends on whether a subjective or an objective epistemic modal is used. (20) is a representation of a subjectively modalized assertion:

- (20) a. Alfred might be unmarried.  
 b.  $A_i [ \text{unmarried}(\text{Alfred}), P(\text{unmarried}(\text{Alfred})) \geq \text{low}]$

This is an assertion, made by speaker  $i$  (henceforth the subscript will be dropped) in which the propositional content is the same as the one that has been asserted in the non-modalized utterance. The proposition is again equivalent to the set of worlds in which Alfred is unmarried. The big difference is that this assertion is made with a lower degree of belief, i.e. in order to felicitously assert the (subjectively) epistemically modalized utterance it suffices for a low probability measure over possible worlds to be the case.<sup>1</sup> This means that the speaker is not fully committed to the claim that Alfred is unmarried. This type of assertion is a suggestion to update the common ground (cf. Stalnaker 1978) which is marked since is not made with the default degree of strength. Wolf & Cohen (2009) discuss the dynamic effect of this type of assertion (containing modal adverbs) on discourse. For our purposes, it is suffice to say that unless the hearer has some other sources of evidence which corroborate the low-strength claim of the speaker, the assertion will not be updated into the common ground and therefore will not have any truth condition. Thus this account agrees with the non truth-conditional account when a subjective epistemic modal is concerned.

The use of an objective epistemic modal is shown below:

- (21) a. Alfred might be unmarried.  
 b.  $A [ P(\text{unmarried}(\text{Alfred})) \geq \text{low}, P(P(\text{unmarried}(\text{Alfred})) \geq \text{low}) \geq \text{high}]$

In this assertion the objective epistemic modal is part of the content. As can be seen, the probability measure is the same as the probability measure of the subjective modal, i.e. 'low'. This is because there is no lexical difference between the meaning of subjective *might* and objective *might*. The difference lies in the scope of the modal. When the modal is part of the propositional content the probability measure is more objective as opposed to when the modal

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<sup>1</sup> In here as well, 'low' corresponds to some numerical value.

modifies the speech act. This is because in the case of objective epistemic modals the speaker asserts that there is an actual probability in the actual world that Alfred is unmarried. This is a straightforward assertion, made with the default degree of strength ‘high’, and it denotes a proposition which is equivalent to the set of possible worlds in which there is a greater than low chance that Alfred is unmarried.

At this point it is helpful to state again the difference between the probability value of the first argument of the assertion operator and the probability value of the second: both are probability measures of possible worlds, but the first is a measure of possible worlds at the level of propositional content and therefore would be updated into the common ground if the assertion is successful, while the second is a measure of possible worlds at the level of the speech act and as such is not part of the content that would be updated into the common ground. This is also the reason why the modals which are part of the content are objective – they are such because the common ground hosts propositions which are acceptable by all conversational participants. Thus this account agrees with the truth-conditional account when an objective epistemic modal is used.

#### 4. Diachronic evidence

The claim of this paper – that epistemic modals are ambiguous between subjective and objective readings, receives support from the studies of Traugott (1989) and Traugott & Dasher (2002) which discuss the semantic change English modals have undergone throughout history. They show that not only has there been a shift from non-epistemic (i.e. ‘root modality’) to epistemic modality, but also a shift from objective epistemic modality (their ‘relatively weak subjective epistemicity’) to subjective epistemic modality (their ‘more strongly subjective epistemicity’). Particularly of interest are the following examples:

(22) 950-1050, LawGer 12, 454. In Traugott & Dasher (2002:127):

& raΔe æfter Δam, gif hit *mot* gewiderian, mederan settan.  
and quicly after that, if it *may* be-fine, madder plant  
‘and quicly after that, if the weather may be fine, [one can] plant madder.’

Here, the epistemic modal is embedded under a conditional in a manner that is infelicitous in modern English (unless, of course, we are dealing with a special objective context).

Another example contains an epistemic modal in the form of the adverb *probably* which today has a subjective interpretation. Indeed this adverb belongs to a class of ‘speaker oriented adverbs’ (cf. Jackendoff, 1972) because of its subjective nature. It appears that in the fifteenth century this adverb had an objective meaning:

(23) 1535 Starkey Let., England xxx. In Traugott (1989:46):

‘You wrote so probably that hyt put me in a feare of daungerys to come.’  
You wrote so believably that your words made me afraid of dangers to come.

This sentence, infelicitous in modern English, does not express a subjective interpretation but rather the objective one in which the things that were written about future dangers are

(objectively) probable. Another example of a ‘speaker oriented adverb’, this time *evidently* is used in the objective sense:

(24) 1429 Will Braybroke in *Ess.AST* 5:298. In Traugott (1989:46):

‘Yif thay finde evidently that I have doon extorcion’  
If they find from evidence that I have performed extortions.

These examples show that epistemic modals were used predominantly in the objective sense in the past and only gradually came to receive subjective meanings, and they support Lyons’ claim, as explicitly stated in Traugott (1989):

*‘This finding supports the claim that meanings tend to move toward greater subjectivity.....It also gives...historical evidence for the validity of Lyons’ claim that there are two distinct kinds of epistemicity, one less and the other more strongly subjective.’* (pp. 43)

### 5. Conclusion

The reason for the divide between classical and traditional theories of epistemic modality is that each side relies on data which is only relevant to one aspect of epistemic modals while both aspects of epistemic modals should be taken under consideration. Lyons’ (1977) insight has been largely overlooked until now, mostly because in order to formalize it there is a need for a theory that lies on the border between semantics and pragmatics. The theory presented here, which is part of a larger theory about assertion and its context update effects, (cf. Wolf & Cohen 2009, 2011) is able to capture both the subjective and the objective aspects of epistemic modality.

The diachronic evidence provided by the research of Traugott (1989) and Traugott & Dasher (2002) indicates that epistemic modals are currently in a tradition stage which has started many centuries ago. The modals were originally objective and have gradually acquired subjective meaning. These days epistemic modals still retain both meanings. In light of this, it would be interesting to check (a) diachronically, if epistemic modals will become more subjective as time progresses and (b) synchronically, to what extent epistemic modals are subjective today and to what extent they are objective.

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# Affix Copying in Kiranti

## An Optimality-theoretic Approach

Eva Zimmermann

In this paper, I argue that affix copying in the verbal paradigms of different Kiranti languages is triggered by defective phonological structure in the representation of morphemes. It is shown that it is impossible to analyse the affix copying as a general repair operation to avoid marked phonotactic structure but it is nevertheless true phonological copying: it avoids elements that are uninterpretable for the phonology. This copying phenomenon is therefore particularly interesting for the discussion of copying and doubling and their respective theoretical accounts in phonology and/or morphology (Zuraw 2002; Inkelas 2008; Kirchner 2010).

### 1. The Phenomenon

The phenomenon I want to focus on are instances of what I call ‘affix copying’ in some Kiranti languages (Tibeto-Burman, spoken in the eastern hills of the Himalayas, mainly in Nepal). I define affix copying as a phenomenon where (parts of) affixes surface several times although the morpho-syntactic features they realize are only present once. This is reminiscent of what Ryan & Schuh (under preparation) call ‘semantically unmotivated affix doubling’, exemplified in their study with data from Bole, a Chadic language. A difference between their affix doubling and copying as I discuss it, is the fact that it is not always a whole affix that appears ‘too often’ in Kiranti but also parts of affixes. It is therefore copying of affix material rather than copying of affixes as a whole. In (1), a first introductory example for affix copying from Athpare, an Eastern Kiranti language, is given.

- (1) *Athpare* (Ebert 1997)
- a. lems–u–ŋ–e  
beat–3.P–1.A–PST  
‘I beat it’
  - b. lems–u–ŋ–tsi–ŋ–e  
beat–3.P–1.A–NS–1.A–PST  
‘I beat them’

Comparing (2-a) and (2-b), we see that the agreement suffix /-ŋ/ appears twice in the slightly different context in (2-b). The morpho-syntactic features for first person agent are only present once and we therefore do not expect the marker realizing those features to occur twice in the suffix string. In addition, there is no contrast between the doubling form in (1-b) and a non-doubling form \*[lemsuŋtsie ~ lemsuŋtse]. This is what makes this second [ŋ] semantically unmotivated.<sup>1</sup>

As I argue below, a closer look at different Kiranti languages and their copying patterns allows to generalize that this process is neither morpho-syntactically motivated nor a general repair operation to avoid marked phonotactic structure. Most importantly, the copying only appears in the presence of certain morphemes. I present a formal analysis for these patterns couched in Optimality Theory (Prince & Smolensky 1993) arguing that the affix copying is true phonological copying, triggered by the presence of phonologically deficient morpheme representations.

Before I turn to the actual analysis in section 3, I discuss some examples for copying in detail in section 2 in order to be able to characterize the copying process and its restrictions.

## 2. Data

Two different patterns of affix copying in two different Kiranti languages are discussed in the following subsections. In 2.1, data from Bantawa illustrates a process of nasal copying that is quite common in Kiranti in general. Section 2.2 focusses on Athpare and a pattern of syllable copying. These processes are analysed in the sections 3.2 and 3.3 respectively.

### 2.1. Nasal Copying in Bantawa

The first example for affix copying is from Bantawa, a Central Kiranti language spoken in the Bhojpur district in Eastern Nepal. In (2), some forms of the transitive verb /k<sup>h</sup>at/ ‘to take’ are given.<sup>2</sup> The verb is preceded by maximally one prefix and followed by up to four agreement suffixes as becomes clear on the left side of the tables where I list the abstract underlying representation of those morphologically complex forms, the phonetic surface forms are given on the right side. It can easily be seen that some affixes or parts of some affixes appear twice on the surface (marked in boldface). There are some more alternations between underlying and surface forms that are irrelevant for the following discussion. For one, there is stem allomorphy (a geminated and a non-geminated form alternate) and second, the affix /-tsi/ predictably surfaces as [tsi] or [tsi]. The latter form is straightforwardly predicted from a backing process of high vowels before velars in Bantawa:  $i \rightarrow i/ \_ + \text{velar}$  (Doornenbal 2009:40). The combination /tsi + u/ is predictably realized as [tsu] to avoid adjacent vowels.

<sup>1</sup>Just a brief comment about the – more or less standard – notation I use throughout the paper: sequences inside square brackets are phonetic sounds and sequences inside slashes are abstract phonological representations, i.e. morphemes in their underlying form or phonemes of the language.

<sup>2</sup>A=agent, P=patient, s=singular, d=dual, p=plural, Ns=non-singular (i.e. dual or plural), e=(1.person)exclusive, i=(first person)inclusive, PST=past, intr.=intransitive.

The list of the agreement affixes involved is given in (3) in order to show that there is truly no morphological motivation behind those doubled segments.<sup>3</sup>

(2) *Bantawa*

(Doornenbal 2009)

a. *3d and 3p object forms*

| A/P | 3Ns                          |                              |
|-----|------------------------------|------------------------------|
| 1s  | k <sup>h</sup> at-u-ŋ-tsi    | [k <sup>h</sup> at:uŋtsiŋ]   |
| 1pe | k <sup>h</sup> at-u-m-tsi-ka | [k <sup>h</sup> at:umtsimka] |
| 1pi | k <sup>h</sup> at-u-m-tsi    | [k <sup>h</sup> at:umtsim]   |
| 2p  | ti-k <sup>h</sup> at-u-m-tsi | [tik <sup>h</sup> at:umtsim] |

b. *1s object forms*

| A/P | 1s                           |                              |
|-----|------------------------------|------------------------------|
| 2d  | ti-k <sup>h</sup> at-ŋaŋ-tsi | [tik <sup>h</sup> atŋaŋtsiŋ] |
| 2p  | ti-k <sup>h</sup> at-ŋaŋ-ni  | [tik <sup>h</sup> atŋaŋniŋ]  |
| 3d  | i-k <sup>h</sup> at-ŋaŋ-tsi  | [ik <sup>h</sup> atŋaŋtsiŋ]  |

(3) *Affixes involved*

|      |   |                       |     |   |        |
|------|---|-----------------------|-----|---|--------|
| -u   | ↔ | [+3,P]                | ti- | ↔ | [+2,A] |
| -ŋ   | ↔ | [+1,+sg]              | i-  | ↔ | [+3,A] |
| -tsi | ↔ | [-sg]                 |     |   |        |
| -m   | ↔ | [-3,+pl,A]            |     |   |        |
| -ka  | ↔ | [+1,-2]               |     |   |        |
| -ŋaŋ | ↔ | [+1,+sg,P]            |     |   |        |
| -ni  | ↔ | [+2,+pl,A] / _ +1,+sg |     |   |        |

Since the morpho-syntactic features that are realized by the affixes that surface twice are only there once and there is neither a contrast between a copying and a non-copying form nor any copying in morphologically similar contexts, we cannot hope to find any morphological motivation for the appearance of those segments. In addition, only a part of a suffix is copied in

<sup>3</sup>The segmentation into affixes and their respective meaning in (3) is the result of my own analysis and differs slightly from the descriptions in Doornenbal (2009) or Gvozdanović (2004). The meaning of the inflectional affixes, i.e. the morpho-syntactic features they realize are given as binary features listed in (i). ‘A’ and ‘P’ are taken as abstract labels for ‘subjecthood’ and ‘objecthood’ (remaining unspecific about alignment and the case system of the language). The affix list is given in the standard Distributed Morphology (Halle & Marantz 1993) notation where context features (morpho-syntactic features that must be present for the marker to be inserted that not necessarily specify the same agreement head than the realized features) are given after a slash.

(i) *Morpho-syntactic categories and their decomposition in binary features*

| category | binary features  |  | category | binary features  |
|----------|------------------|--|----------|------------------|
| 1s       | +1,-2,-3,+sg,-pl |  | 2s       | -1,+2,-3,+sg,-pl |
| 1pe      | +1,-2,-3,-sg,+pl |  | 2d       | -1,+2,-3,-sg,-pl |
| 1pi      | +1,+2,-3,-sg,+pl |  | 2p       | -1,+2,-3,-sg,+pl |
| 1de      | +1,-2,-3,-sg,-pl |  | 3s       | -1,-2,+3,+sg,-pl |
| 1di      | +1,+2,-3,-sg,-pl |  | 3d       | -1,-2,+3,-sg,-pl |
|          |                  |  | 3p       | -1,-2,+3,-sg,+pl |

some contexts, e.g. in (2-b), the affix /ŋaŋ/ is found in copying contexts where only its final nasal is copied: [...ŋaŋtsiŋ]. The copying therefore seems to be a purely phonological process. If we look at the data, there is indeed a phonologically relevant generalization: the copying always creates coda consonants for otherwise open syllables. Since nearly all of the copied segments appear word-finally, a reasonable hypothesis is the assumption that there is a demand for closed syllables word-finally. There are indeed numerous arguments in the optimality-theoretic literature for a constraint FINAL-C demanding that prosodic words must end in a consonant (McCarthy 1993; Itô & Mester 2009). An analysis based on the assumption that FINAL-C demands copying of a consonant to create a word-final consonant is sketched in (5). Note that ‘copying’ is taken to be fission of segments, violating the faithfulness constraint INTEGRITY (McCarthy & Prince 1995) demanding that no input element may correspond to more than one output segment. The winning candidate (5-c) where the input segment /-ŋ/ corresponds to two consonants in the output (=both bear the same index <sub>2</sub>) violates this constraint. Candidate (5-b) inserts an epenthetic coda /ʔ/. This repair strategy is excluded by high-ranked DEP penalizing insertion of elements without an input correspondent (McCarthy & Prince 1995). Since the preceding stem is irrelevant for this process, I only evaluate the suffix string in the following tableau.

(4) *Copying in Bantawa triggered through the demand for a final coda?*

| u <sub>1</sub> ŋ <sub>2</sub> ts <sub>3</sub> i <sub>4</sub>                   | FINAL-C | DEP | INT |
|--------------------------------------------------------------------------------|---------|-----|-----|
| a. u <sub>1</sub> ŋ <sub>2</sub> ts <sub>3</sub> i <sub>4</sub>                | *!      |     |     |
| b. u <sub>1</sub> ŋ <sub>2</sub> ts <sub>3</sub> i <sub>4</sub> ʔ              |         | *!  |     |
| c. u <sub>1</sub> ŋ <sub>2</sub> ts <sub>3</sub> i <sub>4</sub> ŋ <sub>2</sub> |         |     | *   |

There are two problems with such an analysis. First, there is one affix-combination where the copy systematically appears inside the affix string and not at the edge of the word: [...**mtsimka**] (1pe-3Ns). A possible solution would be to assume that the affix /-ka/ must be preceded by a prosodic word boundary and that the bracketing into prosodic words is something like [...**mtsim**]<sub>PrWd</sub>[**ka**]<sub>PrWd</sub>. But that would actually mispredict a double copying: [...**umtsimkam**] since two prosodic word boundaries that demand a closed syllable would be present. Such an analysis is therefore able to predict the copying before /-ka/ but cannot explain the absence of copying after /-ka/ and there are even worse problems with an analysis based on FINAL-C. Namely the fact that there are many contexts where we would expect copying if it were a general phonological repair to create word-final codas but where the syllables remain open. Let's look at those exceptions in some more detail. A first class of exceptions are the ones in (5-a+b) where we would expect a copied stem-final /t/ or a copy of the /ts/. A licit explanation for the lack of copying in those contexts would be a dispreference for fission of non-nasals or obstruents in general since in all the copying examples we saw in (2), it was a nasal that was copied. But as can be seen in (5-c-e), there are similar contexts where a preceding nasal consonant is available for copying and the final syllable nevertheless remains open. In (5-c+d), the crucial difference to the contexts where copying applies successfully is the absence of /-tsi/ or /-ni/.<sup>4</sup> Example (5-e)

<sup>4</sup>The suffix /-ni/ (+1,-sg /\_\_+2) in 1Ns-2 is analysed here as a morpheme on its own and must not be confounded with the /-ni/ (+2,+pl /\_\_+1,+sg) we saw above. Only the latter triggers copying. But even if one wants

is even more interesting since /-tsi/ is indeed present but the nasal of the preceding suffix still does not surface twice. The difference here is that the preceding [n] is onset of the preceding syllable, in contrast to the copying examples, where it was always a coda consonant.

(5) *Non-copying in Bantawa*

|    | underlying                        | surface                | expected                 |
|----|-----------------------------------|------------------------|--------------------------|
| a. | k <sup>h</sup> at-u (3s>3s)       | k <sup>h</sup> at:u    | *k <sup>h</sup> at:ut    |
| b. | k <sup>h</sup> at-tsi-u (1di>3s)  | k <sup>h</sup> attsu   | *k <sup>h</sup> attsuts  |
| c. | k <sup>h</sup> at-u-m-ka (1pe>3s) | k <sup>h</sup> at:umka | *k <sup>h</sup> at:umkam |
| d. | k <sup>h</sup> at-ni (1Ns>2)      | k <sup>h</sup> atni    | *k <sup>h</sup> atnin    |
| e. | k <sup>h</sup> at-na-tsi (1s>2d)  | k <sup>h</sup> atnatsi | *k <sup>h</sup> atnatsin |

We can therefore conclude that the copying is not a general repair to optimize the syllable structure of the language but rather a morpheme-specific process that only happens in the presence of the two morphemes /-tsi/ and /-ni/. A nasal consonant preceding these two suffixes is realized another time after the morphemes. Doornenbal (2009) characterizes this copying process slightly differently, as a ‘copying [of] as much material from the preceding syllable as needed to form a good syllable’ after the two triggering morphemes (2009:159). But this description predicts the same surface effect: syllables are ‘good’ syllables when they are closed by a sonorant. This pattern of nasal-copying can be found in other Kiranti languages as well as can be seen in the exemplifying overview in (6) where I compare the forms for the 1s-3Ns context in Bantawa with some other Kiranti languages.

(6) *More nasal copying in Kiranti (surface forms)*

| Language   | 1s-3Ns                   |                 |                      |
|------------|--------------------------|-----------------|----------------------|
| a. Bantawa | k <sup>h</sup> at:uŋtsiŋ | ‘I take them’   | (Doornenbal 2009)    |
| b. Belhare | lureŋts <sup>h</sup> iŋ  | ‘I told them’   | (Bickel 1998, 2003)  |
| c. Limbu   | huʔruŋsiŋ                | ‘I taught them’ | (van Driem 1987)     |
| d. Puma    | k <sup>h</sup> aŋŋuŋtsaŋ | ‘I see them’    | (Bickel et al. 2010) |
| e. Yakkha  | piŋtsiŋa                 | ‘I gave them’   | (Schackow 2010)      |
| f. Yamphu  | k <sup>h</sup> aksuŋɕiŋ  | ‘I saw them’    | (Rutgers 1998)       |

In all these forms, a nasal preceding /-tsi/ (or its cognates) is copied after this morpheme. The generalizations about morpheme-specificity and the lack of a general phonotactic motivation are the same for all these copying processes.

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to subsume these occurrences under a single unspecific +1 morpheme /-ni/ and assume that the surface alternation between [ni] and [ni] is due to predictable allomorphy (which is plausible, cf. the same alternation for /-tsi/), there is an independent reason why copying does not apply in these contexts (+1,-sg / \_\_ +2): there is simply no nasal available that could be copied. This restriction about the nature of copied segments is discussed in section 3.2.

## 2.2. Nasal copying in the non-past paradigms in Athpare

Another interesting example for copying can be found in Athpare, a language of the south-eastern Kiranti area. In (7), an extract of the non-past paradigm for transitive verbs and the intransitive paradigm is given. For reasons of convenience I exclude the verb stem since all copying applies inside the suffix string. In the first line of each context cell, I list the abstract underlying representation of the suffixes that are attached. The form and distribution of suffixes is quite similar to the one we saw in Bantawa, e.g. in a context where a first person singular agent acts upon a third person non-singular object, /-u/ marks the third person object, /-ŋ/ the first person singular agent and /-tsi/ the non-singularity of the object. In the second line of each paradigm cell, the surface representation of these suffix strings is given. Again, some regular phonological processes apply in these examples and cause alternations between underlying representation and surface form. First, Athpare does not allow sequences of adjacent vowels, and whenever /-tsi/ precedes /-u/, the first vowel of the vowel cluster is deleted resulting in [tsu]. Another relevant phonological process is place assimilation between adjacent nasal consonants that can be observed in 1pe>3 contexts where underlying /ŋ/ is realized as [m] if it is preceded by an /m/. There are two other surface alternations that are taken as phonetic effect. First, a sequence of a stop /t/ and a following affricate /ts/ is notated as [ts], not as \*[tts]. Although geminates exist in Athpare, there are restricted to specific contexts and occur only stem-final or as result of assimilation to the infinitive suffix, (Ebert 1997:14). But apart from these contexts, the difference between [tts] and [ts] is simply never contrastive and neutralized in the phonetics. Another surface alternation can be observed whenever an /ŋ/ or an /n/ are expected to appear after a /t/. Only a [ʔ] is realized at the surface in those configurations. The only regular effect that is expected in these configurations is that the syllable-final voiceless stop is realized as unreleased. Ebert (1997) even notes that ‘[i]t is sometimes difficult to determine the character of the consonant and to distinguish it from a glottal stop’ (Ebert 1997:14). But I have no explanation for the absence of the expected nasal at the surface and why \*[ʔŋ] or \*[ʔn] are excluded. This is mainly due to the fact that the phonology and the phonetics are the domains where the descriptions of Athpare are rather scarce. Right now, I will simply take this as a phonetic surface effect and will ignore it in the following.

Apart from these alternations, one can identify various instances of copied affix material in the paradigm (7). It is apparent that some segments surface even three times, e.g. the nasal [ŋ] in 1s-3Ns. A closer look at the data reveals that there are indeed two copying processes active in the non-past paradigm of Athpare. The first is the familiar nasal-copying process we already saw in Bantawa. As in Bantawa, any nasal preceding /-tsi/ is repeated directly after this morpheme. In Athpare, this affects the suffixes /-m/ and /-ŋ/ in all 1s-3Ns contexts and in all contexts where a plural agent acts upon a 3Ns object.

(7) *Athpare: extract of the non-past paradigms*

(Ebert 1997)

| A/P       | 3s                        | 3Ns                             | intr                    |
|-----------|---------------------------|---------------------------------|-------------------------|
| 1s        | -u-ŋ-t<br>[uŋtuŋ]         | -u-ŋ-tsi-t<br>[uŋtsiŋtsiŋ]      | -ŋa-t<br>[ŋaʔa]         |
| 1de       | -tsi-u-t-ŋa<br>[tsutsuŋa] | -tsi-u-t-ŋa<br>[tsutsuŋa]       | -tsi-t-ŋa<br>[tsitsiŋa] |
| 1pe       | -u-m-t-ŋa<br>[umtumma]    | -u-m-tsi-t-ŋa<br>[umtsimtsimma] | -i-t-ŋa<br>[itiŋa]      |
| 1di,2d,3d | -tsi-u-t<br>[tsutsu]      | -tsi-u-t<br>[tsutsu]            | -tsi-t<br>[tsitsi]      |
| 1pi,2p    | -u-m-t<br>[umtum]         | -u-m-tsi-t<br>[umtsimtsim]      | -i-t<br>[iti]           |
| 2s,3s,3p  | -u-t<br>[utu]             | -u-tsi-t<br>[utsitsi]           | -juk<br>[juk]           |

In addition to this nasal copying, there is one additional syllable in the suffix string throughout all non-past paradigms in Athpare that is systematically absent in the corresponding past paradigms. This asymmetry follows straightforwardly if this is another instance of morpheme-specific copying that is triggered by the non-past marker /-t/. The generalization about this additional copy-syllable is given in (8).

(8) *Copying in the context of /-t/*

An additional syllable surfaces with a rhyme identical to the one of the preceding syllable and

- a. [t] is in the onset position  
e.g. [u.tu] or [i.ti]
- b. it has a segment in its onset position that results from concatenation of /-t/ with the preceding onset consonant.  
e.g. [tsu.tsu] (/tsuttsu/) or [ŋaʔa] (/ŋatŋa/)

A first question is, again, whether this process can be interpreted as general phonological repair to optimize the overall phonotactic structure of the resulting form. Indeed, there are some examples where the creation of this additional syllable avoids complex, word-final consonant clusters (9-a+b) or where the copying creates an open syllable and avoids a coda consonant (9-c+d).

(9) *Copying to avoid marked structure?*

|    | surface form       |                   | without copying  |
|----|--------------------|-------------------|------------------|
| a. | [uŋtuŋ]            | 'I beat him'      | *[uŋt]           |
| b. | [uŋtsiŋtsiŋ]       | 'I beat them'     | *[uŋtsiŋt]       |
| c. | [lem.na.ʔa]        | 'I beat you'      | *[lem.nat]       |
| d. | [a.lem.tsi.tsi.ŋa] | 'You beat us two' | *[a.lem.tsit.ŋa] |

In all these examples, the copying clearly avoids a marked structure. But crucially, such moti-

vations cannot be found for all the cases where copying applies. We do find various examples where the very same marked structure is not repaired via copying but is kept in the output. For example the form for ‘We (incl) beat him’ is [a.lem.sum.tum] instead of \*[a.lem.su.mu.tum] or \*[a.le.me.su.mu.tu.mu] – both hypothetical forms optimize the syllable structure through additional copying operations and avoid all closed syllables. Once again we can conclude that this is a morpheme-specific process.

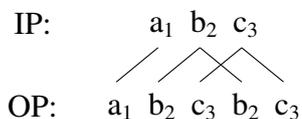
The patterns we saw in the preceding sections can be summarized as follows: *first*, (affix-) nasals are copied around certain morphemes (mainly /-tsi/ and its cognates), and *second*, an additional (affix-) syllable is created after the non-past marker /-t/. Although we saw that these copying operations optimize the phonological structure in one way or the other, they cannot be regarded as a general phonotactic repair operation since copying is blocked in the same phonotactic contexts in the absence of the triggering morpheme. The crucial generalization is therefore that it is a morpheme-specific process without any functional/semantic or phonological motivation.

### 3. Analysis

#### 3.1. Background: Copying as phonological repair strategy

The analysis I propose is couched in standard correspondence-theoretic OT (Prince & Smolensky 1993; McCarthy & Prince 1995) and assumes that all copying of elements is fission. Whenever one input element corresponds to two or more output elements, fission has taken place and split the element up into multiple instances of itself. Instances of fission can be identified by looking at the indices that mark input-output correspondence: one element with index  $x$  in the input corresponds to two elements with index  $x$  in the output as can be seen in the abstract example (10). The faithfulness constraints penalizing such an operation are INTEGRITY in (11-a) and LINEARITY in (11-b). That the latter constraint penalizing instances of reordering is violated as well can easily be detected in (10): the element  $b_2$  (corresponding to  $b_2$  in the output) precedes  $c_3$  (corresponding to  $c_3$  in the output) in the input but in the output (one instance of)  $b_2$  follows (one instance of)  $c_3$ .

(10) *Fission of /abc/ into [abcbc]*



- (11) a.    INTEGRITY    Assign a violation mark for every input element that corresponds to more than one output element.  
 (McCarthy & Prince 1995)    For  $x \in S_1$  and  $w, z \in S_1$ , if  $x \text{ } \mathfrak{N} w$  and  $x \text{ } \mathfrak{N} z$ , then  $w=z$ .

- b. LINEARITY  
(McCarthy  
2008)
- Assign a violation mark for every pair of output segments with another precedence structure than the corresponding input elements.  
Let  $input = i_1 i_2 i_3 \dots i_n$  and  $output = o_1 o_2 o_3 \dots o_m$ .  
Assign on violation mark for every pair  $i_w$  and  $i_y$   
if  $i_w \Re o_x$  and  $i_y \Re o_z$ ,  $i_w$  precedes  $i_y$ , and  $o_z$  precedes  $o_x$ .

I assume that phonological copying is a general phonological repair process comparable to epenthesis or deletion, a view explicitly proposed and discussed in the Theory of Minimal Reduplication (Kirchner 2007, 2010). In Kirchner's approach, the 'world of grammatical copying' (Kirchner 2010:4) is divided into three different kinds, located in the different components of the grammar: phonological, morphological, or syntactic reduplication. The main claim in this theory is that all these components are each capable of producing reduplicative structures without any rules, constraints, or representations that are specific to reduplication or copying in general (Kirchner 2010:3). Whereas phonological copying applies to repair a marked structure in different contexts and with different morphemes, morphological reduplication only applies in the presence of certain morphemes and is triggered by a marked structure, e.g. a floating syllable. This is exactly the analysis I propose for the Kiranti copying: Underlying floating prosodic nodes are a marked structure on their own and must be associated with phonological material in order to be interpretable. The affix-copying is therefore analysed in the very same vein as those cases standardly called 'reduplication', where the (partial) copy of a base expresses a morphological category. The only difference to the Kiranti copying is that the reduplication-triggering morphemes consist of segmental material as well and not only of empty prosodic structure that triggers copying.

The main argument for such a unified theory for copying/reduplication are *first* its theoretical economy and elegance through abandoning any mechanisms specific to a certain process<sup>5</sup> and *second* the fact that there are examples in the languages of the world where copying alternates with other types of non-concatenative exponence. For example in Kwak'wala (Kirchner 2007, 2010; Bermúdez-Otero to appear) or Afar (Bye & Svenonius to appear) copying of segments alternates predictably with epenthesis. The Theory of Minimal Reduplication straightforwardly predicts such a state of affairs since the empty prosodic structure is not bound to any specific repair such as copying: it simply must be filled with material and the languages choose between the different phonological strategies the phonology employs for providing additional material in a specific phonological context.

This assumption that empty prosodic nodes are possible (parts of) morphemes is couched in the tradition of Prosodic Morphology (McCarthy & Prince 1986/1996) assuming that nodes of the prosodic hierarchy exist as true entities on their own and trigger for example quantity-manipulating morphology as lengthening or gemination.<sup>6</sup>

In the following subsections, it is shown how the Kiranti copying is analysed with these background assumptions of copying as fission as a general repair strategy.

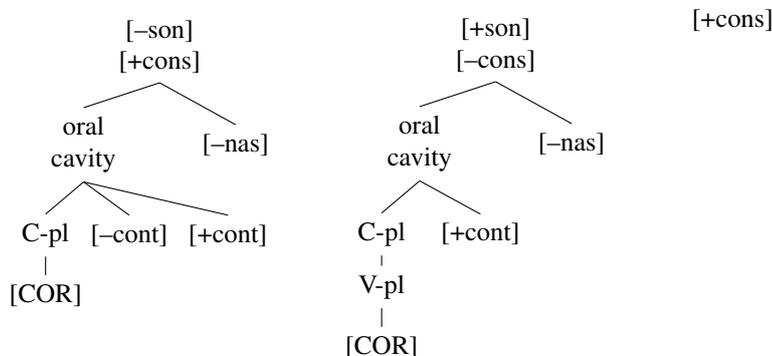
<sup>5</sup>An example is the standard correspondence-theoretic mysterious RED morpheme that triggers reduplication through establishing a new correspondence relation between base and reduplicant (McCarthy & Prince 1995).

<sup>6</sup>Cf. for an overview and literature Trommer & Zimmermann (2010).

## 3.2. Analysis for the nasal copying

In this subsection, I show that the nasal copying that was illustrated with data from Bantawa above is triggered by a defective phonological representation for the triggering morphemes /-tʃi/ and /-ni/. I claim that they have an empty segmental root node in their representation that must be filled with segmental material and filling it with ‘copied’ – i.e. fissioned – elements is the best repair strategy given the ranking of the language. Their underlying segmental representation is therefore roughly speaking something like /-tʃi□/: a string of a fully specified consonant, a fully specified front vowel and a radically underspecified segment. In e.g. Bermúdez-Otero (to appear) such a ‘featureless root node •’ is assumed as a primitive in the theory and segmental root nodes devoid of all features exist on their own.<sup>7</sup> In contrast to this view, I follow the assumption that at least the major class features [±son] and [±cons] are (part of) the root node of a feature tree (Schein & Steriade 1986; McCarthy 1988; Clements & Hume 1995; Halle 1995) and that these features are our candidates for minimally specifying ‘segmenthood’. This avoids an abstract preterminal/class node ‘root’ in a feature-geometric representation (Clements 1985; Sagey 1986) and assumes that a segmental root node must actually consist of at least one phonological feature.

For Bantawa, I assume that the minimal feature content specifying the segmental position is simply [+cons].<sup>8</sup> The feature-geometric representation (Clements & Hume 1995) for the morpheme /-tʃi/ is therefore as in (12): the affricate [tʃ] is followed by a front vowel [i] and a defective segment only specified for [+cons].<sup>9</sup>

(12) Representation for /-tʃi/<sup>10</sup>

It is clear that the defective segment [+cons]<sup>9</sup> cannot be interpreted on its own but must be

<sup>7</sup>In Bermúdez-Otero's analysis of Kwak'wala, the empty root node is part of a prosodic treelet that results in CV 'reduplication'. Another interesting example where the presence of a phonologically deficient morpheme results in yet another type of non-concatenative morphology can be found in Bye & Svenonius (to appear) where two examples for mutation in Afar and in Inor are analysed as the result of affixing a featurally deficient root node.

<sup>8</sup>The assumption of empty segmental positions – whether as abstract 'root node' or as minimal phonological feature content – is actually reminiscent of reintroducing skeletal positions for segments (Levin 1985; Lowenstamm & Kaye 1986). The only difference is that those radically underspecified segments cannot represent length and are therefore not true timing positions but only a placeholder for a segment.

<sup>9</sup>I follow Lombardi (1990) in assuming that affricates are represented as an underlyingly unordered sequence of [-cont][+cont] (for the alternative view cf. e.g. Sagey, 1986). However, nothing hinges on this below.

<sup>10</sup>The following analysis is obviously the very same for the second copy-triggering morpheme /-ni/.

made phonetically interpretable through enriching it with some more features. Several versions of constraints are proposed in the literature to ensure a specification for a certain feature, e.g. HAVEPLACE (Itô & Mester 1993; Padgett 1994; Smith 2002; McCarthy 2008) demanding a place feature specification for a segment. In the case of Bantawa and its underspecified [+cons] segment, the demand to have a specification for the feature [ $\pm$ son], given in (13), is actually sufficient to ensure specifications for all other relevant features as place or nasality as well as is shown below.

- (13)            HAVE[ $\pm$ SON]            Assign a violation mark for every segment that has no feature specification for [ $\pm$ son].

As will become evident below, the constraint ranking predicts that splitting up features that are already present in the input is the optimal repair strategy to fill the defective structure with features. In a hierarchically structured feature representation as in (12), the specification for [ $\pm$ son] dominates all other features (except those inside the root node). If faithfulness for association lines and henceforth dominance relations in such a feature-geometric tree are ensured through high-ranked constraints, fission of the highest feature implies fission of all other features as well. Such faithfulness constraints are actually IDENT constraints demanding the faithful preservation of a segment and all its feature specification. I take it for granted that those are undominated in Bantawa. From this it now follows that high-ranked HAVE[ $\pm$ SON] alone ensures that specification for place and nasality are fissioned as well and that the empty segmental node is a fully-specified segment once [ $\pm$ son] is forced to undergo fission.

But knowing that fission is the optimal strategy to fill the defective root node with features is only the first part of the analysis. In addition, it must be decided which segment's features are split up. If the structure in (12) attaches to a stem (and probably other affixes precede/follow /-tsi/), it is clear that numerous [ $\pm$ son] specifications of neighbouring segments are available: why is it always the preceding nasal that is fissioned?

Many researchers have argued for a general asymmetry in the preference of consonants to occur in coda position. More concretely, sonorant codas are less marked than obstruent codas (Botma & van der Torre 2000; van de Weijer 2002; van der Hulst 2008) ensured by the markedness constraint in (14). This constraint now excludes fission of obstruents, i.e. of any [-son] feature and all the features it dominates. Only sonorants are therefore able to fill the empty segmental position following /-tsi/ in Bantawa. That the copied segments are always nasals is rather an accidental fact following from the distribution of sonorant segments preceding /-tsi/: the defective root node is not prespecified for sonority or nasality at all.

- (14)            \*P] <sub>$\sigma$</sub>                             Assign a violation mark for every [-son] segment in coda position.

This markedness constraint obviously cannot prohibit obstruent codas generally since those are in principle allowed in Bantawa. Higher-ranked faithfulness constraints therefore preserve underlying obstruents and only if there is a choice between filling the defective root node with an obstruent, with a sonorant, or with nothing, \*P] <sub>$\sigma$</sub>  prohibits the creation of a new obstruent coda.<sup>11</sup>

<sup>11</sup>This effect is highly reminiscent of Comparative Markedness (McCarthy 2002) where a distinction is made

All this is summarized in the tableau (15). Note that I abbreviate the full feature-geometric structure given in (12): I write  $\pm c$  and  $\pm s$  for  $[\pm\text{cons}]$  and  $[\pm\text{son}]$  and use the IPA symbol instead of the full feature tree below the root node. Using such autosegmental representations in correspondence theory implies that every feature introduces its own correspondence relation to its output equivalent. But for reasons of readability I will exclude the indices marking correspondence relations in the following. Whenever fission has taken place, I highlight all elements corresponding to the same input element with a grey background. Epenthetic elements without any input correspondent are given in boldface.

Deletion of the defective segment as in candidate (15-a) is an illicit repair since MAX-F preserves the underlying  $[\text{+cons}]$  feature. Candidate (15-b) simply integrates the defective segmental root node and is excluded by HAVE $[\pm\text{SON}]$ : the underspecified segment is uninterpretable since it lacks too many features. The defective segmental root node must therefore be provided with a  $[\pm\text{son}]$  feature specification. Since DEP-F is ranked too high, we cannot insert this feature (15-c) and fission is left over as optimal repair strategy. Fission of any of the surrounding obstruents – e.g. the  $[\text{ts}]$  in (15-d) – is impossible since this generates a new obstruent coda which is dispreferred in Bantawa. The winning candidate is therefore (15-e), where  $[\text{+son}]$  of the preceding nasal undergoes fission. Note again that this implies fission of all features the root node dominates due to faithfulness.

(15) *Nasal Copying in Bantawa*

|    | $\begin{array}{c} -c+s \\   \\ u \end{array}$ | $\begin{array}{c} +c+s \\   \\ + \end{array}$ | $\begin{array}{c} +c-s \\   \\ \eta \end{array}$ | $\begin{array}{c} -c+s \\   \\ + \end{array}$      | $\begin{array}{c} +c \\   \\ ts \end{array}$   | $\begin{array}{c} -c+s \\   \\ i \end{array}$   |          |          |                    |                 |     |
|----|-----------------------------------------------|-----------------------------------------------|--------------------------------------------------|----------------------------------------------------|------------------------------------------------|-------------------------------------------------|----------|----------|--------------------|-----------------|-----|
|    |                                               |                                               |                                                  |                                                    |                                                |                                                 | MAX<br>F | DEP<br>F | HAV<br>[ $\pm S$ ] | *P] $_{\sigma}$ | INT |
| a. |                                               |                                               | $\begin{array}{c} -c+s \\   \\ u \end{array}$    | $\begin{array}{c} +c+s \\   \\ \eta \end{array}$   | $\begin{array}{c} +c-s \\   \\ ts \end{array}$ | $\begin{array}{c} -c+s \\   \\ i \end{array}$   | *!       |          |                    |                 |     |
| b. |                                               |                                               | $\begin{array}{c} -c+s \\   \\ u \end{array}$    | $\begin{array}{c} +c+s \\   \\ \eta \end{array}$   | $\begin{array}{c} +c-s \\   \\ ts \end{array}$ | $\begin{array}{c} -c+s \\   \\ i \end{array}$   |          |          | *!                 |                 |     |
| c. |                                               |                                               | $\begin{array}{c} -c+s \\   \\ u \end{array}$    | $\begin{array}{c} +c+s \\   \\ \eta \end{array}$   | $\begin{array}{c} +c-s \\   \\ ts \end{array}$ | $\begin{array}{c} -c+s \\   \\ i \end{array}$   |          | *!       |                    |                 |     |
| d. |                                               |                                               | $\begin{array}{c} -c+s \\   \\ u \end{array}$    | $\begin{array}{c} +c+s+c \\   \\ \eta \end{array}$ | $\begin{array}{c} -s \\   \\ ts \end{array}$   | $\begin{array}{c} -c+s \\   \\ i \end{array}$   |          |          |                    | *!              | *   |
| e. |                                               |                                               | $\begin{array}{c} -c+s+c \\   \\ u \end{array}$  | $\begin{array}{c} +s \\   \\ \eta \end{array}$     | $\begin{array}{c} +c-s \\   \\ ts \end{array}$ | $\begin{array}{c} -c+s+c \\   \\ i \end{array}$ |          |          |                    |                 | *   |

A second restriction about the nature of the segments which are able to undergo fission in order to fill the empty segmental position becomes apparent if one recalls the last example in (5) where expected copying was blocked. The affix combination  $/\text{-na-tsi}/$  always surfaces as  $[\text{natsi}]$

between ‘old’ marked structure that is already present in the input and ‘new’ marked structure that was not yet present in the input.

not as \*[natsin]. The important difference between this example and the copying data is that the preceding nasal is in the onset rather than in the coda that precedes the triggering morpheme. Fission is therefore apparently blocked when the fissioned consonants corresponding to the same input consonant would be syllabified in different syllable positions. In Optimality Theory, such a state of affairs is predicted from a constraint (16-a) requiring identity between corresponding elements with respect to their syllabic role (McCarthy & Prince 1993; Rose & Walker 2004; Bye & Svenonius to appear). That the first nasal of the morpheme /-na/ is indeed syllabified as onset, irrespective of whether a C-final or a V-final stem proceeds it, follows since onsetless syllables are generally impossible in Bantawa (Doornenbal 2009), ensured through ONSET.

- (16) a. IDENT[ $\sigma$ -ROLE] (Rose & Walker 2004) Assign a violation mark for every two corresponding elements (in the output) that are associated to different syllable roles.
- b. ONSET (Prince & Smolensky 1993) Assign a violation mark for every onsetless syllable.

A final observation is now the fact that the copying always applies within the suffix string and irrespective of the preceding stem. This means that in cases where /-tsi/ cannot fill its empty segmental position with a fissioned affix coda, no copying applies. This is true irrespective of whether the preceding stem has a sonorant in coda position – a perfect candidate for being fissioned to fill the empty segment – or not. This impossibility of stem material undergoing fission follows from ranking INTEGRITY sensitive to stem material (17) above the general INTEGRITY. That the phonology is sensitive to this morphological distinction into affix and stem is well established (cf. the overview in Trommer (2011) for discussion and literature) and the parametrization of faithfulness constraints to these categories is standard in the optimality-theoretic literature and goes back to the original formulation of Correspondence Theory in McCarthy & Prince (1995) (cf. for discussion e.g. Krämer (2002); Ussishkin (2006); Zimmermann & Trommer (2011)).

- (17) INTEGRITY<sub>ST</sub> Assign a violation mark for every input stem element that corresponds to more than one output element.

The ranking of this two constraint and its effect is illustrated in (18) where a stem-nasal /n<sub>s</sub>/ precedes the affix string. Candidate (18-a) has two output correspondents of the stem-final consonant and therefore violates high-ranked INTEGRITY<sub>ST</sub>. This tableau illustrates the effect of IDENT[ $\sigma$ -ROLE] and ONSET as well since it optimizes the affix combination /-na-tsi/. Since syllabification is therefore crucial, I give the phonetic surface form with syllable boundaries below every candidate. For example the contrast between (18-b) and (18-c) is quite subtle since only their syllabification is different: whereas (18-b) syllabifies the affix [n] as onset and IDENT[ $\sigma$ -ROLE] makes any fission into the coda position impossible, candidate (18-c) syllabifies the nasal as coda and is therefore able to fission the nasal into the coda following /-tsi/. But this syllabification is impossible in Bantawa since an onsetless syllable results, excluded by high-ranked ONSET. It is clear that whenever no affix coda sonorant precedes /-tsi/, its empty consonantal position remains unrealized as in the winning candidate (18-d).

(18) *No Copying of an onset or of stem material in Bantawa*

|    | +c-s<br> <br>n <sub>s</sub> | +c+s<br> <br>+ | -c+s<br> <br>n | +c-s<br> <br>a | -c+s<br> <br>+ | +c<br> <br>ts   |                   |                           |       |             |     |    |  |  |  |    |
|----|-----------------------------|----------------|----------------|----------------|----------------|-----------------|-------------------|---------------------------|-------|-------------|-----|----|--|--|--|----|
|    |                             |                |                |                |                |                 | INT <sub>ST</sub> | ONS                       | ID[σ] | HAV<br>[±S] | INT |    |  |  |  |    |
| a. | +c<br> <br>n <sub>s</sub>   | +s<br> <br>+   | +c+s<br> <br>n | -c+s<br> <br>a | +c-s<br> <br>+ | -c+s<br> <br>ts | +c<br> <br>i      | +c<br> <br>n <sub>s</sub> |       |             |     | *! |  |  |  | *  |
|    | [Vn.na.tsin]                |                |                |                |                |                 |                   |                           |       |             |     |    |  |  |  |    |
| b. | +c+s<br> <br>n <sub>s</sub> | +c<br> <br>+   | +s<br> <br>n   | -c+s<br> <br>a | +c-s<br> <br>+ | -c+s<br> <br>ts | +c<br> <br>i      | +s<br> <br>n              |       |             | *!  |    |  |  |  | ** |
|    | [Vn.na.tsin]                |                |                |                |                |                 |                   |                           |       |             |     |    |  |  |  |    |
| c. | +c+s<br> <br>n <sub>s</sub> | +c<br> <br>+   | +s<br> <br>n   | -c+s<br> <br>a | +c-s<br> <br>+ | -c+s<br> <br>ts | +c<br> <br>i      | +s<br> <br>n              |       |             | *!  |    |  |  |  | ** |
|    | [Vnn.a.tsin]                |                |                |                |                |                 |                   |                           |       |             |     |    |  |  |  |    |
| d. | +c+s<br> <br>n <sub>s</sub> | +c+s<br> <br>+ | -c+s<br> <br>n | +c-s<br> <br>a | -c+s<br> <br>+ | +c<br> <br>ts   |                   |                           |       |             |     |    |  |  |  | *  |
|    | [Vn.na.tsi]                 |                |                |                |                |                 |                   |                           |       |             |     |    |  |  |  |    |

The crucial facts about the copying-triggering morphemes /-tsi/ and /-ni/ in Bantawa are therefore that they simply have a radically underspecified segment in their representation and that this defective segment must be filled with material in order to be interpreted. Since epenthesis is impossible, features from a preceding affix consonant undergo fission to fill this position. But only affix sonorant codas are able to undergo fission due to general markedness and faithfulness constraints.

3.3. *Analysis for the syllable copying*

In this section, an analysis of the syllable copying pattern that was exemplified with data from Athpare in section 2.2 is provided. The important generalization about this copying pattern is that an additional syllable is created in the presence of the non-past morpheme /-t/. That syllable has a rhyme identical to that of the preceding syllable with either [t] in its onset position or a segment that results from /-t/ + a preceding onset, cf. (5). Some crucial examples are repeated in (19).

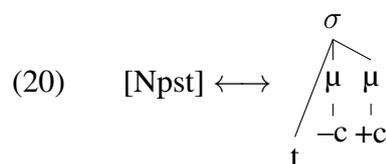
(19) *Athpare: extract of the non-past paradigms*

(Ebert 1997)

| A/P    | 3s                        | 3Ns                        | intr.                   |
|--------|---------------------------|----------------------------|-------------------------|
| 1s     | -u-ŋ-t<br>[uŋtuŋ]         | -u-ŋ-tsi-t<br>[uŋtsiŋtsiŋ] | -ŋa-t<br>[ŋaʔa]         |
| 1de    | -tsi-u-t-ŋa<br>[tsutsuŋa] | -tsi-u-t-ŋa<br>[tsutsuŋa]  | -tsi-t-ŋa<br>[tsitsiŋa] |
| 1pi,2p | -u-m-t<br>[umtum]         | -u-m-tsi-t<br>[umtsimtsim] | -i-t<br>[iti]           |

### 3.3.1. A defective morpheme in Athpare

As in the case of nasal copying, we found no general phonotactic optimization effect that could motivate this process and it was concluded that it was another example for morpheme-specific copying. The analysis I propose for that copying is therefore in essence identical to the one we saw above for the nasal copying: the triggering morpheme /-t/ has a defective, radically underspecified phonological structure in its representation that cannot be interpreted on its own but must be made interpretable through filling it with copied – i.e. fissioned – material. This defective phonological structure was a defective segment node in Bantawa and is a larger prosodic constituent in Athpare: a syllable. Since the segmental content of the non-past morpheme /-t/ is always realized in the onset position of this additional syllable, I assume that it is associated directly to a syllable node. The only other content of this syllable are two moras dominating two radically underspecified segments as can be seen in (20), where I abbreviated the full feature-geometric structure for /-t/. Since the /-t/ is associated to the syllable node without any intervening mora, we can circumscribe the configuration in (20) as a /-t/ that is prespecified as onset in a syllable that lacks its nucleus and coda.<sup>12</sup> Syllabic faithfulness constraints ensure that the syllable template is realized faithfully, e.g. that the association of the syllable node to the /t/ is preserved faithfully and resyllabification of /t/ into another syllable position is impossible (for discussion of faithfulness constraints for prosodic nodes and association to prosodic nodes cf. e.g. Bermudez-Otero (2001) or Elfner (2006)).

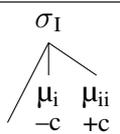
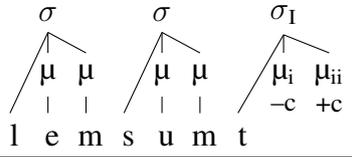
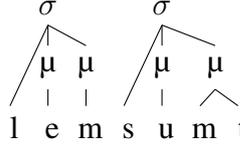
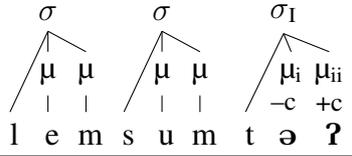
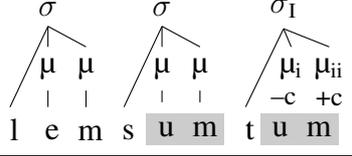


<sup>12</sup>As a reviewer points out, an alternative is the assumption that the whole rhyme is copied in Athpare. This presupposes that the rhyme is taken to be a constituent of its own that is visible for the phonology. The assumptions of moras as the only prosodic constituents under the syllable is the by far more restrictive and more economic assumption and leaves notions as ‘onset’ or ‘coda’ and ‘rhyme’ as purely descriptive notions without any independent theoretical status. The only relevant distinction for the phonology is – in a standard moraic theory – whether a segment is dominated by a mora (=‘rhyme’) or whether it is directly dominated by the syllable node (=‘onset’) (Hyman 1985; McCarthy & Prince 1986/1996).

As in the case of nasal copying in Bantawa, the empty segmental nodes cannot be deleted due to MAX-F but must be filled with material. In contrast to the analysis I gave for Bantawa, it is not only the constraint HAVE[ $\pm$ SON] that demands that the defective [ $\pm$ cons] segment must be fully specified but a constraint on syllabic well-formedness as well. A syllable without some interpretable segment dominated by a mora that is interpreted as nucleus is excluded.

The tableau in (21) illustrates the example ‘We (incl) beat him’ where the stem /lem(s)/ is followed by the suffix /-u/ marking a third person object, the suffix /-m/ for the plurality of the agent and the non-past marker /-t/. Candidate (21-a) realizes the input structure faithfully and leaves the additional syllable positions empty. This is excluded by the demand to have a nucleus. Candidate (21-b) avoids this violation by simply deleting the empty syllable positions but is excluded by MAX-F (and MAX- $\mu$ ). The candidate filling these defective segments with epenthetic features is given in (21-c) and is excluded by high-ranked DEP-F. Fission as in candidate (21-d) is therefore left as the best repair strategy to fill these otherwise uninterpretable segmental nodes in Athpare. Note that I excluded indices again except for the syllable and moras in the representation of /-t/ order to distinguish them from epenthetic prosodic nodes. Fission is again recognizable since I mark fissioned segments as grey.

(21) *Syllable Copying in Athpare*

|    | $\sigma_I$<br>         | MAX<br>F | DEP<br>F | HAV<br>[ $\pm$ S] | INT |
|----|----------------------------------------------------------------------------------------------------------|----------|----------|-------------------|-----|
|    | l e m s + u + m + t                                                                                      |          |          |                   |     |
| a. | <br>l e m s u m t     |          |          | *!*               |     |
| b. | <br>l e m s u m t     | *!*      |          |                   |     |
| c. | <br>l e m s u m t ə ? |          | *!*      |                   |     |
| d. | <br>l e m s u m t u m |          |          |                   | **  |

This process is again restricted to affixal material and stem segments are never copied. This is ensured by high-ranked INTEGRITY<sub>ST</sub>. Whenever no affix consonant precedes the /-t/, the additional syllable therefore remains codaless as in e.g. [lem.su.tu] ‘You beat him’, illustrated

in (22) where we see that fission of the stem consonant in candidate (22-b) is outranked by the winning candidate (22-a) leaving one of the empty syllable positions unfilled.

(22) *No coda for the additional syllable*

|    |                                                                                                                                                                                                                                                                                    |          |          |                   |             |     |
|----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|----------|-------------------|-------------|-----|
|    | $\begin{array}{c} \sigma_I \\ \swarrow \quad \searrow \\ \mu_i \quad \mu_{ii} \\ -c \quad +c \end{array}$                                                                                                                                                                          | MAX<br>F | DEP<br>F | INT <sub>ST</sub> | HAV<br>[±S] | INT |
|    | l e m s + u + m + t                                                                                                                                                                                                                                                                |          |          |                   |             |     |
| a. | $\begin{array}{ccc} \sigma & \sigma & \sigma_I \\ \swarrow \downarrow \searrow & \swarrow \downarrow & \swarrow \downarrow \searrow \\ \mu \quad \mu & \mu & \mu_i \quad \mu_{ii} \\   \quad   &   & -c \quad +c \\ l \quad e \quad m \quad s & u & t \quad u \end{array}$         |          |          |                   | *           | *   |
| b. | $\begin{array}{ccc} \sigma & \sigma & \sigma_I \\ \swarrow \downarrow \searrow & \swarrow \downarrow & \swarrow \downarrow \searrow \\ \mu \quad \mu & \mu & \mu_i \quad \mu_{ii} \\   \quad   &   & -c \quad +c \\ l \quad e \quad m & s \quad u & t \quad u \quad s \end{array}$ |          |          | *!                |             | **  |

And the constraint IDENT[σ-ROLE] is active in Athpare as well penalizing instances where fissioned elements end up in different syllabic positions. Only coda consonants can ever be copied into the empty [+cons] position following /-t/. Otherwise we would actually predict that the /t/ is copied into its own empty coda position resulting in something like \*[lemsutut]. This is excluded if IDENT[σ-ROLE] is undominated in Athpare as well.

But the assumptions so far only capture the first part of the generalization in (8), namely those cases where /-t/ is preceded by an affix that only consist of a vowel. Whenever the preceding affix has the shape CV, it can be observed that not only the vowel is copied but the onset as well. This is obscured at the surface by the already mentioned phonetic realization of /t + ts/ as [ts] and /t + ŋ, n/ as [ʔ]. Some crucial examples are repeated in (23).

(23) *Copying of /-ŋa/, /-na/ and /-tsi/*

| context | underlying | copying | phonetic surface |
|---------|------------|---------|------------------|
| 2s>1s   | -ŋa-t      | ŋatŋa   | [ŋaʔa]           |
| 1>2     | -na-t      | natna   | [naʔa]           |
| 2s>3d   | -u-tsi-t   | utsitti | [utsitsi]        |

The generalization over those patterns is that only the whole contiguous string of a morpheme can undergo fission. That is, whenever the vocalic features of a morpheme CV are fissioned to fill the following syllable nucleus, its onset features are fissioned as well. This ‘whole-morpheme-fissioning’ is predicted from a restrictive version of CONTIGUITY (McCarthy & Prince 1995; Landman 2002) demanding that a morpheme should form a contiguous string, formulated as in (24).<sup>13</sup>

<sup>13</sup>Since [±son] features are assumed to undergo fission (and consequently all the feature structure below them) and [±son] is located inside the root node (Schein & Steriade 1986; McCarthy 1988; Clements & Hume 1995;

- (24) CONTIGUITY<sup>R</sup> Assign a violation mark for every pair of output segments  $o_1$  and  $o_2$  if  $o_1 \mathfrak{R} i_1$  and  $o_2 \mathfrak{R} i_2$  and  $i_1$  directly precedes  $i_2$  but  $o_1$  does not directly precede  $o_2$ .

This definition actually departs from the original definition in McCarthy & Prince (1995) and is more restrictive since it not only demands that the contiguous input string must form a contiguous string somewhere in the output but that *all* elements corresponding to an input string must be part of a corresponding contiguous output string. In fact, it is reminiscent of a strict version of LINEARITY, referring to adjacency. This difference becomes apparent only if segments have multiple output correspondents. Whereas an input sequence /ab/ corresponding to an output sequence abxa does not violate the original version of CONTIGUITY (McCarthy & Prince 1995), it violates the more restrictive version in (24).

The effect of CONTIGUITY<sup>R</sup> in Athpare can be seen in (25) where it demands fission of /ts/ whenever /i/ is fissioned in order to keep the morpheme contiguous in all its two occurrences in the segmental string. Recall again that this is obscured at the surface since only [tsi] is phonetically realized. In tableau (25), I exclude the stem and only evaluate the combination of /-tsi/ and a following /-t/. If one looks at winning candidate (25-b) that fissions all segmental content of morpheme /-tsi/, a straightforward objection against this structure is that resyllabification is expected resulting in /tsit.sit/. This, however is impossible since the syllabic template of /-t/ with all its associations is preserved by high-ranked faithfulness constraints.

- (25) *Only contiguous morphemes are copied in Athpare*

|    | $\sigma_1$<br>$\begin{array}{c} \mu_a \quad \mu_b \\ -c \quad +c \end{array}$<br>$ts_1 i_2 + t_3$                                          | CON <sup>R</sup> | HAV<br>[±S] | INT |
|----|--------------------------------------------------------------------------------------------------------------------------------------------|------------------|-------------|-----|
| a. | $\begin{array}{c} \sigma \quad \sigma_1 \\ \mu \quad \mu_a \quad \mu_b \\   \quad -c \quad +c \\ ts_1 i_2 \quad t_3 \quad i_2 \end{array}$ | *!               | *           | *   |
| b. | $\begin{array}{c} \sigma \quad \sigma_1 \\ \mu \quad \mu_i \quad \mu_{ii} \\   \quad -c \quad +c \\ ts_1 i_2 t_3 ts_1 i_2 \end{array}$     |                  | *           | **  |

Halle 1995), the contiguity constraint can refer to ‘segments’. Corresponding features inside segmental root nodes are therefore taken as sufficient to identify ‘segments’ as corresponding.

3.3.2. No backwards copying

The copying in Athpare always applies ‘forward’, i.e. it never copies segments into the empty position that follows /-t/. Actually there is only one suffix that ever follows the tense morpheme /-t/: the first person marker /-ŋa/. The surface form in those examples, e.g. in /lems-u-m-t-ŋa/ is never \*/lemsumtŋa/ that results if /-ŋa/ is copied but always /lemsumtumŋa/ where the syllable preceding /-t/ is copied. I take this to be an effect of the dispreference to have a fissioned final syllable. This is a straightforward effect from positional faithfulness (McCarthy & Prince 1995; Steriade 1995; Casali 1996; Beckman 1998) preserving the final syllable faithfully.<sup>14</sup> INTEGRITY sensitive to the final syllable INTEGRITY<sub>FINσ</sub> is taken to be ranked in the same stratum as INTEGRITY. From this it follows that fission of the final syllable is indeed possible if this is the only strategy to fill the otherwise empty syllable positions with affix material (26-I) but is excluded if there is the choice between fissioning the final syllable or the penultima (26-II).

(26) Fission of the final syllable...

|                                                               | MAX<br>F                                                                                                                                                                                                                                                                                                                                                  | DEP<br>F | HAV<br>[±S] | INT | INT<br>FINσ |
|---------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-------------|-----|-------------|
| I. ... is possible if no other affix material is present.     |                                                                                                                                                                                                                                                                                                                                                           |          |             |     |             |
| a.                                                            | $\begin{array}{c} \sigma \quad \sigma \quad \sigma_I \\ \diagup \quad \diagdown \quad \diagup \quad \diagdown \\ \mu \quad \mu \quad \mu \quad \mu \\   \quad   \quad   \quad   \\ l \quad e \quad m \quad s \quad u \quad m \quad t \end{array}$                                                                                                         |          |             | *!* |             |
| b.                                                            | $\begin{array}{c} \sigma \quad \sigma \quad \sigma_I \\ \diagup \quad \diagdown \quad \diagup \quad \diagdown \\ \mu \quad \mu \quad \mu \quad \mu \\   \quad   \quad   \quad   \\ l \quad e \quad m \quad s \quad u \quad m \quad t \quad u \quad m \end{array}$                                                                                         |          |             | **  | **          |
| II. ... is impossible if preceding affix material is present. |                                                                                                                                                                                                                                                                                                                                                           |          |             |     |             |
| a.                                                            | $\begin{array}{c} \sigma \quad \sigma \quad \sigma_I \quad \sigma \\ \diagup \quad \diagdown \quad \diagup \quad \diagdown \quad \diagup \quad \diagdown \\ \mu \quad \mu \quad \mu \quad \mu \quad \mu \\   \quad   \quad   \quad   \quad   \\ l \quad e \quad m \quad t \quad s \quad i \quad t \quad \eta \quad a \quad \eta \quad a \end{array}$      |          |             | **  | *!*         |
| b.                                                            | $\begin{array}{c} \sigma \quad \sigma \quad \sigma_I \quad \sigma \\ \diagup \quad \diagdown \quad \diagup \quad \diagdown \quad \diagup \quad \diagdown \\ \mu \quad \mu \quad \mu \quad \mu \quad \mu \\   \quad   \quad   \quad   \quad   \\ l \quad e \quad m \quad t \quad s \quad i \quad t \quad t \quad s \quad i \quad \eta \quad a \end{array}$ |          |             | **  |             |

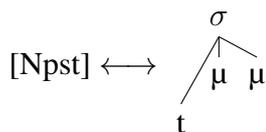
<sup>14</sup>Positional Faithfulness constraints are proposed to account for facts of positional neutralization (Trubetzkoy 1939), i.e. the phenomenon that phonological material in a ‘strong’ position resists a phonological alternation that can be observed in the corresponding weak position. Examples for strong positions are typically stems (vs. affixes) or material standing at the edge of a constituent.

The analysis I proposed for the nasal copying in Bantawa and the syllable copying in Athpare crucially hinges on the assumption of defective elements in the representation of certain morphemes. If these copying processes are indeed morpheme-specific, more than one copying operation is predicted to apply if more than one triggering morpheme is present. This prediction is borne out in Athpare where we do find nasal copying after /-tsi/ and syllable copying after /-t/ whenever these morphemes occur in the same suffix string. An example for this interaction is the form for ‘I beat them’ [lemsuŋtsiŋtsiŋ] resulting from the underlying form /lem(s)-u-ŋ-tsi-t/.

### 3.3.3. A simpler alternative?

To conclude this analysis for syllable copying in Athpare, I briefly discuss an apparently simpler alternative representation for the /-t/ in Athpare. One could ask why the prosodic treelet in the representation of /-t/ is specified for segmental features. Wouldn’t it be sufficient to have two catalectic moras (Kager 1999; Kiparsky 1991) under the syllable node as in (27)? Those empty moras would demand some segmental content and fission of a whole segment would apply to fill these empty syllable positions.

(27) *Alternative representation for /t/?*



Such a defective structure would actually predict surface metathesis for some contexts and no surface effect at all in other contexts. This follows since filling the empty syllable position with segments that are already present underlyingly causes less constraint violations than fission of segments. Splitting an input element into multiple instances of itself does not only violate INTEGRITY but LINEARITY as well, the correspondence-theoretic constraint preserving the underlying order of elements.<sup>15</sup> The violation marks of a candidate that only reorders segments are therefore always a subset of a candidate achieving the same result through fission. This is illustrated in the tableau (28). A /-t/ with two empty moras in its representation is attached to a stem and the constraint ranking demands that these two empty moras must be filled with non-epenthetic material. The moras that do not dominate any segment cannot be interpreted on their own and are excluded by constraints like HAVE[±SON]. It is impossible to delete the moras (high-ranked MAX-μ) or to fill them with epenthetic features in order to make them interpretable (high-ranked DEP-F). The only chance to realize those empty moraic positions is to fill them with material that corresponds to input material. Given that stem material can never undergo fission in Athpare, two possibilities remain to fill the moraic positions: two affix segments that precede the /-t/ in the input can associate to the moras as in candidate (28-b) or the two affix segments preceding /-t/ can undergo fission as in candidate (28-a). Crucially, both the metathesis candidate (28-a) and the fission candidate violate LINEARITY. But the latter also violates INTEGRITY and is always harmonically bound by a reordering-only candidate. Again,

<sup>15</sup>Cf. the discussion in Section 3.1.

the underlying moras are identifiable since they bear an index and to ease the identification of metathesis, I include indices for the segments as well. ☛ indicates the candidates that are empirically correct, but does not become optimal under the given ranking.

(28) *Misprediction: Metathesis instead of Copying*

|      |                                                                                                                                                                                                                                                                                                   |              |          |                    |     |     |
|------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|----------|--------------------|-----|-----|
|      | $\begin{array}{c} \sigma_1 \\ \swarrow \quad \searrow \\ \mu_i \quad \mu_{ii} \end{array}$                                                                                                                                                                                                        | MAX<br>$\mu$ | DEP<br>F | HAV<br>[ $\pm S$ ] | LIN | INT |
|      | $l_1 e_2 m_3 s_4 + u_5 + m_6 + t_7$                                                                                                                                                                                                                                                               |              |          |                    |     |     |
| ☛ d. | $\begin{array}{ccc} \sigma & \sigma & \sigma_1 \\ \swarrow \downarrow \searrow & \swarrow \downarrow \searrow & \swarrow \downarrow \searrow \\ \mu \quad \mu & \mu \quad \mu & \mu_i \quad \mu_{ii} \\   \quad   &   \quad   &   \quad   \\ l_1 e_2 m_3 s_4 & u_5 m_6 & t_7 u_5 m_6 \end{array}$ |              |          |                    | **  | *!* |
| ☛ e. | $\begin{array}{ccc} \sigma & \sigma & \\ \swarrow \downarrow \searrow & \swarrow \downarrow \searrow & \\ \mu \quad \mu & \mu \quad i \quad \mu_{ii} & \\   \quad   &   \quad   \quad   & \\ l_1 e_2 m_3 s_4 & t_7 u_5 m_6 & \end{array}$                                                         |              |          |                    | **  |     |

And if the first person suffix /-ŋa/ follows /-t/, yet another surface effect is predicted under this apparently simpler alternative representation for /-t/. Our alternative representation where the /-t/ has only two empty moras in its representation predicts that the /ŋ/ and the /a/ are simply syllabified under the templatic syllable of /-t/ resulting in a sequence /tŋa/ (phonetically realized as [ʔa]). This prediction is illustrated in the tableau (29) where the affix string /t + ŋa/ is evaluated. Candidate (29-a) is the correct output in Athpare: the preceding affix vowel /i/ is fissioned to fill the otherwise empty moraic position under violation of INTEGRITY and LINEARITY. Candidate (29-b), however, does not violate any of these faithfulness constraints and simply syllabifies the following /ŋa/ under the templatic syllable of /-t/.

(29) *Misprediction: No surface effect instead of Copying*

|      |                                                                                                                                                                                                                    |              |          |                    |     |     |
|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|----------|--------------------|-----|-----|
|      | $\begin{array}{c} \sigma_1 \\ \swarrow \quad \searrow \\ \mu_a \quad \mu_b \end{array}$                                                                                                                            | MAX<br>$\mu$ | DEP<br>F | HAV<br>[ $\pm S$ ] | LIN | INT |
|      | $i_1 + t_2 \quad + \quad \eta_3 a_4$                                                                                                                                                                               |              |          |                    |     |     |
| ☛ a. | $\begin{array}{ccc} \sigma & \sigma_1 & \sigma \\   & \swarrow \downarrow \searrow & \swarrow \downarrow \searrow \\ \mu & \mu_a \quad \mu_b & \mu \\   &   \quad   &   \\ i_1 & t_2 i_1 & \eta_3 a_4 \end{array}$ |              |          | *                  | *!  | *   |
| ☛ b. | $\begin{array}{ccc} \sigma & \sigma_1 & \\   & \swarrow \downarrow \searrow & \\ \mu & \mu_a \quad \mu_b & \\   &   \quad   & \\ i_1 & t_2 \eta_3 a_4 & \end{array}$                                               |              |          | *                  |     |     |

This misprediction is avoided in the analysis I proposed above. Since the empty segmental positions are already specified as segments through their [+cons] feature, it is impossible to simply shift a fully specified segment into this position. High-ranked MAX-F preserves a [ $\pm$ cons] feature that is already present in the input and prohibits a candidate where a fully-specified segment is realized in a position already specified as segment.

#### 4. Conclusion

I have discussed two examples for copying inside the affix string in Kiranti languages and concluded that those processes are morpheme-specific. The analysis I presented therefore locates the trigger for the copying inside the underlying representation of the morphemes in question. Those morphemes are argued to be phonologically defective in the sense that they have some defective phonological element in their representation that cannot be interpreted on its own. In Bantawa, I showed that a radically underspecified segment triggers copying of a preceding sonorant and in Athpare, a syllable with two empty segmental positions triggers copying of a vowel and a coda consonant. Although both pattern target elements of different size, they are actually quite similar and underly the same restrictions: *first*, they only apply inside the affix string and preceding stem material is never copied and *second*, elements can only be copied if the two instances of the same element are realized in the same syllable position. The two crucial constraints that are high-ranked in both languages are therefore INTEGRITY<sub>ST</sub> and IDENT[ $\sigma$ -ROLE].

This analysis is based on the assumption that phonological copying is a general repair strategy to avoid marked structure (Kirchner 2007, 2010) and allows a general account for morphological reduplication and other copying phenomena without any copying-specific mechanism. In addition, the assumption that defective prosodic structure can be (part of) a morpheme derives different kinds of non-concatenative morphology as well: if copying is a possible strategy to fill empty positions, processes like epenthesis or e.g. lengthening of segments are as well. An important empirical argument for such a general account are therefore instances of non-concatenative allomorphy (Zimmermann 2010; Bye & Svenonius to appear) that are easily predicted by analyses as the one I presented here. Most interestingly, a related phenomenon in another Kiranti language even provides exactly such an instance where copying alternates with epenthesis. In Chintang (Bickel et al. 2007, 2010), lexical stems can be compounded with a second verb (so-called v2 or vector verb) that fulfills a grammatical or explicatory function.<sup>16</sup> Those v2 verbs have the general prosodic subcategorization restriction that they can only attach to disyllabic hosts. Since regular stems are generally monosyllabic in Chintang, the stem must become ‘bigger’ if it is compounded with a v2 verb. To create this disyllabic foot, stems are augmented by a regular inflectional suffix that is regularly attached *after* the v2 verb. The interesting case is now that in the absence of any suffix, epenthetic elements are inserted to create a disyllabic host (Bickel et al. 2007:50). This is therefore exactly such an instance of non-concatenative allomorphy where copying alternates with epenthesis. Since the minimal word in Chintang is not disyllabic, this is a true morpheme-specific requirement and can be anal-

<sup>16</sup>This is a common feature in South-Asian languages, e.g. (Kachru & Pandharipande 1980; Deoskar 2006; Butt 2010).

used as resulting from a defective phonological representation as well: those v2 stems would be preceded by an empty foot that must be filled with material, either copied or inserted.

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