*LF complex predicate formation: the case of participle fronting in Serbo-Croatian**

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Abstract

We argue that cases of so-called long head movement in Serbo-Croatian, in which a participle precedes an auxiliary, involve complex predicate formation in covert syntax (LF). Following Wilder & Ćavar (1994) and Bošković (1995, 2001), we analyse these cases not as involving actual long head movement, but rather as head-to-head adjunction of the lower verb to the higher (verb clustering). Contrary to what these authors assume, however, we argue that, exceptionally, it is the participle that is merged as the higher verb, the auxiliary as the lower one. The auxiliary adjoins to the participle at LF. Any arguments can be licensed by the thematic properties of the participle, despite being merged in a lower phrase, as a result of the formation of a complex predicate consisting of participle and auxiliary at LF, the level where the theta-criterion is checked. This analysis provides an explanation for the verb clustering that does not occur in general in Serbo-Croatian, and makes possible a straightforward account of the word order possibilities in cases of verbal complexes with three verbs, of the fact that elements that are high in the structure block participle fronting whereas elements that are lower in the structure do not, and of certain gapping data.

1 Introduction: apparent Long Head Movement in Serbo-Croatian

A well-known property of Serbo-Croatian (SC) are its second position clitics. One element that has an instantiation as such a clitic is the auxiliary *biti* 'to be'. In (1) some examples are given in which the clitic form *je* 'is' from the paradigm of *biti* follows a subject (1a) or some other element (1b-c) in a main clause, or a complementizer in an embedded clause (1d).

(1) a. Ivan je pojeo sve gljive.
Ivan is eaten all mushrooms
'Ivan has eaten all the mushrooms.'

*For discussion on long head movement, we would like to thank Neil Smith, as well as Marijana Marelj and the audience at the linguistics colloquium at University of Nijmegen.

b. Sve gljive je pojeo.
all mushroom is eaten
'He has eaten all the mushrooms.'
c. Sve je gljive pojeo.
all is mushrooms eaten
d. (…) da je pojeo sve gljive.
that is eaten all mushrooms

We will not go into the question what the proper characterisation is of the 'second position' in which such clitics must occur; for detailed discussion see Halpern 1995, Franks & King 2000, Bošković 2001, Čamdžić & Hudson 2002, and references mentioned there.

What we will be concerned with is a construction that has come to be known under the name of 'long head movement' (Lema & Rivero 1990, Rivero 1991, Roberts 1993), for which we will use the more analysis-neutral term 'participle fronting' henceforth. In this construction, the clitic auxiliary is preceded by the participle.[1] Thus (1a-c) can be contrasted with the participle fronting cases in (2).

(2) a. Pojeo je sve gljive.
eaten is all mushrooms
'He has eaten all the mushrooms'
b. Bio je pojeo sve gljive.
been is eaten all mushrooms
'He had eaten all the mushrooms'
c. Pojeo je bio sve gljive

This construction has a number of unexpected properties, both from an empirical and a conceptual point of view. At first sight, it may seem to be just another instance of the type of sentence in (1b-c), with a constituent fronted to a position before the clitic auxiliary. In this case the fronted constituent would be a VP that is emptied of all its material besides its head, the participle. Such 'remnant VP

[1] In fact, other predicative elements besides participles can be fronted as well, so the construction could be more appropriately labelled 'predicate fronting' (compare also section 5). An example is given in (i), where an adjectival predicate is fronted across a clitic form of the copula:

(i) Sretna je.
happy-AGR is
'(she) is happy'

We will focus on the participle fronting case, under the assumption that the analysis will extend to other cases of predicate fronting.

movement' is familiar from Germanic languages like German (see Den Besten & Webelhuth 1989, Müller 1998). SC does indeed have VP-topicalisation, as illustrated by an example like (3), so there is no reason to expect it cannot have remnant VP-topicalisation as well.

(3) Pojeo sve gljive Ivan jeste.
eaten all mushrooms Ivan is
'Ivan did eat all the mushrooms.'

Nevertheless, participle fronting cases like in (2) have some properties that are not shared by VP-topicalisation, as noted by Rivero (1994) and others. Three differences between the two are the following.

First, participle fronting is impossible in SC across the non-clitic forms of those auxiliaries that license participle fronting in their clitic guise (although it is possible across other full auxiliary forms such as past tense *bješe*). But there is nothing wrong with topicalizing a VP across such an auxiliary in its full form. This contrast is illustrated in (4) ((4a-a") from Boškovic 2001:76). (Note that *su* is the clitic form for 'are', *jesu* the full form; compare also the full form *jeste* 'is' in (3) and (4b) with the clitic form *je* in (2)).

(4) a. Poljubili su Mariju.
kissed are Maria
'They kissed Maria.'
a'. *Poljubili jesu Mariju
kissed are Maria
a". Poljubili Mariju jesu.
kissed Maria are
'They did kiss Maria'
b. ?*Pojeo (Ivan) jeste sve gljive
eaten (Ivan) is all mushrooms

Second, if participle fronting involved (remnant) XP-topicalization, we would not expect it to be clause-bound – as it in fact is. (Remnant VP-topicalization in Germanic, for example, is not clause-bound).

Third, an often observed, though not yet very well understood, property of reduced forms of auxiliaries and copulas (amongst other reduced forms) is that they are bad when string adjacent to a gap. In English this is illustrated by the impossibility of auxiliary or copula contraction in front of an elided VP (5a) or in front of a sluicing gap (5b). Something similar can be observed for clitic auxiliaries in SC: VP-topicalisation is impossible if the trace of the VP directly follows a clitic auxiliary. This is shown by (5c).

(5) a. She won't go to Glasgow, but he will / *he'll [e]
b. I know he is not in that movie, but I don't know who is / *who's [e]
c. ?*Pojeo sve gljive je.
eaten all mushrooms is

In cases of participle fronting, however, there is no problem with the clitic auxiliary being the last element in the string, indicating that apparently no trace follows it. Thus, (6) contrasts with (5c).[2]

(6) Pojeo je.
eaten is
'He has eaten something'

Finally, the presence of heads like the question particle *li* and the sentential negator blocks participle fronting in SC, whereas there is no reason to expect heads to block XP-topicalisation (compare (7b) with the case of full VP-topicalization in (7c), for instance):[3]

(7) a. *Pojeo li je gljive.
eaten Q is mushrooms
'Has he eaten mushrooms?'
b. *Pojeo nije gljive.
eaten not-is mushrooms
'He has not eaten mushrooms.'
c. Pojeo gljive nije.
eaten mushrooms not-is
'He did not eat mushrooms.'

Some phrasal elements, too, are incompatible with participle fronting over a clitic auxiliary, in particular overt nonfocused subjects and sentential adverbs (see below).

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[2] Note that it is unlikely that (5c) is ruled out independently by the requirement that the clitic must be in second position. This of course depends on what the correct definition of 'second position' is, but since the clitic can follow other fronted constituents (like the object in (1b)), there should be nothing wrong when it follows a fronted VP either. For this reason, Bošković (2001) argues that clitics are not proper head governors, so that they cannot save the trace of a topicalized VP in their complement position from violating the ECP.

[3] An example like (7a) again is not out because of the second position requirement of the clitic *je*. *li* is a clitic itself and forms a cluster with other clitics; this cluster as a whole must be in second position, as it in fact is in (7a).

Because of such differences, a number of authors have concluded that participle fronting involves head movement rather than XP-movement - at least for SC.[4] Such proposals basically come in two variants (or a combination of the two), one in which the participle undergoes substitution into a head position above the auxiliary, and one in which the participle adjoins to the auxiliary. In the next section we will discuss these two types of analysis.

2 Substitution or adjunction

2.1 Long head movement

According to the first type of analysis, the participle moves into a head position above the auxiliary, after which (either in syntax or at PF) the auxiliary cliticizes to the participle. This means that in such analyses there is actual long head movement of the participle, as this skips the head position in which the auxiliary occurs on its way to the higher head; see Lema and Rivero 1991, Rivero 1991, Roberts 1993. The higher head to which the participle moves is usually taken to be C. As evidence for this, Rivero points out that participle fronting is restricted to root clauses, in which C is not occupied already by a complementizer. In SC, participle fronting indeed does not occur in embedded clauses introduced by a complementizer (or at least, speakers find this marginal):[5]

(8) ?? (...) da pojeo je gljive.
that eaten is mushrooms

Moreover, as noted, participle fronting is blocked by the question particle *li* which may plausibly be assumed to occupy C. According to Rivero and Roberts, then, the complementary distribution between participle fronting and clauses with a filled C position indicates that the participle moves to C. (A parallel can be drawn with the classic analysis of verb second: in some Germanic languages V2 is blocked in

[4] An interesting account of participle fronting in Bulgarian in terms of phrasal movement is given in Broekhuis & Migdalski 2003. Significantly, Bulgarian participle fronting differs from SC participle fronting with respect to some of the properties just discussed; for example, it is not blocked by heads like *li* (see also Lambova 2002 for discussion).

[5] However, in contrast to the cases discussed in footnotes 2 and 3, this is ruled out independently by the second position requirement of the clitic. The complementizer fills the first position, and clitics must occur directly after it in SC. In a language in which clitics need not occur in second position, like Bulgarian, participle fronting is possible in embedded clauses, see Embick & Izvorski 1995 and Lambova 2002.

clauses with a filled C, and this too has been taken as evidence that the verb moves to C; see Den Besten 1983).

The disadvantage of this approach is that the concept of long head movement in itself is probably undesirable. One of the most fundamental properties of movement processes appears to be that they are subject to some sort of relativized minimality requirement (Rizzi 1990, Chomsky 1995). Elements that move in general do not skip elements of the same type. Put differently, if movement is 'attraction' of some element by a 'probe', the probe attracts the closest element that can undergo the movement (Chomsky 2001). With respect to head movement, the result is that moving heads cannot skip other heads, a restriction known as the Head Movement Constraint (Travis 1984, Baker 1988). This constraint excludes the hypothesized movement of the participle to C, which skips the head position of the auxiliary, in 'long head movement' cases.

Roberts (1993) proposes to deal with this problem by adopting a distinction between two types of heads, A-heads and A'-heads, on a par with the A/A'-distinction for phrasal positions (see also Li 1990). Phrasal A'-movement can skip A-positions without problems. A *wh*-moved object, for example, can skip an in situ subject. Similarly, Roberts proposes that, if the auxiliary is in an A-head position and the position to which the participle moves is an A'-head position, the head movement instantiation of relativized minimality is satisfied after all.

There remains a problem, however. Cases in which a phrase undergoes A'-movement across another phrase are possible when the other phrase is not a potential target for the same movement. An object can be *wh*-moved across a non-*wh* subject. If the higher element is itself a potential target for the movement, then moving the lower element is impossible (Superiority). So, a *wh*-object cannot be moved across a *wh*-subject.[6] For Roberts's solution of the long head movement problem to work, the auxiliary should not itself be a potential target for the movement to C. That is unlikely, however, when we consider that in languages that have general or residual V-to-C movement, it is the auxiliary that moves to C in periphrastic tenses, not the participle (see the Dutch example in (9)).[7]

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[6] Exceptions to Superiority occur if one or more of the *wh*-phrases is D-linked (Pesetsky 1987), which is not at issue in the case of head movement.

[7] It is often even claimed that only finite verbs can undergo V-to-C, but this is presumably not correct in general. Various cases have been reported in which, in clauses without a finite verb above the nonfinite one, an infinitive or participle can move to C; see Johnson & Vikner 1994 (on infinitives in Icelandic control clauses), Hoekstra 1997 (on infinitives in Frisian), Hoeksema 2001 (on present participles in early modern Dutch).

(9) a. Gisteren heeft ze het derde pianoconcert van Beethoven gespeeld
yesterday has she the third piano-concerto of Beethoven played
'Yesterday she played Beethoven's third piano concerto'
a'. *Gisteren gespeeld ze het derde pianoconcert van Beethoven heeft

Of course, moving the clitic auxiliary to C instead of the participle leads to ungrammaticality in SC, as a clitic would end up in first position:

(10) *Je pojeo gljive.
is eaten mushrooms

This, however, is out because of a phonological requirement of the clitic, not because the auxiliary is not a potential target for verb movement in syntax. As argued in detail by Bošković, syntax is not sensitive to such phonological requirements of the clitic. Rather, phonology filters out a subset of the possible syntactic configurations, namely those that lead to a violation of the relevant requirement.

This latter point also relates to another problem for accounts of participle fronting in terms of long head movement. In various models of grammar evidence has been put forward for the idea that syntactic movement is costly, at least if it is overt. If there are two derivations or representations that do not differ in interpretation but only in the presence or absence of a movement chain, then the one with movement appears to be blocked. Consequently, movement only occurs if it is necessary to prevent the derivation/representation from crashing, or to get a different interpretation (compare Chomsky 1995, 2001, Grimshaw 1997, Fox 2000). This brings up the question what triggers the hypothesized participle substitution into C in SC. Since SC is not a (residual or general) verb second language, C does not appear to have a need to be occupied by a verbal element in general in this language. The participial verb only moves to this position in the long head movement construction.

According to Rivero, this indicates that the movement is a last resort operation, which saves a clitic auxiliary from ending up in first position. Arguably, however, the second position requirement of SC clitics is a phonological, rather than a syntactic, requirement (see Halpern 1995, Franks & King 2000, Bošković 2001 and references cited there). This means that, if the participle is placed in C by syntactic movement, a syntax-internal operation of movement must be triggered by the demands of another module, phonology. Syntactic processes do not seem to show this type of sensitivity, however.

2.2 V-to-V adjunction

Bošković (1995, 2001) proposes that a different type of verb movement is responsible for the participle-auxiliary order in apparent long head movement cases, while avoiding actual long head movement. The idea is that the participle adjoins to the auxiliary, resulting in a verb cluster, as in (11). Another analysis that also involves verb clustering is proposed by Wilder & Ćavar (1994).

(11) a. …[$_{AuxP}$ Aux [$_{VP}$ Pple]] (underlying structure)
b. …[$_{AuxP}$ [$_{Aux}$ Pple$_i$ [$_{Aux}$ Aux]] [$_{VP}$ t$_i$]] (structure after V-to-V raising)

An attractive aspect of this analysis is that this kind of verb-to-verb adjunction, in contrast to long head movement, is independently attested in various other languages. For example, it is familiar from the Germanic OV languages, in which a particular class of auxiliaries obligatorily triggers verb raising of the head of their infinitival or participial complement, resulting in a verb cluster like the one in (11b) (see Evers 1975 and much subsequent work). Clauses in which verb clustering occurs behave like monoclausal constructions, not like biclausal ones. In effect, the verbs form one complex predicate which heads a single clause. This effect has come to be known as 'restructuring' (see Wurmbrand 2001 for a detailed study and further references).

In languages with verb raising the perfect auxiliary invariably belongs to the class of verbs that trigger raising of the verbal head of their complement, it always forms a cluster with the participle it selects. This is illustrated for Dutch in (12). [8]

(12) a. dat zij [Karel gezien] heeft (underlying) →
that she Karel seen has
dat zij Karel [heeft gezien] / [gezien heeft] (surface)
that she Karel has seen / seen has
b. dat zij [[Karel dansen] gezien] heeft (underlying) →
that she Karel dance seen has
dat zij Karel [heeft zien dansen] (surface)
that she Karel has see dance

[8] It is sometimes argued, in line with Kayne's (1994) antisymmetry program, that OV languages have underlying VO order, and that verb clusters are derived by leftward remnant VP movement (objects being moved out of the VP to a position further to the left than the landing site for the remnant VP); for a detailed study along these lines see Koopman and Szabolcsi 2000. We do not adopt this hypothesis here, but the issue is really immaterial to our present concerns (for relevant discussion see Evers 2002, Wurmbrand 2002, Bobaljik 2003, Williams 2003).

Note that in case the verb cluster consists of two verbs only, both possible surface orders are allowed in Dutch, but in either case the structure behaves like a monoclausal one and the evidence for clustering is the same (Evers 1975). In cases with more than two verbs, the cluster-internal order in Dutch obligatorily has governing verbs before governed verbs, but this is an accidental language-specific property; in Frisian, for example, governing verbs obligatorily follow governed verbs in the cluster. Cross-linguistically, all possible orders of three-verb clusters occur, except one (see below).

So, adjunction of the participle to the perfect auxiliary is an independently attested process, which, moreover, does not involve head movement that skips a head position. It is therefore attractive to invoke it to account for participle fronting in SC as well. We will indeed follow Bošković in assuming that the construction involves verb clustering. However, the SC cases have a number of unexpected properties if this verb clustering consists of participle-to-auxiliary movement here as well. Bošković discusses these properties in detail, but we will argue in the rest of this section that his solutions to the problems they pose are not without some problems of their own. Then in the next section we will argue that a shift in perspective on the verb clustering process in SC, especially with respect to the question of which verb starts out as the structurally higher one and which verb raises to this verb from a lower position, makes possible more straightforward accounts of the relevant properties.

Bošković's analysis faces some difficulties of an empirical as well as a conceptual nature. The empirical problems concern the question which elements block participle fronting and which do not, and the possible orders of the verbs in periphrastic tenses with three verbs. The conceptual problems concern the trigger for verb raising, and perhaps also the possibility of leaving a gap after a clitic auxiliary.

Consider first which elements are expected to block the verb clustering involved in participle fronting if this clustering consists of adjoining the participle to the auxiliary, and which elements are expected not to block it. In general, all head-to-head adjunction is subject to a strict linear adjacency condition. That is to say, a head can only adjoin to another head if nothing intervenes between the two. The issue is discussed in detail by Van Riemsdijk (1998), who formulates the constraint in (13) and provides evidence for (13a) on the basis of various constructions involving head-to-head-adjunction in German, French and Dutch.

(13) The Head Adjacency Principle (HAP)
A transformational process that affects two head positions must be either Head Adjunction or Head Substitution

a. Head Adjunction: Two phonetically identified heads are adjoined, yielding an adjunction structure, in which case the two heads must be strictly linearly adjacent at the moment of application of the rule.
b. Head Substitution: A head is moved into a head position which is phonetically empty but which may contain ϕ-features, thereby unifying the two morphosyntactic feature matrices.

Crucially, the elements that block participle fronting all seem to be elements that are relatively high in the structure. As noted, heads like the question particle *li* and negation block it. Perhaps surprisingly, phrasal elements that appear in a position above the base position of the auxiliary (presumably T, cf. Bošković 1995, 2001) block the construction, too. Bošković notes this with respect to sentential adverbs. A sentence with an adverbial phrase and auxiliary - participle order is ambiguous: the adverbial can have a VP-modifying reading or a sentence-modifying reading, as illustrated by (14a). But in the participle fronting case in (14b), the adverb can only be a VP-adverb, not a sentential modifier (examples from Bošković 2001).

(14) a. Ivan je mudro prodao kuću.
Ivan is wisely sold house
'Ivan sold his house in a wise manner.'
'It was wise of Ivan to sell his house.'
b. Prodao je mudro kuću.
sold is wisely house
'He sold his house in a wise manner.'
*'It was wise of him to sell his house.'

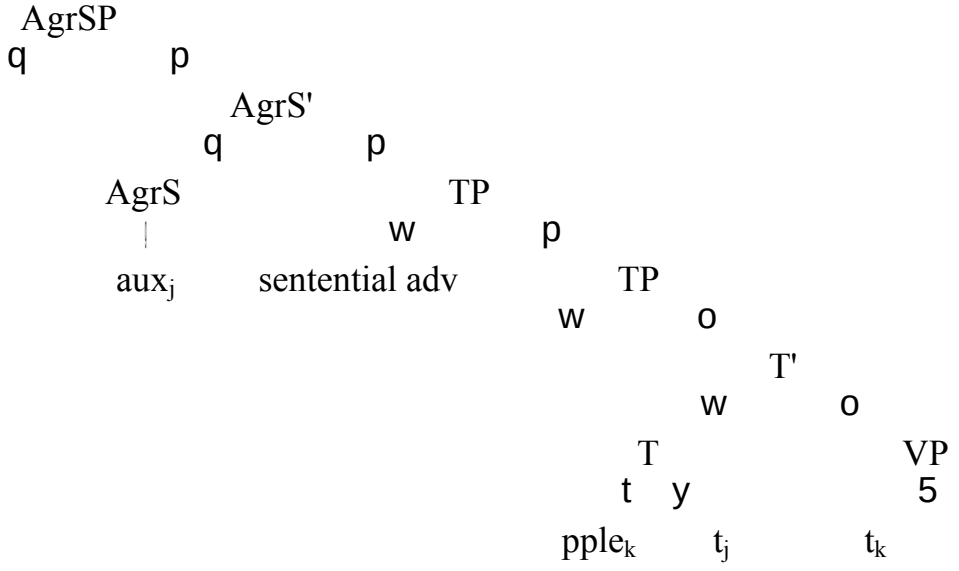
The same distinction can be observed with respect to arguments. It is no problem to have objects present in case there is participle fronting, but subjects cannot in general appear in the construction. This has been observed for Bulgarian (see Embick & Izvorski 1995, Lambova 2002 and Broekhuis & Migdalski 2003), but the same phenomenon can be observed in SC. Not only if the subject is in between the participle and the auxiliary (leading to a violation of the second position requirement of the clitic), but also when it is below the verb cluster on the surface, the result is ungrammatical; see (15a,b). (An example like (15b) becomes more acceptable when the participle is stressed and focused, an issue that we will ignore in this paper.) Subjects can only appear in participle fronting cases when they are focused, as in (15c). We will come back to this in section 4, but for now we conclude that any element that appears above the base position of the auxiliary (T) seems to make participle fronting impossible, no matter whether the element is a head or a phrase, and no matter whether the element is an argument or an adjunct.

(15) a. *Pojeo Ivan je halapljivo gljive.
eaten Ivan is greedily mushrooms
b. *Pojeo je Ivan halapljivo gljive.
eaten is Ivan greedily mushrooms
c. Pojeo je gljive IVAN.
eaten is mushrooms Ivan
'It is Ivan who ate the mushrooms.'

Bošković (2001) rules out cases where a structurally high element co-occurs with participle fronting by means of the following assumptions.

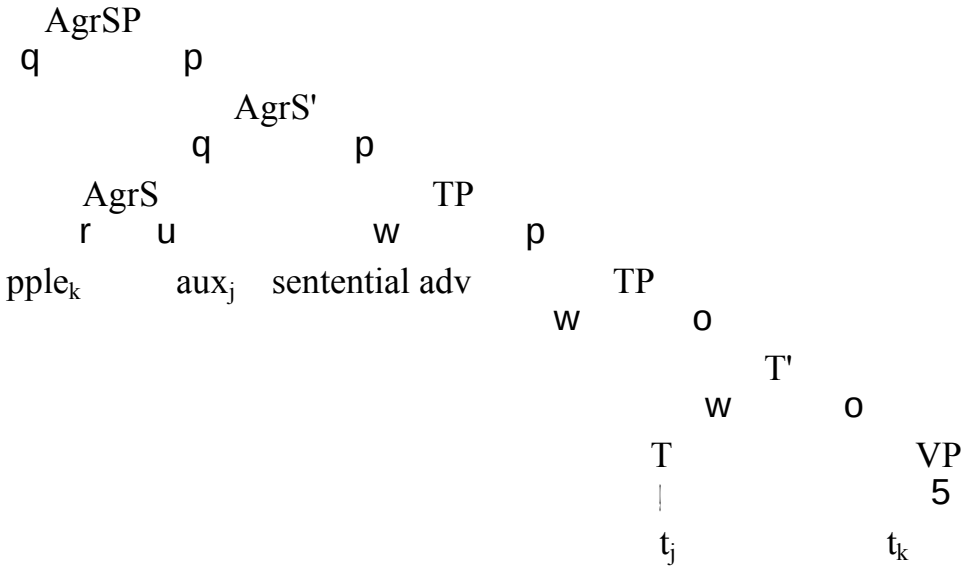
First, the participle adjoins to the auxiliary when the latter is still in its base position in T. The auxiliary can move to a higher head position (namely to AgrS), which is indicated by an example like (14a): when there is auxiliary - participle order, the auxiliary can perfectly well precede a sentential modifier. However, Bošković argues, the participle cannot be taken along under such auxiliary raising (which would give rise to the impossible interpretation for (14b)) because of a notion of economy according to which the least possible material should be moved. Thus, if the higher head position has some feature that attracts auxiliaries, the auxiliary will excorporate from the cluster it forms with the participle, rather than this cluster raising as a whole. The resulting structure then is as follows:

(16)



There is an alternative derivation that would still have the undesired result that the entire participle - auxiliary cluster could appear above a structurally high element like a sentential modifier. The auxiliary could first move to the high head position (AgrS) on its own, thereby satisfying economy, and then the participle could adjoin to it to form the cluster. The resulting structure is given in (17).

(17)



According to Bošković, this derivation is ruled out by economy as well, because in (17) the participle makes a longer movement than in the grammatical derivation in (16). Note, however, that this means that two different notions of economy are both required to derive the correct observation, namely that no elements above the auxiliary's base position are allowed to occur in cases of participle fronting. According to the first notion, economy concerns the amount of material moved, and is evaluated locally within a single derivation. According to the second notion, economy concerns the length of movement paths and is evaluated transderivationally (it compares the derivation involving short participle movement and auxiliary excorporation in (16) with the derivation involving long participle movement but no excorporation in (17)). If two different notions of economy are both needed to derive a single observation, it would appear that a generalization is missed.

More problematic from an empirical point of view, however, is the reverse observation: elements that are low in the structure, in particular elements that are in between the base positions of participle and auxiliary, do *not* block participle fronting. This is quite unexpected if the process concerns adjunction of the participle to the auxiliary. For verb raising cases in Germanic it can be shown that, in accordance with (13a), anything that linearly intervenes between the base positions of participle and auxiliary blocks the process (see Evers 1975, Reuland 1990, Van Riemsdijk 1998, Ackema & Neeleman 2002).

Consider the Dutch data in (18). In Dutch, nonpredicative PPs can either precede or follow the verb when this is in its base position. If more than one PP precedes the verb, the left one takes scope over the right one. If more than one PP follows the verb, the reverse is true: the right one scopes over the left one.

(18) a. dat Jan om die reden gedurende een tijdje het project hinderde
that John for that reason during a while the project hampered
'that it was for that reason that John hampered the project for a while'
b. dat Jan gedurende een tijdje om die reden het project hinderde
that John during a while for that reason the project hampered
'that for a while John hampered the project for that reason'
c. dat Jan het project hinderde gedurende een tijdje om die reden
that John the project hampered during a while for that reason
'as in (a)'
d. dat Jan het project hinderde om die reden gedurende een tijdje
that John the project hampered for that reason during a while
'as in (b)'

Now consider the case in which a VP headed by a participle and containing two PPs is embedded under an auxiliary, and the participle raises to the auxiliary:

(19) dat Jan het project om die reden gedurende een tijdje heeft gehinderd
that John the project for that reason during a while has hampered
'that it was for that reason that John has hampered the project for a while'
*'that for a while John has hampered the project for that reason'

As it turns out, the sentence in (19) is not ambiguous: the left PP must scope over the right one, the reverse is impossible. This means that the participle cannot have raised from a position preceding the PPs as in (20a), since then the right PP should scope over the left one. The participle must have raised from a position following the PPs, as in (20b). In other words, the PPs may not intervene between the participle and the auxiliary at the moment of application of verb-to-verb adjunction.[9]

(20) a. * $[_{AuxP}\ [_{VP}\ t_k$ om die reden gedurende een tijdje] heeft gehinderd$_k$]
b. $[_{AuxP}\ [_{VP}$ om die reden gedurende een tijdje $t_k]$ heeft gehinderd$_k$]

According to Bošković, participle fronting in SC is the same process as participle-to-auxiliary adjunction in Germanic, the only difference being that because of the VO nature of SC the participle raises leftward rather than rightward. Given that this type of head-to-head adjunction obeys a strict adjacency condition (as expressed by (13a) and empirically motivated by (18)-(20)), anything that is in between the base

[9] The participle also cannot have raised from a position in between both PPs, since if the PPs are on either side of their selecting verb, their scopal relation is ambiguous (so (19) should then allow for the impossible reading, too).

positions of participle and auxiliary should block it. This means that VP-adverbials should block it, but as we have seen such a structurally low element is precisely the type of element that does not block participle fronting in SC. So we have arrived at a paradox: an analysis of participle fronting in terms of verb-to-verb adjunction is more attractive than its alternative in terms of substitution (long head movement), but it is elements *above* the auxiliary that intervene in the adjunction process, whereas elements below the auxiliary do not intervene.

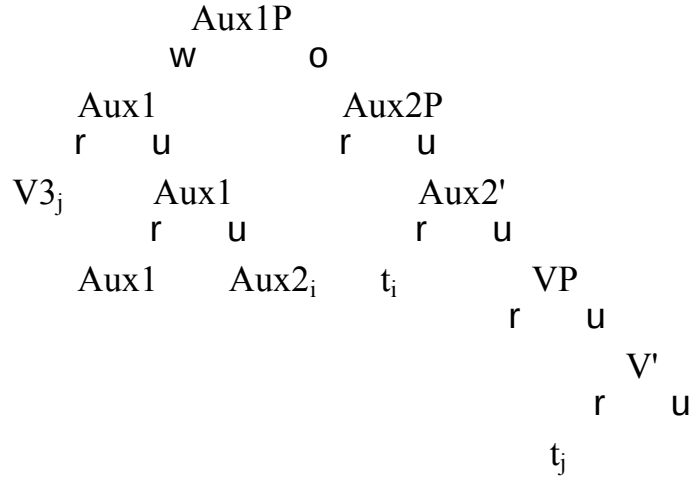
Another problem concerns cases in which there are two auxiliaries, in the past perfect. One of the auxiliaries shows up in participial form in that case, so we have a structure with one finite auxiliary and two participles, namely the second auxiliary and the main verb. Participle fronting is possible again (provided, of course, that none of the blocking elements is present and that the second position requirement of the clitic auxiliary is satisfied). Interestingly, either participle can occur as the first element:

(21) a. V3 (main) - Aux1 (clitic aux) - Aux2 (participial aux)
Pojeo je bio sve gljive.
eaten is been all mushrooms
'He had eaten all the mushrooms.'
b. Aux2 (participial aux) - Aux1 (clitic aux) - V3 (main)
Bio je pojeo sve gljive.
been is eaten all mushrooms
'He had eaten all the mushrooms.'

Especially interesting is the order in (21a). If the main verb were to raise to the clitic by participle-to-auxiliary adjunction, and if the second, nonclitic, auxiliary were in its base position, then we would still have to allow for actual long head movement: the intermediate auxiliary is skipped when the main verb raises. However, Bošković shows that the intermediate auxiliary is in fact also part of the verb cluster that results from verb raising: nothing can intervene between the V3-Aux1 combination and Aux2 in (21a), nor can anything intervene between the Aux2-Aux1 combination and V3 in (21b). This means that in (21a) the participial auxiliary, too, apparently adjoins to the clitic auxiliary (and, likewise, the main verb in (21b) adjoins to the auxiliary cluster).

According to Bošković, what happens in a case like (21a) then, is that V3 left-adjoins to Aux1 and Aux2 right-adjoins to Aux1, whereas the direction of adjunction is the opposite in (21b). Thus, (21a) is structured as in (22).

(22)



Note that in (22) there still is a form of long head movement, as the lowest verb skips the position of the intermediate one. The difference with 'real' long head movement is that this intermediate head position now contains a trace, rather than an unmoved verbal head. Chomsky (1995) hypothesises that traces are not active with respect to whatever triggers movement, which means they should not count as intervening elements with respect to the Head Movement Constraint or to the Minimal Link Condition in general. On the other hand, Baker (1988: chapter 7) argues that 'acyclic incorporation' of the type in (22) is not attested for the incorporation processes he investigated, and goes on to give an account in terms of the ECP of why this should be impossible.

Be that as it may, it can be shown that at least as far as verb raising is concerned, the assumption that the position of the intermediate verb can be skipped is undesirable, also when this position only contains a trace. When we look at what is possible in Germanic verb raising cases again, it turns out that any order in the verb cluster occurs in some dialect or other, except one. Absent is the order that results from allowing simultaneous left- and right-adjunction of two lower verbs to the highest verb, or, in other words, allowing that the lowest verb does not first form a cluster with the intermediate one and instead moves independently across the position of the intermediate one.

If we have a structure with three verbs, their underlying order in an OV language will be as in (23) (cf. footnote 8). This 3-2-1 order may also surface as such, which is what happens in Frisian for example. The intermediate verb may right-adjoin to the highest on its own, resulting in 3-1-2 order on the surface, which is a possibility in Dutch when V3 is participial. The lowest verb may left-adjoin to the intermediate one, after which this cluster can right-adjoin to the highest one, so that we get the 1-3-2 order that occurs with particular verbs in German. Or the lowest verb may right-adjoin to the intermediate one, after which this cluster can right-adjoin again to the highest verb. This gives 1-2-3, the usual order in Dutch. Finally, the lowest verb can right-adjoin to the intermediate one with this cluster

staying to the left of the highest verb, so that we get 2-3-1, which occurs with certain verbs in Afrikaans, for example. We see that head-to-head adjunction is strictly cyclic in all these cases. However, no instances are attested in which the intermediate verb left-adjoins to the highest one, and the lowest verb right-adjoins to the highest, across the trace of the intermediate one. Of the six logically possible orders, no Germanic dialect shows the 2-1-3 order that would result from such a derivation. An extensive overview of possible orders in verb clusters of various types in many Germanic languages and dialects is provided by Wurmbrand (2003), and 2-1-3 is absent.[10]

(23)]V3]Aux2]Aux1

Finally, there is a conceptual issue, which concerns the question what the trigger is for verb clustering in SC. Bošković assumes that the participle has a [+aux] feature that is checked by participle-to-auxiliary adjunction. As it stands, adopting such a feature seems ad hoc. To be fair, it is quite unclear what triggers V-to-V raising and cluster formation in the Germanic OV languages as well (for discussion, see Wurmbrand 2002 and references mentioned there). The problem is more serious for SC, however. Whatever the trigger is for verb raising in Germanic, it does indeed result in cluster formation in all cases in which particular auxiliaries select a 'defective', infinitival, verbal complement. In SC, on the other hand, the possibility of verb raising and clustering appears to be limited to the case where the auxiliary happens to be a clitic at PF, and moreover to the cases in which there is participle fronting (see section 4.4 below). Indeed, we would not expect SC to have verb raising in general. It is a VO language, whereas in general verb clustering appears to be limited to OV languages (for ill-understood reasons; see Bobaljik 2003 and references mentioned there).[11]

Bošković argues that in fact there is verb raising in SC in case the auxiliary is a full verb as well. After all, there are participle - auxiliary orders also in case the auxiliary is not a clitic:

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[10] A caveat is in order here. Schmid & Vogel (2003) report that 2-1-3 occurs in some dialects of German as a non-neutral order (next to a different, neutral, order) when one of the verbs is contrastively focussed by heavily stressing it (and that there is dialect variation with respect to which of the verbs must be stressed to allow this order).

[11] It has been argued that infinitival complements that undergo restructuring with the matrix clause may involve a kind of verb raising in VO languages as well. However, the verbs need not be adjacent in these cases (cf. Kayne 1991, who argues that verb raising is covert here, or Roberts 1997, who argues that the lower instead of the higher copy of the infinitival's movement chain is pronounced).

(24) Pojeo bješe sve gljive.
eaten be-PAST all mushrooms
'He has eaten all the mushrooms.'

However, cases like (24), involving full auxiliaries like *bješe*, might not involve head-to-head adjunction, but rather remnant VP-topicalization (cf. section 1). In contrast to the verb raising construction, remnant VP topicalization across a full auxiliary does not require adjacency between participle and auxiliary. An overt subject, for example, can intervene between the two even on the surface:

(25) Pojeo Ivan bješe sve gljive.
eaten Ivan be-PAST all mushrooms
'Ivan has eaten all the mushrooms.'

Also, if (24) involved participle-to-auxiliary adjunction, this movement would have to be optional, in contrast to Germanic verb raising. This is because there can be orders in which the auxiliary follows a sentential adverb, indicating that it is in its base position, where nevertheless the participle is not adjacent to it:

(26) Sentential adverb - Aux - VP-adverb - Participle
Mudro bješe brzo prodao kuću.
wisely be-PAST quickly sold house
'It was wise of him to have sold the house quickly.'

Bošković assumes that participle adjunction can optionally take place in covert syntax. This means that the hypothesized[+aux] feature on the participle must be of variable strength: it can either be weak or strong. It seems fair to say that this is descriptively adequate but does not offer insight as to why there must obligatorily be cluster formation in the true participle fronting cases, but not in the (remnant) VP-topicalization cases or in cases in which the participle is not fronted at all.

We conclude that, while the verb clustering analysis is attractive compared to the long head movement analysis, it still faces some problems. In the next two sections we will show that these problems can be solved ifone particular assumption of the analysis is changed.

3 LF complex predicate formation

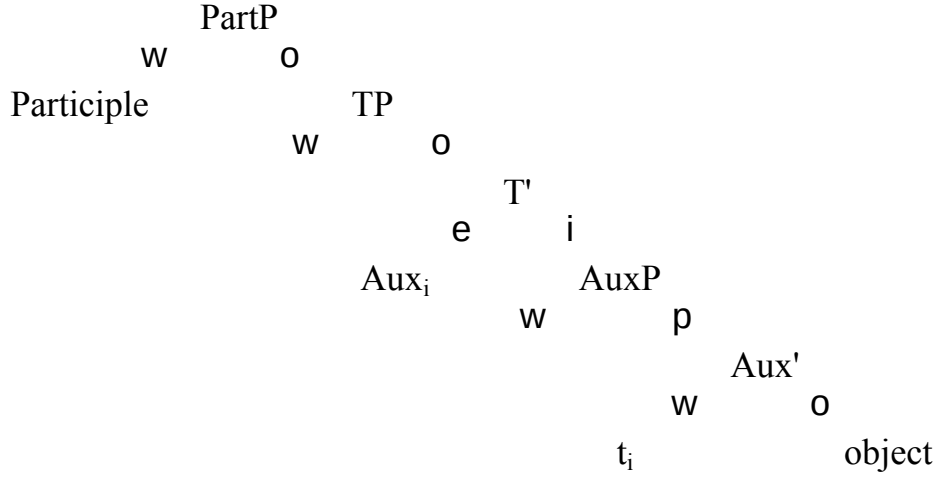
3.1 Inverse merger and auxiliary-to-participle raising

The previous analyses share one assumption: the participle undergoes some form of raising. Either it substitutes in C (long head movement) or it adjoins to the auxiliary

(verb raising). We will argue that a more straightforward account of the data is possible if it assumed that the participle is merged directly as the highest head in the structure, above the auxiliary.[12] The auxiliary is merged as the head of the verbal projection containing the arguments and adjoins to the participle at or before LF. So we will pursue a verb clustering analysis, as proposed by Bošković, but in reverse as it were. The participle does not raise to the auxiliary; rather, it is the other way around. We will show in section 4 how this accounts for the data. First we must show that such 'inverse merger' is actually allowable.

Merger of the participle as the highest head, and merger of the auxiliary below it, results in the following underlying structure for a clause with participle fronting (for expository convenience, we label the projections headed by the participle and auxiliary PartP and AuxP here, but see section 5 for some more discussion):

(27)



Of course, if the 'classic' Government-Binding view of Θ-theory is correct, then a structure with inverse merger of main verb and auxiliary as in (27) should be impossible. In GB theory, the dedicated level at which the thematic structure of a predicate is expressed is D-structure, that is, the structure that results from the

[12] Schafer (1997) argues for a nonmovement account of long head movement constructions in Breton, with the fronted nonfinite predicate base-generated in the left periphery. In this respect our analysis has a close affinity to Schafer's proposal, although there are also some important differences. For example, Schafer argues that in long head movement cases the nonfinite verb is merged twice, not only in the left periphery but also within the VP; the lower instance of the verb (in VP) then gets deleted. This means that the cluster formation upstairs cannot be driven by the need to form a syntactic complex predicate between fronted nonfinite verb and auxiliary, as we will argue. Rather, Schafer argues that clustering does not take place in syntax, but is a prosodic process which occurs at PF. This in turn implies that the SC data discussed here cannot be captured in the way described below. It is beyond the scope of the present paper to compare the Breton data with the data discussed here and see if the proposal can be extended so as to cover both sets.

merger of all elements before any movement applies. The Projection Principle, which holds that the Θ-criterion must be satisfied at all levels of representation, then ensures that movement can never feed or bleed thematic relations (cf. Chomsky 1981).

If the Θ-criterion were indeed to apply to the underlying representation in (27) already, things would obviously go wrong. The auxiliary does not have thematic properties of its own, it being a functional rather than a lexical verb. It can therefore not license any arguments in its projection in (27). Neither can the main verb license these, since this would have to involve downward θ-role assignment into the lower phrase, which is impossible. A general restriction on all instances of θ-role assignment is that the argument must c-command the predicate (see Williams 1980 and subsequent work).

However, as Chomsky (1995) observes, the assumption that there is a level like D-structure, the specific role of which is to fully express all thematic relations and nothing else, is superfluous at best. Restrictions on possible syntactic derivations or representations should follow from constraints imposed by the interfaces between syntax and other modules with which it interacts. The interface that is relevant for our concerns is the one between syntax and the conceptual-intentional module, Logical Form (LF). Given that thematic relations must be visible in the conceptual module, it is at this interface level that the Θ-criterion must hold. There is no reason to assume, however, that the Θ-criterion holds throughout the derivation leading to LF (or in other representations than LF). Consequently, it is in principle possible that movement feeds thematic relations. As long as the Θ-criterion is satisfied at LF, the structure will not be ruled out syntactically.

It has in fact been argued by several authors that a proper account of certain constructions must involve movement that feeds a thematic relation (Neeleman 1997, Bošković & Takahashi 1998, Saito & Hoshi 2000, Fanselow 2001, 2002, Kuroda 2003). To illustrate why this is necessary we will discuss two examples in the next subsection, which will turn out to be illustrative for the SC participle fronting case as well.

3.2 The LF Θ-criterion and θ-feeding movement

3.2.1 PP-complements. Neeleman (1997) discusses the question how thematic relations are established in phrases containing a PP-complement, like (28).

(28) a. John can always count on his sister.
b. Marie houdt van ijs met slagroom.
Mary holds of ice-cream with cream
'Mary likes ice cream with cream.'

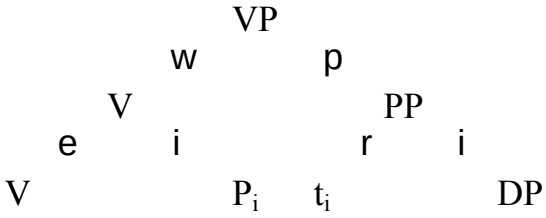
The problem is that the θ-role that the complement of the preposition receives is not a θ-role of this preposition. There is no thematic relation between *his sister* and *on* in (28a), as there is in for example *I put the vase on the table*. Rather, the thematic role *his sister* gets appears to be a role of the entire complex *count on*. Similarly, in (28b) the thematic interpretation of *ijs met slagroom* 'ice cream with cream' is such that it does not correspond to either a θ-role of *houden* 'hold' nor to a θ-role of *van* 'of'. Instead, this phrase is interpreted as the internal argument of the entire complex *houden van*, which as a whole happens to mean 'like'. Nevertheless, the surface structure of examples like these is such that there is a PP-constituent that is independent of the verb. This is indicated by the fact that the PP can, for example, be fronted as a unit:

(29) a. On his brother John can never count.
b. Van ijs met slagroom houdt hij niet.
of ice-cream with cream holds he not
'He does not like ice cream with cream.'

The problem is very similar to the one posed by (27). The argument is in a phrase headed by an element that does not θ-mark it. But the head of the complex that does θ-mark the argument is too high in the structure, so that cannot θ-mark it (downwards) either.

Neeleman argues that having the Θ-criterion apply only at LF solves this puzzle. At (or before) LF, the preposition incorporates into the verb, resulting in a structure like (30).

(30)



At LF, then, the verb and the preposition form a complex predicate. A complex predicate is a cluster of two predicative elements, whose argument structures are combined into a single one (cf. Grimshaw & Mester 1988, Rosen 1990, Neeleman & Van de Koot 2002, among others). According to Neeleman, the result of complex predicate formation (incorporation of P into V) is that the internal θ-role in the argument structure of the preposition is equated with the internal θ-role in the argument structure of the verb. Because traces inherit all properties from their antecedents, this means that the trace of P in (30) can now assign a θ-role to DP that is equal to the internal θ-role of the V-P complex predicate. (Alternatively, it is perhaps possible that the V-P complex directly θ-marks the DP without this

counting as downward θ-assignment across another head after P-incorporation. Baker (1988) has shown that when a head Y incorporates into a head X, the trace of Y does not count as intervener in any grammatical relation that is to be established between the X-Y complex and lower elements, the so-called Government Transparency Corollary. This may apply to θ-assignment as well). We will not discuss the empirical evidence Neeleman advances to further support the analysis in (30); the relevant point for us is that it crucially involves θ-feeding movement, allowed because the Θ-criterion holds at LF only.

3.2.2 Remnant VP-topicalisation. Another construction that has been argued to involve arguments that are not merged in the immediate projection of the head that thematically licenses them is so-called remnant VP-movement in Germanic languages. The argument is made by Fanselow (2001, 2002).

Remnant VP topicalisation, also called incomplete category fronting, involves the fronting of the main verb plus one or more parts of its VP, while other elements belonging to this VP are stranded. An example is given in (31).

(31) Peter gegeben hättest du das Buch nicht dürfen. (Fanselow 2001:420)
Peter given had you that book not may
'You should not have given the book to Peter.'

Fronting of a nonconstituent is not allowed, but neither is fronting two constituents (both the indirect object and the participle in (31)) separately, because this would violate the verb second constraint on the finite verb in German main clauses. In order to avoid these undesirable options, it has been proposed that (31) is an instance of ordinary VP-topicalisation, with the stranded constituents being moved out of the VP before it is fronted (Den Besten & Webelhuth 1989, Müller 1998):

(32) $[_{VP}$ Peter t_i gegeben$]_j$ hättest du [das Buch]$_i$ nicht t_j dürfen

One problem for this analysis, as noted by both Fanselow and Müller, is that the movement that is needed to empty the VP of those elements that are stranded after topicalisation is not independently motivated. Usually it is assumed that the operation of scrambling, which can place objects in pre-VP positions in German, accomplishes this. An object like *das Buch* in (32) can indeed be scrambled across the negator *nicht* in a clause without VP-topicalisation as well:

(33) Er hat das Buch nicht gelesen.
he has the book not read
'He has not read the book.'

However, in contrast to definite DPs, it is usually infelicitous to scramble nonspecific indefinites; see (34a). Nevertheless, such objects, too, can be stranded by remnant VP-topicalisation without any problems; see (34b).

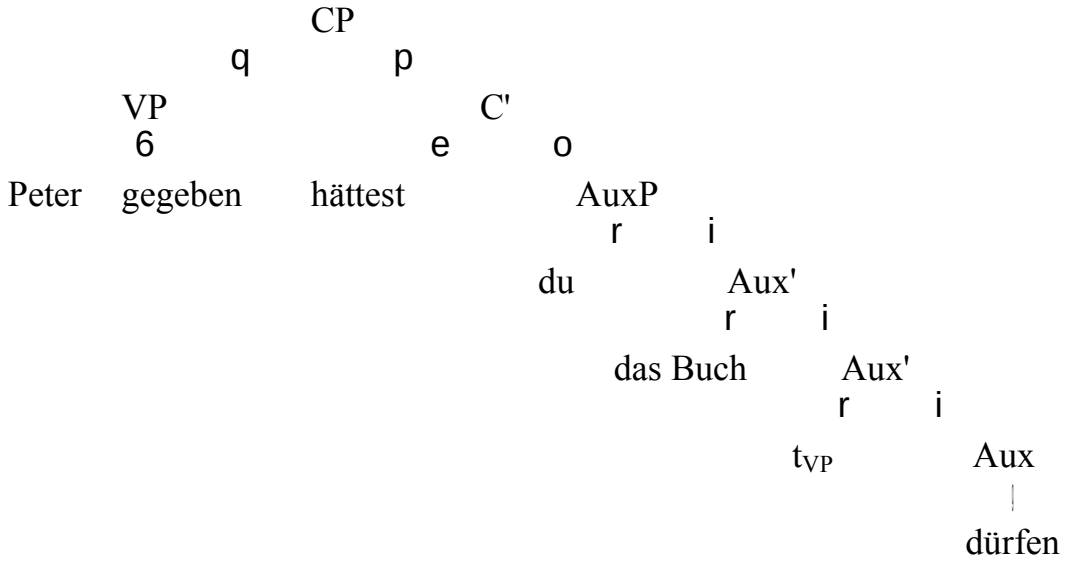
(34) a. ?*Er hat ein Buch nicht gelesen (if *ein Buch* is nonspecific)
he has a book not read
b. Peter gegeben hättest du ein Buch nicht dürfen.
Peter given had you a book not may
'You should not have given Peter a book.'

The same point can be made with respect to adverbial phrases. These are usually taken to be in fixed positions and not to undergo scrambling themselves, but again, they can either be taken along or be stranded by remnant VP-topicalisation:

(35) a. Zo snel als mogelijk het boek teruggeven zal hij wel niet.
as quickly as possible the book back-give will he well not
'I don't suppose he will give back the book as quickly as possible.'
b. Het boek teruggeven zal hij zo snel als mogelijk.
the book back-give will he as quickly as possible
'He will give the book back as quickly as possible.'

Fanselow notes that, if the arguments need not be merged in the projection of the main verb but can optionally be merged in a projection higher up, namely in the projection of the auxiliary, a simple account of remnant VP-topicalisation is possible that does not invoke scrambling elements out of VP that cannot be scrambled. This is because 'remnant' VP-topicalisation can then be taken to be full VP-topicalisation: the fronted VP includes all the material that is merged in it and does not contain any internal trace. The arguments (or adverbs) that are stranded are merged outside of VP, in the projection of the auxiliary:

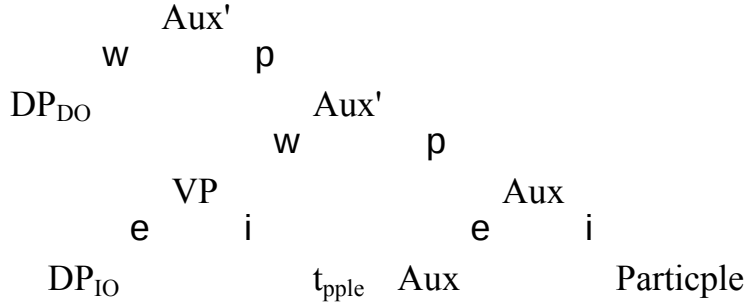
(36)



This would be impossible again if the Θ-criterion were to hold throughout a derivation, since the auxiliary does not have the thematic capacities to license arguments on its own. But if the Θ-criterion holds at LF only it suffices to form a complex predicate of main verb and auxiliary at or before this level to supply all arguments with their proper θ-role.

Complex predicate formation is achieved in this case by the operation of verb raising in Germanic, so by participle-to-auxiliary adjunction as was discussed in section 2. Fanselow argues that at LF the fronted VP reconstructs to its base position. From this position the participle adjoins to the auxiliary, with the result that the two form a complex predicate, sharing a single argument structure. Any argument in the AuxP projection in (36) can then be assigned a θ-role by this complex predicate. Given that the auxiliary does not have thematic properties of its own, this θ-role will be identical to a θ-role of the participle. Any argument in the lower projection, the VP, can be licensed by the trace of the participle. At LF, then, the relevant part of the structure for a case like (31) is as in (37). Here, the Θ-criterion is satisfied.

(37)



We propose that SC participle fronting is another case in which arguments are

merged in the projection of the auxiliary rather than in that of the participle, as in Fanselow's analysis of incomplete category fronting. At the same time, because the auxiliary is merged below the participle in this case, it involves another instance in which arguments are merged in a projection below the one of the head that they thematically belong to, as in Neeleman's analysis of PP-complements.

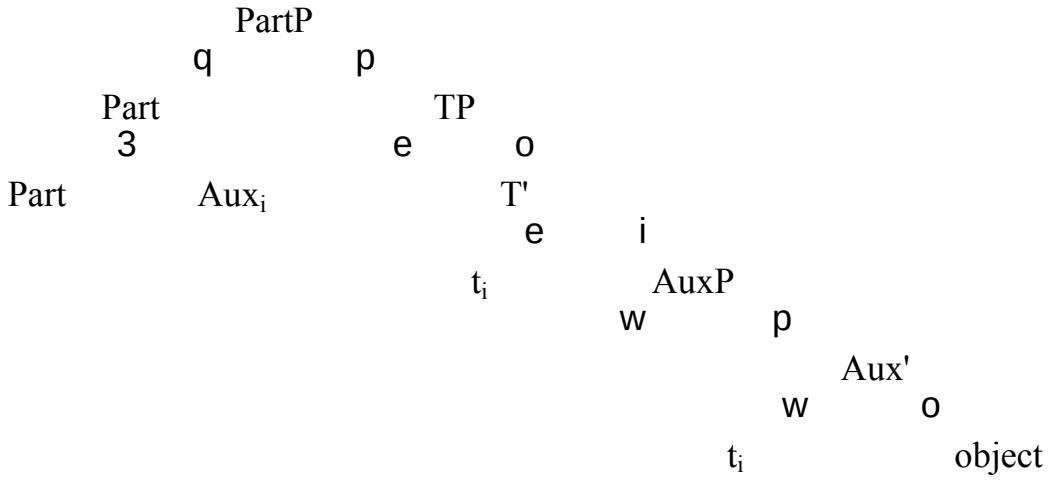
3.3 Complex predicate formation at LF and SC participle fronting

As noted, structures in which verb raising takes place show monoclausal behaviour. The combination of auxiliary and participle forms the complex head of a single extended projection. This restructuring effect of verb raising is indicated by things like matrix scope for apparently embedded adverbials, 'long passive' and 'long scrambling' of apparently embedded objects, and others (see Evers 1975, Wurmbrand 2001). Fanselow's analysis of remnant VP-topicalization discussed in the previous subsection is based on the idea that the behaviour of the two verbs as a single complex head extends to their thematic properties: the auxiliary and the participle form a complex predicate, sharing a single argument structure.

When complex predicate formation takes place, the argument structures of two predicative elements are merged into a single one. When the thematic roles in each of these argument structures have independent content, these roles get identified with one another in accordance with principles that need not concern us here (see Grimshaw & Mester 1988, Rosen 1990 and Neeleman & Van de Koot 2002 for discussion). But when the θ-role(s) of one of the heads that make up the complex predicate lack(s) independent content, the argument structure of the complex predicate is identical to that of the semantically contentful predicate in it. This is what happens when a cluster of an auxiliary and a lexically contentful main verb is formed. (This does not mean that all auxiliaries necessarily lack a θ-grid altogether. An auxiliary can assign a semantically vacuous θ-role that must receive content via identification with a θ-role of the main verb).

Let us return now to the question why a structure is possible with inverse merger of participle and auxiliary, which we claim underlies cases with participle fronting in SC (as in (27)). This structure can be saved from violating the Θ-criterion by complex predicate formation. At or before LF, the auxiliary adjoins to the participle, with (38) as result.

(38)



As a result of complex predicate formation, the argument structure of the auxiliary is merged with that of the participle. Since the traces of the auxiliary are identical to their antecedent (compare the copy theory of movement), these too will have the relevant thematic properties in the representation in (38) (compare Fanselow's analysis of remnant VP-topicalization, in which it is the participle that raises: both the participle 'upstairs' and its trace 'downstairs' have the same thematic properties – either of them can license arguments). This means that, as a result of complex predicate formation, the arguments in the structure can be thematically licensed at LF by that trace of the auxiliary in the projection of which they appear.[13] Hence, the Θ-criterion, which applies at LF only, is satisfied.

Of course, what this shows is merely that inverse merger of main verb and auxiliary is feasible in principle, as long as it is salvaged by verb clustering. We claim that this actually occurs in participle fronting cases in SC. But it does not appear to occur as freely, cross-linguistically speaking, as 'regular' merger of the auxiliary above the participle. This will be discussed in some more detail in section 5. First, however, we will show how this analysis of participle fronting in SC accounts for the set of properties discussed in section 2.

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[13] There is an issue of technical execution here, at least if we were to adopt a strictly derivational theory (we want to remain agnostic on the derivational vs. representational issue here). If the auxiliary lacks the relevant thematic properties before adjoining to the participle, while its trace inherits them from the antecedent after verb raising and complex predicate formation has applied, the principle of inclusiveness (cf. Chomsky 1995) would appear to be violated. This can be solved by assuming a checking version of thematic features (see Bošković & Takahashi 1998, Manzini & Roussou 2000, among others). In that case, we can assume that the θ-roles of the auxiliary do not so much lack content and acquire it by argument structure merger (complex predicate formation), but rather that these roles can have any content as long as this is checked against identical θ-features on the main verb, on which these features are interpretable. (Hence, we are dealing with a regular instance of checking uninterpretable against interpretable features).

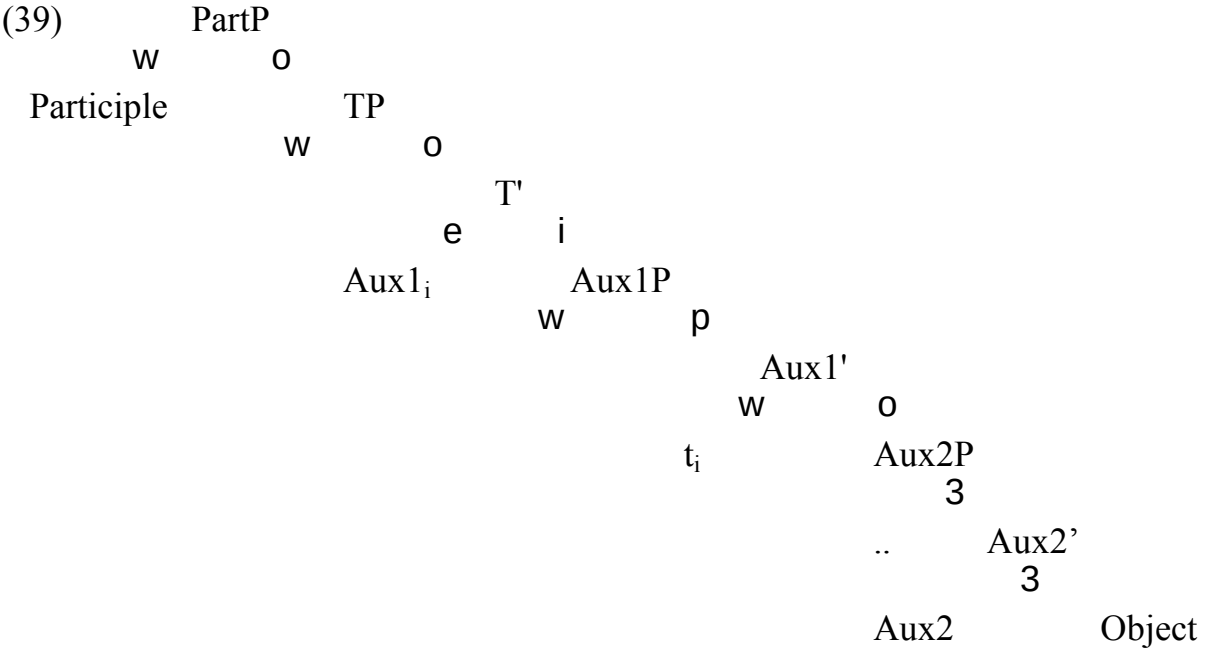
4 Deriving the properties of SC participle fronting

4.1 Word order

An analysis as in (27)/(38) accounts for the possible and impossible word orders in SC participle fronting cases by straightforward cyclic application of verb raising. No long head movement, not even in the form of skipping traces of intermediate verbs, is necessary. Consider how this works.

There are two options for verb raising: the lower verb can right-adjoin or left-adjoin to the higher one. Languages show arbitrary variation in this respect. Possible orders inside verb clusters in Germanic vary per dialect, and within a dialect can vary per type of verb, without this being connected to any deeper property of the language (see Wurmbrand 2002, 2003). Therefore, let us assume that in principle either option can occur in the SC participle fronting construction.

In case there are only two verbs, the fronted participle and the auxiliary, left-adjunction would lead to a clitic ending up in first position at PF, so that the structure is filtered out there. In this case, therefore, only the right-adjunction option gives a wellformed output. This is different in case there are three verbs, the participle merged on top, and two auxiliaries, the finite clitic auxiliary (Aux1) and the second, participial, auxiliary (Aux2):

(39)


Starting out from (39), verb raising by left-adjunction (left-adjoining Aux2 to Aux1 and then left-adjoining this cluster to Participle) gives the order Aux2-Aux1-Participle, which is instantiated by (21b). Verb raising by right-adjunction gives the order Participle-Aux1-Aux2, which is instantiated by (21a).

Both derivations are strictly cyclic, no separate raising of the lower verb across the position of the intermediate one (whether containing a trace or the intermediate verb itself) is required. Recall that this is a desirable result not only from a conceptual point of view, but also empirically, because the order that would result in Germanic verb clusters from such skipping is precisely the one that is not attested (modulo footnote 10). In fact the same holds for SC, at least if the underlying structure is indeed as given in (39). If the two auxiliaries in (39) could move independently and adjoin on opposite sides of the participle in the highest position, we could get orders Aux1-Participle-Aux2 and Aux2-Participle-Aux1, which are impossible:

(40) a. *Je pojeo bio sve gljive.
is eaten been all mushrooms
b. *Bio pojeo je sve gljive
been eaten is all mushrooms

Clearly, (40a) is ruled out anyway because of the second position requirement on the clitic *je*. For (40b), however, this would only be so if the cluster *bio pojeo*, headed by *pojeo*, could not possibly count as first element, which is not clear.

4.2 Intervening elements

As discussed in section 2.2, at the point in the derivation at which head-to-head adjunction is to take place the two heads involved must be strictly linearly adjacent. Any element that intervenes between the two blocks the possibility of adjunction, no matter whether the intervening element is a head or a phrase or whether it is an argument or an adjunct.

We already saw that in the case of verb raising in Germanic no PP may intervene between the auxiliary and the verb that raises to it (see the discussion around (18)-(20)). Similarly, a bare head like a particle may not intervene either (an observation that dates back to Evers 1975). In (41)-(42) a minimal pair is given. If the verb *leren* ‘learn’ in Dutch takes a verbal complement, then both verb raising of the head of this complement and extrapositon of the entire complement are allowed (see (41a) and (41b) respectively). But in case the matrix verb is the minimally different particle verb *afleren* ‘off-learn’ (i.e. ‘unlearn’) only the extraposition option remains ((42b)), verb raising is impossible now ((42a)).

(41) a. dat zij [PRO die liederen t_i] leerde [te zingen]$_i$
that she those songs learned to sing
‘that she learned to sing those songs’

b. dat zij t_i leerde [PRO die liederen te zingen]$_i$
that she learned those songs to sing
'idem'

(42) a. * dat zij [PRO die liederen t_i] afleerde te zingen$_i$
that she those songs off-learned to sing
b. dat zij t_i afleerde [PRO die liederen te zingen]$_i$
that she off-learned those songs to sing

It is an interesting question in its own right what causes this adjacency requirement, but not one that is directly relevant for our present concerns.[14] What is relevant here is that verb clustering, as an instance of head-to-head adjunction, is independently known to be constrained by this adjacency condition as well.

Given this, the analysis in (38) accounts for why elements that are high in the structure are incompatible with participle fronting, whereas elements that are lower in the structure are not. If the participle raised from its base position to the auxiliary in T, anything in between V and T should block cluster formation, whereas anything above T would not be in the way. But if the participle is merged on top and it is the auxiliary that raises from T to the participle, then anything in between T and the highest head position should block cluster formation, whereas anything below T does not intervene and may be present. As discussed in section 2, the latter prediction is the correct one. Blocking elements include the question particle *li*, negation, sentential adverbs, and (nonfocused) subjects. These arguably occur at or above the TP-level in the left periphery of the clause, that is, in between the base positions of the participle and auxiliary in (38). Nonblocking elements include VP-adverbs and, interestingly, focused subjects. Schematically:

(43) [$_{PartP}$ Participle (**li*) [$_{TP}$ (*Adv) [$_{TP}$ (*Subject) T-Aux [$_{VP}$ (√Adv) [$_{VP}$ ...]] (√Focus)]]]

With respect to the possibility of having a focused subject in cases of participle fronting, the crucial observation is that the adjacency restriction on head-to-head adjunction involves *linear* adjacency, rather than hierarchical (see (13a)). The data that show that no PP can intervene when a verb raises to a higher verb in Dutch

[14] If head-to-head adjunction were an instance of (any type of) movement, this adjacency requirement would be quite an unexpected property. Neither head movement by substitution nor any kind of phrasal movement has this property. It has therefore been suggested that head-to-head adjunction is the result of reanalysis rather than movement, since reanalysis of two nodes as one complex node by its very nature cannot 'skip' intervening material (as this would result in a tree with crossing branches in the reanalyzed structure), but the issue remains controversial. For relevant discussion see Haegeman & Van Riemsdijk 1986 and Van Riemsdijk 1998.

((18)-(20)) concern linear intervention. The PP is selected by the lower verb. If it is merged to the right of this verb (which as such is allowed in Dutch) it occurs in between the two verbs and verb raising is blocked. However, if the same PP is merged to the left of its selecting verb, there is no problem with raising this verb to the right, see (20b) vs. (20a). There is no reason to assume the PP is in a different hierachical position in both cases, it is purely its linear position that determines whether it intervenes between the two heads and blocks head-to-head adjunction or not (see Ackema & Neeleman 2002).

Now, in many languages focused constituents appear in syntactic positions in which their nonfocused counterparts do not appear. Positions at the edge of the clause are particularly popular for focused elements, either at the left edge (in Basque, Hungarian, etc.) or at the right edge (in Italian, English, etc.). Indeed, SC is another language in which word order correlates with focus structure. Relevant here is that narrowly focused subjects can occur on the right edge of the clause (see Godjevac 2000), so in VOS orders (as in (15c)) or OVS orders. No matter how a focused subject ends up there (by moving it rightward into the focus position or by moving everything else leftward out of the focus position), i.e. no matter what its hierarchical position, it is clear that in this right-peripheral position it does not linearly intervene between the auxiliary in T and the participle in the left periphery. Hence, in contrast to nonfocused subjects, it does not block verb clustering.

As a final point, it should be noted again that neither head movement by substitution nor phrasal movement is subject to a linear adjacency requirement between source and goal positions. This means that in the absence of participle fronting, so with [Aux ...Participle] orders, the auxiliary can substitute into higher heads without problems. No element will block substitution of the auxiliary into C for instance (cf. Bošković 1995), just as no intervening heads or phrases block verb second in a language like Dutch. Note also that the auxiliary and the participle themselves need not be adjacent in [Aux...Part] orders, since no verb clustering takes place in this case (see section 4.4 below). Indeed, sentential adverbs as well as VP-adverbs can freely intervene in this case:

(44) Ivan je mudro prodao kucu. (= (14a))
Ivan is wisely sold house
'Ivan sold his house in a wise manner.'
'It was wise of Ivan to sell his house.'

Similarly, if the participle ends up in the left periphery of the clause because it is taken along under an instance of phrasal movement such as VP-topicalization, no blocking effects are to be expected. Indeed, VP-topicalization differs from participle fronting in being able to cross structurally high elements like negation, as noted in section 2.

4.3 No participial trace

For analyses that involve participle movement to or across the auxiliary it is somewhat unexpected that the auxiliary can appear in clitic form, since auxiliary cliticization leads to bad results if it takes placein front of a trace. This was shown by the impossibility of VP-fronting if the VP is merged in a position directly following a clitic auxiliary (as in (5c)). That participle fronting is possible when the auxiliary is a clitic would then seem to indicate that in this construction the participle is not merged in a position following the auxiliary, leaving a trace there when it fronts. This is indeed a feature of the analysis in (38), and hence provides some extra evidence for it. It should be noted though that, although suggestive, this is far froma decisive argument on its own, as it still is rather unclear what causes the impossibility of auxiliary reduction in the relevant cases, in particular whether the presence of a syntactic gap is crucial or not, cf. Pullum & Zwicky 1997).

4.4 A trigger for restructuring

Our analysis follows the basic insight of Bošković (1995, 2001) and Wilder & Ćavar (1994) that SC participle fronting involves verb clustering (V-to-V adjunction) rather than substitution or phrasal movement. However, in section 2.2 we put forward as a problem for this type of analysis that the trigger for verb raising is unclear. Why should the participle adjoin to the auxiliary? It was noted furthermore that this problem is not just another instance of the question what causes verb clustering in general, but is more serious. This is because verb clustering is not expected to occur in SC, given that, as far as the evidence outside SC goes, it appears that such verb clustering is restricted to OV-languages and does not occur in VO-languages.[15]

Indeed, it can be observed that in the regular case there is no verb cluster formation in SC. In [Aux…Participle] orders, so when there is no participle fronting, material can intervene between the auxiliary and the participle. This was shown by an example like (26), repeated here as (45), with an adverb intervening between an auxiliary in its base position and the participle.

(45) Sentential adverb - Aux - VP-adverb - Participle
Mudro bješe brzo prodao kucu.
wisely be-past quickly sold house

[15] This means that Hungarian verbal complexes, as discussed by Koopman & Szabolcsi 2000 and Kiss 2003, must either be fundamentally different from Germanic ones in not involving verb clustering of this type (cf. Bobaljik 2003), or that Hungarian is in fact, at least with respect to the syntax of verbal complementation, an OV language underlyingly (cf. Ackema 2003).

'It was wise of him to have sold the house quickly.'

Bošković (1995) does argue that, in cases with three verbs, nothing can intervene between the two lowest ones (the participial ones), which he takes to be an indication that the lowest verb adjoins to the intermediate one. He provides the following paradigm as evidence for this adjacency restriction, hence for verb clustering (his (22) and (23)):

(46) a. Vas dvoje ste bili čekali Marijinu prijateljicu.
you two are been waited Marija's friend
'You two had been waiting for Marija's friend'
b. Vas dvoje ste Marijinu prijateljicu bili čekali.
you two are Marija's friend been waited
c. *Vas dvoje ste bili Marijinu prijateljicu čekali.
you two are been Marija's friend waited
d. *Marijinu prijateljicu ste bili vas dvoje čekali.
Marija's friend are been you two waited

However, before it can be concluded that the two participles must be adjacent, we must first consider what kind of elements we would expect to occur in between them in the first place. In (46b,c) the object that we see in its base position in (46a) is shifted leftward. This is presumably an instance of focus shifting, since the order in (46b) goes together with narrow focus on the object. Taken together, what (46b,c) show then is that focus fronting must move a constituent to the left edge of the participles' projection. This is not really surprising, since it is a general property of focus shifting that it targets particular edges of phrases (cf. Godjevac 2000, see also section 4.2 above). In (46d) it is the subject that intervenes between the two participles. What this shows is that a participle cannot be moved from a base position in VP into the TP domain, to a position higher than the subject, not an unexpected restriction either.

What we would expect to possibly occur in between the two participles are modifying adverbials like the VP-adverb that intervenes between auxiliary and participle in (45). As it turns out, there is no problem with having these intervene between the participles:

(47) a. Ivan je bio brzo prodao kuću.
Ivan is been quickly sold house
'Ivan has quickly sold the house.'
b. Ivan je bio loše popravio radio.
Ivan is been badly repaired the radio
'Ivan has repaired the radio badly.'

Apparently, then, there is a connection between participle fronting and verb clustering in SC: clustering obligatorily occurs ifthere is participle fronting, but is absent otherwise.

This is directly accounted for by the analysis put forward above, as there is a very clear trigger for clustering if participle fronting consists of merging the participle above the auxiliary, in the form of the Θ-criterion (whatever shape that takes, cf. footnote 13). As explained in section 3, if the auxiliary did not form a complex predicate with the participle, the arguments in the structure would fail to be thematically licensed. This is not so if the regular order of merger is followed.Consequently, clustering is not required in that case, and is not expected to occur then in the VO language SC.

As a potential problem for invoking the Θ-criterion as the trigger for verb clustering one may point to the fact that participle fronting is possible in clauses without any arguments as well. This potential objection is mostly voided if it is not just the presence of arguments in a projection that is dependent on there being a lexically contentful predicate as head, but the presence of modifiers as well, which seems plausible enough. In other words, the notion of licensing can be generalized from thematic licensing of arguments, used above, to licensing of other dependents of the verb as well (compare Travis 1988). Hence, in the presence of modifiers, too, the head of the projection must acquire content, which is achieved by raising the auxiliary to the participle and complex predicate formation.

The only case, therefore, in which there is no such trigger for raising is when there is apparently no dependent of the main verb present at all, as in (48).

(48) Pojeo je.
eaten is
'He has eaten something.'

Precisely in this case, however, it is actually untestable whether clustering takes place or not: if there are no other elements besides participle and auxiliary, then we cannot see either if these elements can intervene between these verbs or not.

4.5 The participle as head of the verbal complex: evidence from gapping?

An important difference between the analysis proposed here and other clustering analyses for SC participle fronting is that that the participle is the structurally highest head, not the auxiliary (there is inverse merger). There may be an additional piece of evidence for this conjecture, although the argument is somewhat intricate. The evidence comes from data involving gapping.

Gapping, or coordinate ellipsis, targets the verbal head of the second conjunct in a coordination, as in (49a) (cf. Neijt 1980). This process seems to be recursive: if

there are more verbal heads in an extended projection, they can be gapped in succession, as in (49b-d) (cf. Williams 1997). However, crucially for our purposes, no head can ever be skipped in this process. If a lower head is gapped, then so must all the heads above it in the extended projection; see (50e-f). So the highest head must always be targeted if there is coordinate ellipsis (Johnson's [2002] "No Embedding Constraint").[16]

(49) a. Mary listens to Messiaen and Harry ~~listens~~ to Kurtág
b. Mary wants to listen to Messiaen and Harry ~~wants~~ to read about Kurtág
c. Mary wants to listen to Messiaen and Harry ~~wants~~ ~~to~~ read about Kurtág
d. Mary wants to listen to Messiaen and Harry ~~wants~~ ~~to~~ ~~listen~~ to Kurtág
e. *Mary wants to listen to Messiaen and Harry wants/tries ~~to~~ read about Shostakovich
f. *Mary wants to listen to Messiaen and Harry wants/tries ~~to~~ ~~read~~ about Shostakovich

Given this, it is predicted that, if the participle is merged as the highest head in the extended projection in cases of SC participle fronting, it should be gappable on its own, leaving the auxiliary as an overt remnant. If the auxiliary were the highest head, this should be impossible. Conversely, we predict that in such cases the auxiliary should not be gappable on its own, stranding the participle, although it should be possible to do exactly this in all other circumstances, when the auxiliary is regularly merged as the highest head. If the auxiliary is merged as the highest head, as in other clustering analyses, the participle should under no circumstances be gappable on its own. Let us see in how far these predictions can be tested.

Note first of all that in periphrastic tenses in SC the auxiliary may be gapped and leave the participle as a remnant, both when there is participle fronting in the first conjunct and when there is not (cf. Bošković 2001):

(50) a. Ivan je pojeo gljive i popio vino.
John is eaten mushrooms and drank wine
'John has eaten mushrooms and drunk wine'
b. Pojeo je gljive i popio vino.
eaten is mushrooms and drank wine
'He has eaten mushrooms and drunk wine'

[16] There is a requirement that the overt remnants must be 'disanaphoric' (Williams 1997) to the corresponding constituents in the first conjunct, but note that using a different matrix verb in the second conjunct as remnant in (49e-f) does not void their unacceptability.

If the second conjunct in (50) involves participle fronting, our analysis makes the wrong prediction, namely that the auxiliary should not be gappable on its own. However, it is difficult to assess whether or not there is participle fronting in the second conjunct in (50), since, precisely because the auxiliary is gapped, this obviously cannot be deduced from the surface order between participle and auxiliary. That the first conjunct shows participle fronting in (50b) does not really tell us anything in this respect. The idea that only structurally identical phrases can be coordinated has been shown to be untenable (Sturm 1986, Johannessen 1998). Thus, two clauses can be coordinated when there is topicalization in the first but not the second ((51a)), and gapping is still possible in that case as well ((51b)).

(51) a. DE HOND verzorgt JAN maar MARIE doet DE PLANTEN
the dog takes-care-of John but Mary does the plants
'JOHN takes care of THE DOG, but MARY takes care of THE PLANTS'
b. DE HOND verzorgt JAN maar MARIE ~~verzorgt~~ DE PLANTEN.
the dog takes-care-of John but Mary the plants

What could in principle give an indication of whether or not there is participle fronting in the second conjunct in (50) is to see if elements that block this construction, like sentential adverbs, can be added to this conjunct. This is possible in (50a) which, perhaps unsurprisingly, indicates there is indeed no participle fronting in the second conjunct there:

(52) Ivan je sigurno pojeo gljive i vjerovatno popio vino.
Ivan is certainly eaten mushrooms and probably drank wine
'Ivan has certainly eaten mushrooms and probably drunk wine.'

Adding a sentential adverb to (50b) gives a somewhat degraded result:

(53) ?Pojeo je gljive i vjerovatno popio vino.
eaten is mushrooms and probably drank wine

However, there is an independent reason for this. The disanaphora requirement on overt remnants in coordinate ellipsis (cf. footnote 16) requires that for each overt remnant in the second conjunct, a parallel but semantically contrastive element be found in the first conjunct. But adding a sentential adverb to the first conjunct in (50b) is impossible, because of the participle fronting that has taken place there. There may be one exception, however. Negation contrasts with the absence of negation, so with a simple positive declarative sentence. Thus, it is possible to strand a negator in coordinate ellipsis that does not contrast with a parallel overt element in the first conjunct:

(54) Marie luistert naar Bartók maar Piet ~~luistert~~ niet naar Messiaen.
Mary listens to Bartok but Piet not to Messiaen
'Mary listens to Bartók but Piet does not listen to Messiaen.'

Interestingly, it is possible to add negation to the second conjunct in (50b):

(55) Pojeo je gljive ali nije popio vino.
eaten is mushrooms but not drank wine

This indicates that there need not be participle fronting in this conjunct. Hence, the possibility of gapping the auxiliary while stranding the participle comes as no surprise. Of course, it is impossible to tell whether, in the absence of negation, there *cannot* have been participle fronting in the second conjunct, so in this respect the first prediction cannot really be tested.

The second prediction made by our analysis therefore is more relevant: in principle it should be possible to gap the participle on its own and strand the auxiliary. This prediction is not easy to test, however. Consider why.

Participle fronting occurs when the auxiliary is a clitic (cf. section 1). This means that, usually, if the participle is merged high and then is gapped, it cannot strand the auxiliary, because that would leave a clitic in first position. (The second position requirement of clitics is a PF requirement, not a syntax-internal one, and hence it is sensitive to whether or not there is gapping; see Bošković 2001). This is why (56) is impossible.

(56) *Pojeo je gljive i je pastrmicu
eaten is mushrooms and is trout

There may be one context in which the prediction can be tested, however. In contrast to *i* 'and' in (56), there is a coordinator which itself can act as host for clitics, namely *ali* 'but'. If there is gapping in coordinations that involve this coordinator there should not be a problem with having a clitic auxiliary directly following it. Indeed, the following is acceptable:

(57) Vidjeli su Ivana ONI, ali je Marka ONA.
seen are Ivan they but is Marko she
'THEY have seen Ivan but SHE has seen Marko.'

This would be a case of illicitly skipping a head in gapping if the participle were not the structurally highest head.[17] But if it is the highest head, as in (38), this can be targeted by a regular instance of coordinate ellipsis.

5 On inverse merger

We have argued above that it is possible to merge a participle above its associated auxiliary, as long as the two undergo complex predicate formation before or at LF, the only level at which the Θ-criterion is relevant. However, if this order of merger is allowed, it must be asked why we do not encounter it more often, cross-linguistically speaking. Why is it not allowed everywhere to merge participles and auxiliaries in either order? This is the issue we will discuss in this section.

Before discussing this, however, let us point out that it is actually somewhat difficult to determine how rare 'inverse merger' really is. The SC case as discussed here is certainly not the only candidate for an analysis along these lines. For instance, it has been noted that the construction known as 'stylistic fronting' that occurs in present day Icelandic and in older stages of some Scandinavian and Romance languages shows properties that are similar to those of long head movement (see Holmberg 2003 and references mentioned there). Stylistic fronting puts some predicative element in front of the clause, moving it (apparently) across its associated copula or auxiliary. It can apply to participles, but it applies to other predicative elements as well; the same is true for the SC construction (see footnote 1).It applies to heads (although it also applies to phrases). It is subject to a 'subject gap' restriction: like SC participle fronting, stylistic fronting is blocked if there is an overt subject. And there is an adjacency requirement between the fronted element and the auxiliary/copula. Although such parallels are suggestive, more research is obviously required to see if participle fronting as it occurs in SC is really just another instance of stylistic fronting.

All the same, it seems clear that not all languages with periphrastic verbal tenses allow inverse merger. In this respect there is another interesting parallel between participle fronting and stylistic fronting: stylistic fronting is said to occur only in languages which allow for some form of subject agreement on nonfinite predicative elements. For example, the mainland Scandinavian languages lost stylistic fronting when they lost subject agreement, whereas Icelandic has retained both; Falk 1993 argues there is a direct connection between the two. Similarly, Broekhuis & Migdalski (2003) argue that the crucial factor which allows for participle fronting in Bulgarian is that the participle carries subject agreement. We will follow their

[17] Note that it is unlikely that (57) involves pseudo-gapping rather than gapping, witness the unlike subjects in both conjuncts (cf. Baltin 2003 and references cited there).

insight, implementing it a bit differently: we will argue that the participle's property of carrying subject agreement makes it possible to merge it above the auxiliary, as in our analysis of SC participle fronting.

Note first that the 'inverse' order of merger does not go against any principles of selection. It is sometimes said that an auxiliary 'selects' the associated participle. In structural terms, a functional head Aux would select for a PartP. But as argued by Grimshaw (1991), this kind of 'selection' of a functional head for (the projection of) another head is very different from selection between a lexical head and its complements.

Consider for instance the question what the head is of a verbal extended projection in a periphrastic tense: the auxiliary (as is usually assumed, this then selecting a complement that is headed by the participle), or the participle? Usually, the head is that thing in a projection which you cannot leave out, at least not without changing the nature of the projection. In a VP the verb cannot be left out without the thing that is left not being a VP anymore. But you can leave out an NP complement to the verb and you will still have a VP. In contrast, in a verbal extended projection it is impossible to leave out either the auxiliary or the participle(-phrase) without this resulting in the thing being left not being a wellformed verbal extended projection anymore. What we really want to say, then, is that actually both the auxiliary and the participle are heads of that extended projection (hence the introduction of the concept 'extended head' in Grimshaw 1991).

Of course, some verbs obligatorily take a complement, and in that case this complement cannot be left out without the whole projection not being a wellformed VP anymore. We might thus say, as is sometimes done, that, similarly, an auxiliary *obligatorily* selects a VP (or PartP). However, this misses the fundamental difference between the two situations:there are verbs that take a nominal complement and there are verbs that do not, but there are no auxiliaries that happen not to go together with a main verb. The option of intransitivity, i.e. of *not* 'selecting' a main verb, just does not exist for an auxiliary – which makes it questionable that the relation between the heads in an extended projection is one of ordinary selection at all. The order in which the heads in an extended projection come does not follow from any principles of selection. Instead, this order is more templatic in nature: there is some universal functional hierarchy that states in which order the heads in a extended projection come (cf. Grimshaw 1991, Cinque 1999).

The view we adopt on how this functional hierarchy connects to syntactic and morphological structure is much as in Williams 2003. In this view the functional hierarchy is not a sequence of heads in syntactic structure, nor a sequence of affixes in morphological structure. Rather, such a sequence of heads and/or affixes is the *realization* of the functional hierarchy. There is a universal template that specifies in which hierarchical order functional features are to be realized. For verbal

projections, this functional hierarchy might look as in (58) (this hierarchy may be more elaborate in practice, but this is the bit that is relevant for our concerns; we follow Borer 2003 and others in assuming that the feature in the 'AgrO' position is really an aspectual feature).

(58) C > AgrS > T > Asp > V

This functional hierarchy may be realized via syntactic means, by heads in an extended projection. Alternatively, it may be realized via morphological means, by affixation. And it can be realized via a combination of these means. It is not necessary to assume that affixes are syntactic heads, picked up by a stem via head-to-head movement; they are merged directly with the stem (on the problems facing syntactic affixation, see Ackema & Neeleman to appear). As Williams (2003) points out, the Mirror Principle follows from the existence of the functional hierarchy in (58) as such, plus the assumption that the features it mentions can alternatively be realized either by syntactic heads or by morphological affixes. Suppose, for example, that language A realizes (58) exclusively by syntactic means. The hierarchy in (58) dictates that the heads realizing the various features come in the following order:

(59) $[_{CP}$ C $[_{AgrSP}$ AgrS $[_{TP}$ T $[_{AspP}$ Asp $[_{VP}$ V]]]]]

Suppose language B realizes (58) exclusively via affixation. The hierarchical ordering of the affixes must be in accordance with (58), which means a morphological structure as in (60a) results if we are dealing with prefixes, and a structure as in (60b) results if we are dealing with suffixes. Comparing (59) with (60), and (60a) with (60b), we see the Mirror Principle effect.[18]

[18] Of course, not every language shows a number of heads and/or affixes that correspond in one-to-one fashion to the features mentioned in the hierarchy. This may have one of two reasons. First, a particular feature might not be expressed in the language at all (say, in English the feature responsible for the verbal category dualis). We will leave open the question whether the language in this case has a null realization of this feature, i.e. whether the hierarchy leads to exactly the same hierarchical structures universally, or whether there is more flexibility so that the size of the structures realizing the functional hierarchy can vary according to which features are actually expressed (for arguments in favour of such flexibility, see Ackema et al. 1993, Grimshaw 1991, 1997; for arguments in favor of universal functional structures see Cinque 1999). The number of heads and/or affixes can also be less than the number of features mentioned in the hierarchy because of fusion: it is possible that one head or affix expresses more than one feature simultaneously (note that this is different from the first case in that in the case of fusion the morphological shape of the head is sensitive to the value of both features).

(60) a. [C [Agrs[T[Asp[V]]]]
b. [[[[V[Asp]T]AgrS] C]

Two things are crucial now. The first is that, as noted, it is possible to realize the functional hierarchy by a *combination* of heads and affixes, one head carrying affixes that realize part of the hierarchy, and another head (or heads) carrying affixes that realize the other part of the hierarchy. Because the hierarchy must be complied with, each head must realize a contiguous part of it. Having one head realize a discontinuous part of the hierarchy and another head the remaining part would violate the specified order of realization.

The second thing that will be important in our account of inverse merger is the phenomenon of multiple exponence (see Stump 1998 and references mentioned there): it is possible that more than one head in an extended projection is morphologically specified for the same feature. Being morphologically specified for a feature shows itself, as usual, in a morphological sensitivity to the value of the feature in question: the shape of the heads in question differs according to the different values of the feature. However, the functional hierarchy in (58) demands only that the feature in question be expressed once. This means that if two heads in the same extended projection are both specified for a particular feature, this feature will be, in Wiliams's (2003) terms, *silent* on one of the heads. This means that this feature on this head is not used to realize a part of the hierarchy in (58). Rather, the identical feature on the other head is used for this. (To avoid potential confusion, note that if a feature is silent in this sense, this does not mean that the morphological shape of the head that it occurs on does not alter according to the value of the feature anymore; it just means that the feature is not taken to realize a part of the functional hierarchy in (58)). Which head is used to realize the feature mentioned by (58) and which head has the silent feature is in principle optional, but in practice this can be restricted by the other features that both heads carry, as these need not be identical and the overall hierarchy in (58) must be respected.

Now let us take a closer look at the functional hierarchy that is usually assumed. There is one element in (58) that immediately stands out as an odd bird, as itis fundamentally different from all the others: V. This is not a functional feature at all. Indeed, it presumably is not a feature at all. As argued in detail by Baker (2003), the category features [±V] and [±N] have never been given real empirical content; when one looks at what a V actually *is*, what makes it different from other categories, it is a particular syntactic property - according to Baker, verbs but not other categories can directly take a specifier. Similar considerations hold for the other lexical categories.

Seen in this light, it is not such a radical move, but rather an almost unavoidable one, to leave out V from the hierarchy in (58). If we do this, there is nothing in the theory that explicitly states that the lexical verb should realize the lowest head

position in an extended projection. If a wellformed structure is to be built, the functional hierarchy in (58) must be realized by a number of heads carrying appropriate morphology, one of these heads must have lexical content, and any arguments that depend on this lexical content need to be properly θ-marked at LF. Nothing further need be said.

The verb with lexical content will be merged in some head position in which it can realize one or more of the features in (58). If it cannot realize all features, auxiliary verbs will be used to realize the other features. Usually, the lexical verb is realized as the lowest element, so in Asp (if that is the lowest element on the hierarchy). This is indeed the most economical option, since in this position it can directly license its object and subject, there is no need for complex predicate formation to save the structure at LF. Note that even in this 'normal' case there is no VP, at least not one that is distinct from AspP. The projection of the lexical verb may always be called VP, since it is the projection of V, but at the same time it is the projection of a head that realizes some feature(s) of (58). In the 'normal' case it is also the projection of the head that realizes Asp, so its projection is an AspP as well as a VP.[19] In a periphrastic tense, the verb(s) without lexical content, the auxiliary(s), must hence in the 'normal' case realize the features higher up in the hierarchy, in particular AgrS and T. The usual division of labour hence is as follows:[20]

(61)

C > AgrS > T	> Asp
Aux (AgrS,T)	Pple (Asp)

Now, as noted by Broekhuis & Migdalski (2003), the crucial property of languages that allow long predicate fronting is that they have the morphological quirk that nonfinite forms of the verb are specified for AgrS. Indeed, participles in Serbo-Croatian show number and gender agreement with the subject:

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[19] There may be a parallel with recent work by Borer (2003) and others, in which it is assumed that all licensing and thematic interpretation of arguments necessarily takes place outside of VP. Although Borer still assumes there is a distinct VP below the lowest functional projection, this is in all but a few cases evacuated by all the material present, and it is always evacuated by the verb, which means there is little reason left to still make a distinction between a separate AspP and VP as the lowest projection.

[20] For simplicity, we assume any verb is properly specified to realize C, and do not indicate this feature on the verb (cf. also footnote 7). C may in fact stand for one or more mood features or features relating to illocutionary force (for discussion see Rizzi 1997, Poletto 2000, among others).

(62) a. Ivan je pojeo.
Ivan has eaten-MASC.SG
b. Marija je pojeli.
Maria has eaten-FEM.SG

So participles (and other predicative elements) are specified for AgrS and Asp, though not for T. In other words, they are specified for features that are discontinuous on the feature hierarchy. Because the features it is specified for are not contiguous on the functional hierarchy, this type of head can often not actually be used to realize part of this hierarchy (because the hierarchy will not be realized in the proper order if T is realized by an element either above or below this head).

However, there is an escape route in the form of multiple exponence, if there is another head that is partly specified for the same features. In the case at hand we need a head that is specified for T and also for the lower feature that the nonfinite verb can also realize, which we have labelled Asp. If auxiliaries in periphrastic tenses in SC are indeed specified for Asp in addition to T, we get the option of realizing the feature hierarchy as in (63b), in addition to the 'normal' way of realizing it, as in (63a).[21] (Here, features between double brackets are 'silent' in Williams's sense. Note again that 'silent' does not mean 'morphologically unexpressed' – the feature still is a feature of the element in question, and hence gets its normal morphological expression; 'silent' means that the feature does not realize a part of the functional hierarchy in this case).

(63) a. C > AgrS > T > Asp

Aux (AgrS,T, (Asp)) Pple ((AgrS), Asp)

b. C > AgrS > T > Asp

Pple (AgrS, (Asp)) Aux ((AgrS), T, Asp)

Though possible, realization as in (63b) necessitates complex predicate formation, in order to licence the arguments in the TP and AspP projection. This means realization as in (63a) is more economical, which may account for the last resort flavour of constructions involving (63b), which occur when there is a second position clitic requiring a host – without actually having to assume that a movement

[21] With respect to both the participle and the auxiliary being specified for Asp, note that participle and auxiliary together realize the perfect tense. Replacing either one of them by a different element gives a nonperfect structure, hence the assumption they both carry an aspectual feature is not implausible.

process is triggered by the phonological requirement of the clitic (compare section 2.1). In languages in which participles do not carry an AgrS feature to begin with, the participle must by necessity be merged low, as the AgrS feature in the functional hierarchy can only be realized by an auxiliary in that case.

6 Conclusion

If our analysis of SC participle fronting is on the right track, we might expect to find the kind of inverse merger it involves in other domains of syntax as well. In particular, we might expect it to occur in extended projections of the other lexical categories besides verbs. Analogously to our reasoning in the previous section, we should leave out N and A from the respective functional hierarchies that characterize nominal and adjectival extended projections. A noun or adjective with lexical content can in principle realize one or more features in any position in this hierarchy, as long as their dependents can be properly licensed.

A possible candidate for inverse merger in the nominal domain is a type of N-to-D movement found in Italian, as discussed by Longobardi (1994). Longobardi argues that proper names can move to D when this position is not occupied by a determiner. When this happens, the noun can skip a possessor:

(64) a. il mio Gianni
the my Gianni
b. Gianni mio
Gianni my

If the possessor is itself a head within the nominal extended projection there is 'long noun movement' in (64b), which might be amenable to the sort of analysis proposed for long verb movement above. Whether it is, and whether such an analysis will give the same sort of advantages we claimed it has for the SC long verb movement case, will have to await further research.

References

Ackema, Peter (2003). Do Preverbs Climb? To appear in K. É. Kiss and H. van Riemsdijk (eds.), *Verb Clusters in Hungarian and Germanic: A Sprachbund?*. Amsterdam: John Benjamins.

Ackema, Peter and Ad Neeleman (2002). Effects of Short-Term Storage in Processing Rightward Movement. In: S. Nooteboom, F. Weerman and F. Wijnen (eds.), *Storage and Computation in the Language Faculty*, 219-256. Dordrecht: Kluwer.

Ackema, Peter and Ad Neeleman (to appear). *Beyond morphology: Interface conditions on word formation*. Oxford University Press.

Ackema, Peter, Ad Neeleman and Fred Weerman (1993). Deriving Functional Projections. In: A. Schafer (ed.), *Proceedings of NELS 23*, 17-31. Amherst: GLSA.
Baker, Mark (1988). *Incorporation: A Theory of Grammatical Function Changing*. Chicago: University of Chicago Press.
Baker, Mark (2003). *Lexical Categories: Verbs, Nouns, and Adjectives*. Cambridge: Cambridge University Press.
Baltin, Mark (2003). The Interaction of Ellipsis and Binding: Implications for the Sequencing of Principle A. *Natural Language and Linguistic Theory* 21, 215-246.
Besten, Hans den (1983). On the Interaction of Root Transformations and Lexical Deletive Rules. In: W. Abraham (ed.), *On the Formal Syntax of the Westgermania*, 47-131. Amsterdam: John Benjamins.
Besten, Hans den and Gert Webelhuth (1989). Remnant Topicalization and the Constituent Structure of VP in the Germanic SOV Languages. *GLOW Newsletter* 18, 15-16.
Bobaljik, Jonathan (2003). Clustering Theories. To appear in K. É. Kiss and H. van Riemsdijk (eds.), *Verb Clusters in Hungarian and Germanic: A Sprachbund?*. Amsterdam: John Benjamins.
Borer, Hagit (2003). *Structuring sense: An Exo-skeletal Trilogy*. To appear at Oxford University Press.
Bošković, Željko (1995). Participle Movement and Second Position Cliticization in Serbo-Croatian. *Lingua* 96, 245-266.
Bošković, Željko (2001). *On the Nature of the Syntax-Phonology Interface*. Amsterdam: North-Holland.
Bošković, Željko and Daiko Takahashi (1998). Scrambling and Last Resort. *Linguistic Inquiry* 29, 347-366.
Broekhuis, Hans and Krzysztof Migdalski (2003). Participle Fronting in Bulgarian as XP-Movement. To appear in L. Cornips and P. Fikkert (eds.), *Linguistics in the Netherlands 2003*. Amsterdam: John Benjamins.
Čamdžić, Amela and Richard Hudson (2002). Serbo-Croat-Bosnian Clitics and Word Grammar. *UCL Working Papers in Linguistics* 14, 321-353.
Chomsky, Noam (1981). *Lectures on Government and Binding*. Dordrecht: Foris.
Chomsky, Noam (1995). *The Minimalist Program*. Cambridge, Mass.: MIT Press.
Chomsky, Noam (2001). Derivation by Phase. In: M. Kenstowicz (ed.), *Ken Hale: A Life in Language*, 1-52. Cambridge, Mass.: MIT Press.
Cinque, Guglielmo (1999). *Adverbs and Functional Heads*. Oxford: Oxford University Press.
Embick, David and Roumyana Izvorski (1997). Participle-Auxiliary Word Orders in Slavic. In: W. Browne, N. Kondrashova and D. Zec (eds.), *Formal Approaches to Slavic Linguistics: The Cornell Meeting 1995*, 210-239. Ann Arbor: Michigan Slavic Publications.
Evers, Arnold (1975). *The Transformational Cycle in Dutch and German*. Ph.D. dissertation, Utrecht University.
Evers, Arnold (2002). Review of Koopman and Szabolcsi 2000. Ms. Utrecht University.
Falk, Cecilia (1993). *Non-Referential Subjects in the History of Swedish*. Ph.D. dissertation, University of Lund.
Fanselow, Gisbert (2001). Θ-roles and Free Constituent Order. *Linguistic Inquiry* 32, 405-437.
Fanselow, Gisbert (2002). Against Remnant VP Movement. In: A. Alexiadou, E. Anagnostopoulou, S. Barbiers and H.-M. Gärtner (eds.), *Dimensions of Movement*, 91-127. Amsterdam: John Benjamins.
Fox, Danny (2000). *Economy and Semantic Interpretation*. Cambridge, Mass.: MIT Press.
Franks, Stephen and Tracy Holloway King (2000). *A Handbook of Slavic Clitics*. Oxford: Oxford

University Press.
Godjevac, Svetlana (2000). *Intonation, Word Order, and Focus Projection in Serbo-Croatian*. Ph.D. dissertation, Ohio State University.
Grimshaw, Jane (1991). Extended Projection. Ms. Brandeis University.
Grimshaw, Jane (1997). Projection, Heads, and Optimality. *Linguistic Inquiry* 28, 373-422.
Grimshaw, Jane and Armin Mester (1988). Light Verbs and θ-marking. *Linguistic Inquiry* 19, 205-232.
Haegeman, Liliane and Henk van Riemsdijk (1986). Verb Projection Raising, Scope, and the Typology of Rules Affecting Verbs. *Linguistic Inquiry* 17, 417-466.
Halpern, Aaron (1995). *On the Placement and Morphology of Clitics*. Stanford: CSLI.
Hoeksema, Jack (2001). Verb Movement in Dutch Present-Participle Clauses. In: S. Pintzuk, G. Tsoulas and A. Warner (eds.), *Diachronic Syntax: Models and Mechanisms*. Oxford: Oxford University Press.
Hoekstra, Jarich (1997). *The Syntax of Infinitives in Frisian*. Ljouwert: Fryske Akademy.
Holmberg, Anders (2003). Stylistic Fronting. To appear in: Martin Everaert and Henk van Riemsdijk (eds.), *The Syntax Companion*. Oxford: Blackwell.
Johannessen, Janne Bondi (1998). *Coordination*. Oxford: Oxford University Press.
Johnson, Kyle (2002). Gapping. To appear in: M. Everaert and H. van Riemsdijk (eds.), *The Syntax Companion*. Oxford: Blackwell.
Johnson, Kyle and Sten Vikner (1994). The Position of the Verb in Scandinavian Infinitives: in V^0 or in C^0 but not in I^0. *Working Papers in Scandinavian Syntax* 53, 61-84
Kayne, Richard (1991). Romance Clitics, Verb Movement, and PRO. *Linguistic Inquiry* 22, 647-686.
Kayne, Richard (1994). *The Antisymmetry of Syntax*. Cambridge, Mass.: MIT Press.
Kiss, Katalin É (2003). A Comparative Analysis of Hungarian and Continental West-Germanic Verbal Complexes. To appear in: K. É. Kiss and H. van Riemsdijk (eds.), *Verb Clusters in Hungarian and Germanic: A Sprachbund?*. Amsterdam: John Benjamins.
Koopman, Hilda and Anna Szabolcsi (2000). *Verbal Complexes*. Cambridge, Mass.: MIT Press.
Kuroda, S.-Y. (2003). Complex Predicates and Predicate Raising. *Lingua* 113, 447-480.
Lambova, Mariana (2002). Is Head Movement Syntactic: Evidence from Bulgarian. *MIT Working Papers in Linguistics* 43, 91-104.
Lema, José and Maria-Luisa Rivero (1991). Types of Verbal Movement in Old Spanish: Modals, Futures, and Perfects. *Probus* 3, 237-278.
Li, Yafei (1990). X^0-binding and Verb Incorporation. *Linguistic Inquiry* 21, 399-426.
Longobardi, Giuseppe (1994). Reference and Proper Names. *Linguistic Inquiry* 25, 609-665.
Müller, Gereon (1998). *Incomplete Category Fronting*. Dordrecht: Kluwer.
Neeleman, Ad (1997). PP-complements. *Natural Language and Linguistic Theory* 15, 89-137.
Neeleman, Ad and Hans van de Koot (2002). The Configurational Matrix. *Linguistic Inquiry* 33, 529-574.
Neijt, Anneke (1980). *Gapping*. Dordrecht: Foris.
Pesetsky, David (1987). Wh-in-situ: Movement and Unselective Binding. In: E. Reuland and A. ter Meulen (eds.), *The Representation of (In)definiteness*, 98-129. Cambridge, Mass.: MIT Press.
Poletto, Cecilia (2000). *The Higher Functional Field: Evidence from Northern Italian Dialects*. Oxford: Oxford University Press.
Pullum, Geoffrey and Arnold Zwicky (1997). Licensing of Prosodic Features by Syntactic Rules: The Key to Auxiliary Reduction. Paper presented at LSA 1997, University of Chicago.
Reuland, Eric (1990). Head Movement and the Relation between Morphology and Syntax. In: G.

Booij and J. van Marle (eds.), *Yearbook of Morphology 1990*, 129-161. Dordrecht: Foris.
Riemsdijk, Henk van (1998). Head Movement and Adjacency. *Natural Language and Linguistic Theory* 16, 633-678.
Rivero, Maria-Luisa (1991). Long Head Movement and Negation: Serbo-Croatian vs. Slovak and Czech. *The Linguistic Review* 8, 319-351.
Rivero, Maria-Luisa (1994). Clause Structure and V-movement in the Languages of the Balkans. *Natural Language and Linguistic Theory* 12, 63-120.
Rizzi, Luigi (1990). *Relativized Minimality*. Cambridge, Mass.: MIT Press.
Rizzi, Luigi (1997). The Fine Structure of the Left Periphery. In: L. Haegeman (ed.), *Elements of Grammar*, 281-337. Dordrecht: Kluwer.
Roberts, Ian (1993). *Verbs and Diachronic Syntax*. Dordrecht: Kluwer.
Roberts, Ian (1997). Restructuring, Head Movement, and Locality. *Linguistic Inquiry* 28, 423-460.
Rosen, Sara (1990). *Complex Predicates*. New York: Garland.
Saito, Mamoru and Hiroto Hoshi (2000). The Japanese Light Verb Construction and the Minimalist Program. In: R. Martin, D. Michaels and J. Uriagereka (eds.), *Step by Step*, 261-295. Cambridge, Mass.: MIT Press
Schafer, Robin (1997). Long Head Movement and Information Packaging in Breton. *Canadian Journal of Linguistics* 42, 169-203.
Schmid, Tanja and Ralf Vogel (2003). Dialectal Variation in German 3-Verb Clusters. Ms. University of Stuttgart / University of Potsdam.
Stump, Gregory (1998). Inflection. In: A. Spencer and A. Zwicky (eds.), *The Handbook of Morphology*, 13-43. Oxford: Blackwell.
Sturm, Arie (1986). *Syntactische structuren in het Nederlands*. Ph.D. dissertation, University of Nijmegen.
Travis, Lisa (1984). *Parameters and Effects of Word Order Variation*. Ph.D. dissertation, MIT.
Travis, Lisa (1988). The Syntax of Adverbs. *McGill Working Papers in Linguistics: Special Issue on Germanic Syntax*, 280-310.
Wilder, Chris and Damir Ćavar (1994). Long Head Movement? Verb Movement and Cliticization in Croatian. *Lingua* 93, 1-58.
Williams, Edwin (1980). Predication. *Linguistic Inquiry* 11, 203-238.
Williams, Edwin (1997). Blocking and Anaphora. *Linguistic Inquiry* 28, 577-628.
Williams, Edwin (2003). *Representation Theory*. Cambridge, Mass.: MIT Press.
Wurmbrand, Susi (2001). *Infinitives*. Berlin: Mouton de Gruyter.
Wurmbrand, Susi (2002). West Germanic Verb Clusters: The Empirical Domain. To appear in: K. É. Kiss and H. van Riemsdijk (eds.), *Verb Clusters in Hungarian and Germanic: A Sprachbund?*. Amsterdam: John Benjamins.
Wurmbrand, Susi (2003). Verb Clusters, Verb Raising, and Restructuring. To appear in: M. Everaert and H. van Riemsdijk (eds.), *The Syntax Companion*. Oxford: Blackwell.