Linearizing and interpreting remnant movement

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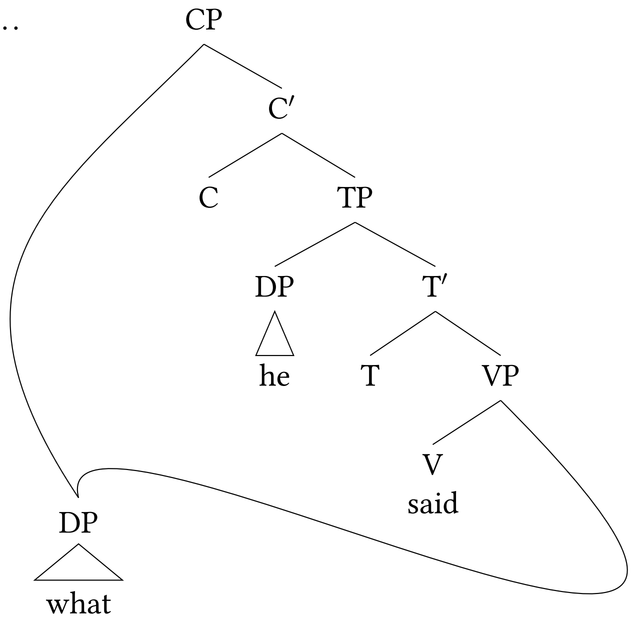
Abstract

A long-standing question is how multidominant structures (trees containing nodes with more than one mother) are interpreted at the interfaces. On the PF side, previous work on multidominance has proposed algorithms that can derive the correct linearization of multidominated nodes. Furthermore, there have been explicit proposals for how such structures can receive a compositional interpretation. A construction that has received less attention in the multidominance literature, however, is remnant movement. This describes a structural configuration in which a moved item no longer c-commands its base position in the final output representation. In this paper, I will show that remnant movement poses a serious challenge for certain approaches to linearization, namely those based on the concept of *full dominance.* Rather than being a shortcoming of these approaches, however, I will argue that the solution to this problem, Branch Pruning, can account for a well-known puzzle about remnant movement constructions, an anti-reconstruction effect known as 'Barss' Generalization'. Given this effect essentially comes for free as part of the solution we require for linearization, I contend that the inability of accounts employing full dominance to linearize remnant movement without further assumptions should be viewed as a feature rather than a bug.

1 Introduction

The phenomenon of displacement has been the focus of research in syntactic theory since the earliest days of Generative Grammar. Across shifting frameworks, the central insight that a syntactic element shows properties connected with a position it does not occupy on the surface has led to a range of theoretical devices with which to model this effect, e.g. traces, copies, feature percolation and multidominant structures. In this paper, I focus on the multidominance analysis of the many-to-one relation between syntactic positions and pronunciation sites that is posed by displacement such as (1).

(1) I forgot…



Here, the displaced DP *what* is 'multidominated', which I will use to mean that it has more than one mother (VP and CP). While multidominance theories have been shown to be able to derive displacement (in addition to various kinds of 'sharing' constructions, e.g. ATB-movement, Right-Node Raising), much of the explanatory burden falls on the linearization component of the grammar. While there have been various successful proposals for how to linearize mulitdominant structures (e.g. Wilder 1999, 2008, Bachrach & Katzir 2009, 2017, de Vries 2009, Johnson 2012, 2020, Gračanin-Yüksek 2013), I will show in this paper that one particular kind of approach, namely those relying on Wilder's (1999) concept of *full dominance*, cannot correctly linearize remnant movement structures.

Far from being a deficit of such approaches, I will try to show that this can be seen as a virtue if we embrace its consequences and adopt a repair in the form of 'Branch Pruning' (Ross 1967, Perlmutter 1971, É. Kiss 2008, Stepanov 2012, Belk et al. 2024). The point that I would like to highlight in this paper is that the same branch that causes a linearization problem at PF also appears to be unavailable for reconstruction at LF. This is embodied by what has become known as *Barss' Generalization*, going back to observations in Barss (1986). I will argue that if Branch Pruning affects the input to both interfaces, then we automatically derive Barss' Generalization 'for free'. Since the precise nature of Barss' Generalization is currently an open question, I take this to be an interesting result which may in turn justify a full dominance approach to linearization after all.

The paper is structure as follows. In section 2, I will briefly review the full dominance approach to multidominance and show why it runs into problems with remnant movement. Then, I will propose a specific repair in the form of Branch Pruning that will apply only in remnant movement configurations. In section 3, I present some background on how multidominant structures can be interpreted compositionally, with a particular focus on quantifier scope. Finally, section 4 shows how this comes together to derive Barss' Generalization in a straightforward way. Section 5 then concludes.

2 Linearizing remnant movement

2.1 Multidominance and linearization

One of the major challenges facing multidominance theories is to provide a linearization algorithm that correctly derives the fact that an item that occupies multiple positions in the structure is, in most cases, only pronounced in one of them. This is comparable to the challenge faced by analyses employing the Copy Theory of Movement (Chomsky 1995). The relevant difference here is between *terms* and *positions* (Larson 2016), where structure building in a multidominant syntax is predominantly concerned with the latter, i.e. which of its positions a multidominated node is to be linearized at.

There have been several proposals for how to linearize trees containing multidominated nodes (see e.g. Wilder 1999, 2008, Gärtner 2002, Bachrach & Katzir 2009, 2017, Chen-Main 2008, de Vries 2009, Potter 2010, Johnson 2012, 2016, 2020, Gračanin-Yüksek 2013, O'Brien 2017, Poole 2017 for a variety of perspectives) and I will not attempt to review them here for reasons of space. While they all ultimately differ in the fine details, many of them share a common idea: The pronunciation of a multidominated node will be delayed until its structurally highest position. This embodies the hypothesis that movement is always 'upward'. It is the implementation of this analytical intuition in a multidominance framework that I will focus on in this paper.

For the sake of presentational ease, however, I will not adopt any of the aforementioned approaches to linearization in its entirety. Instead, I will present a simplified yet explicit approach to linearization that encompasses the main ideas in the works cited above. Since I will provide analyses of both head-initial (English) and head-final languages (German), I will not pursue an approach that tries to maintain some version of Kayne's (1994) *Linear Correspondence Axiom (LCA)* (see e.g. Wilder 2008, Gračanin-Yüksek 2013), as this would significantly complicate the structures we have to consider.

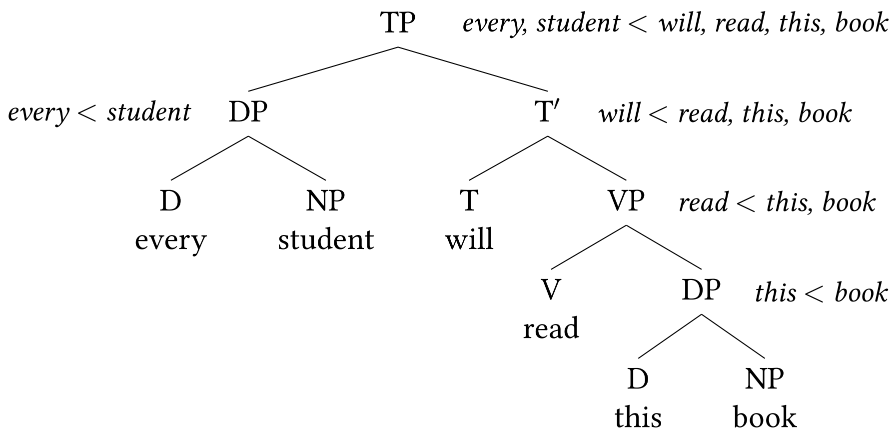
Instead, I will work with what I call the *Flexible Linearization Algorithm*:[1]

(2) *Flexible Linearization Algorithm* (to be revised)
For every branching node N with daughters X and Y in a phrase marker P:

a. Let $d(\beta)$ be the set of terminal nodes dominated by β
b. d(X) $<$ d(Y) or d(Y) $<$ d(X) (*Directionality*)
c. Every terminal node in P must appear in the linearization (*Totality*)
d. No linearization can contain both $x < y$ and $y < x$ (*Antisymmetry*)

The basic idea behind this algorithm is that, for a given tree, we calculate the respective precedence relations between the daughters of all branching nodes in the structure.[2] This is done by first defining what Kayne (1994: 5) called the 'image' of β (under d), $d(\beta)$, as the set of terminal nodes dominated by β. The second clause (2b) states that for two daughters of any branching node N, the terminals dominated by one daughter either precede or follow all the terminals dominated by the other daughter. This yields flexibility in the relative ordering of sister nodes, where precedence is not determined by the linearization mechanism itself, but rather by language-specific properties (the same also applies to adjuncts/specifiers which can in principle be linearized to the left or the right). In this way, it is flexible enough to analyze head-final, head-initial or languages exhibiting mixed directionality without additional movement operations. Additionally, every terminal node in the tree must be mentioned somewhere in the final linearization. I will refer to this property as *Totality*, as Johnson (2012, 2016, 2020) also does. The final clause in (3d) encompasses the idea that conflicting linearization statements are illegitimate and are not interpretable by PF (Kayne 1994, Fox & Pesetsky 2005).

Given this approach to linearization, the calculation of precedence relations is relatively straightforward for trees without any multidominated nodes such as (3). If we start from the bottom of the tree, the object DP has two daughters both of which are terminal nodes. In this case, d(D) = {*this*} and d(NP) = {*book*}. Given the fact that DPs are head-initial in English, the linearization statement *this* $<$ *book* is generated. When we move up to the VP, the same procedure applies. Since the VP is also head-initial, we require that d(V) $>$ d(DP). The image of V is trivial (d(V) = {*read*}), while d(DP) = {*book, the*}. The members of the set d(DP) are unordered, but we have already established their relation independently. This yields the linearization statement *read* $<$ *this, book.* The procedure applies iteratively until we reach the root node. When we consider all of these linearization statements, the sequence that is compatible with all of them is the desired outcome *every student will read this book.*

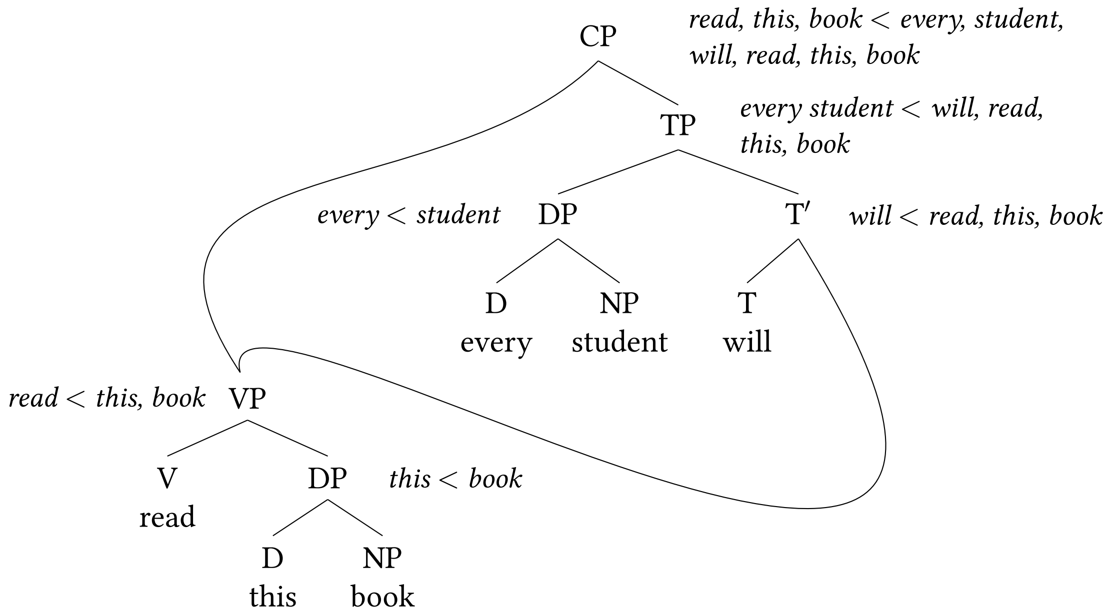
(3)


[1]The formulations here borrow heavily from those in Johnson (2020).

[2]In this sense, it perhaps comes closest to the approach to linearization in Bachrach & Katzir (2009, 2017), though their primary concern was linearizing multidominance structures involving cross-conjunct sharing rather than upward displacement.

This works well for cases without multidominance. Let us now consider how our linearization algorithm fares if we remerge the VP at a higher point in the tree as in (4) to derive the VP-topicalization *Read this book, every student will* (here, I have omitted the head of CP for convenience). VP is a now multidominated as it has two distinct mothers, T′ and CP. The problem now is that for the daughters of T′, we generate the linearization statement *will* $<$ *read, this, book.* This is then later contradicted at the linearization of CP, as the content of its left daughter (VP) has to precede everything dominated by its right daughter (TP). This results in the conflicting statement that the terminals *read, this, book* precede the auxiliary *will.*

(4) *Unwanted linearization*



The problem here is clear. In cases of multidominated nodes, we do not want more than one position to count for the purposes of linearization. This property, referred to by Johnson (2012) as *Terseness*, is something that any theory of displacement should derive as the unmarked case. In the case of (4), the higher branch is the one that is relevant for linearization. In the Copy Theory, one has to stipulate that is usually the highest copy of a moved item that is pronounced (Nunes 2004). In a multidominance approach to movement, one can take a different approach. Several approaches to linearizing multidominance trees adopt a concept going back Wilder (1999), namely *full dominance.*[3] I define full dominance as in (5).

(5) *Full dominance*
A node N fully dominates α if every path from α to the root contains N.

This definition mentions a 'path' to the root. Paths can be understood intuitively as a sequence of immediate dominance (mother) relations leading to the root node. Since paths will also be important later on, I provide a full definition below in (6).[4]

[3]Various works refer to this instead as *complete dominance* (Bachrach & Katzir 2009, 2017, Gračanin-Yüksek 2013, O'Brien 2017), but I will stick with Wilder's original coinage.

[4]Here, I treat paths as unordered sets (Collins 1994: 56) rather than an ordered tuple that directly encodes the relevant motherhood/immediate dominance relations between the elements in the path (e.g. Collins & Stabler 2016: 51; O'Brien 2017: 36). For present purposes, this information about dominance within the path will not be relevant.

(6) *Path*
A path π from α to the root is a set of nodes that dominate α such that

a. the root node $\in \pi$ and
b. for all X $\in \pi$:
   (i) if Y immediately dominates X, then Y $\in \pi$,
   (ii) at most one mother of X $\in \pi$ (supersedes (i)).

There are cases in which the two subclauses of (6b) conflict. If a node has two mothers, then the clause in (6b.i) will require that both are included in the path. Clause (6b.ii), on the other hand, states that at most one mother of a given node in the path may be included. For this reason, I propose that (6b.ii) trumps (6b.i) where both are applicable (i.e. in cases of multidominated nodes).

To see this in action, let us consider the paths from the verb *read* to the root in the structure in (4). Once we reach VP only one of the two mothers may be included in the path, given (6b.ii). This gives rise to two distinct paths to the root, namely those in (7). The clause in (6b.i) in addition ensures that no nodes may skipped in the path to the root. I have also listed the paths from the terminal nodes D and NP. These paths are the same, with the addition that they also pass through DP.

(7) Paths from *read* to the root

a. P_1: {VP, <u>T′</u>, <u>TP</u>, CP}
b. P_2: {VP, CP}

Paths from *this* and *book* to the root

a. P_1: {DP, VP, <u>T′</u>, <u>TP</u>, CP}
b. P_2: {DP, VP, CP}

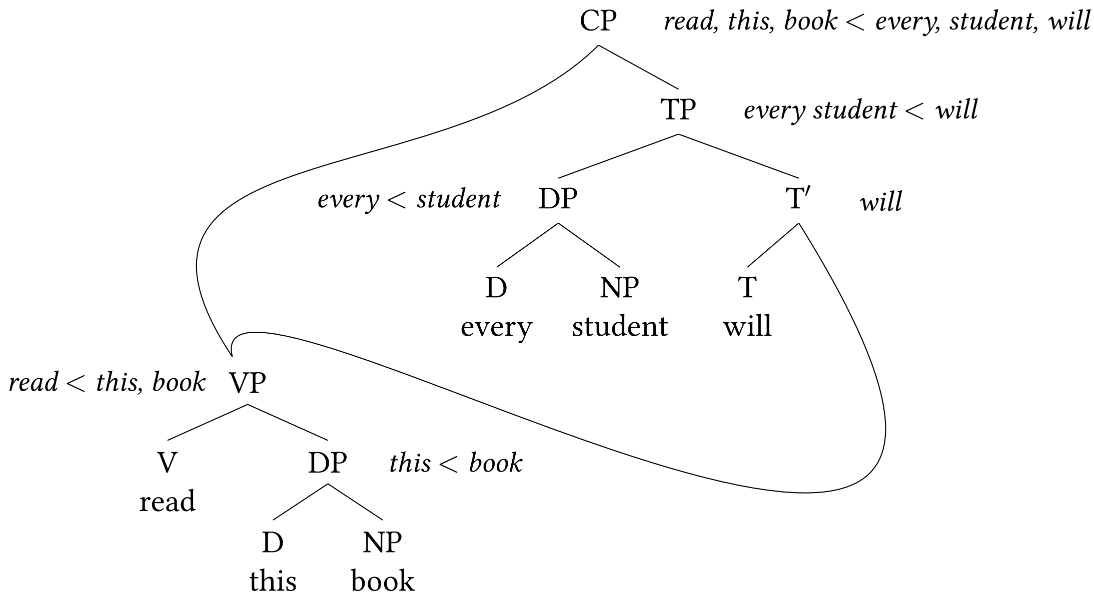
Given our definition of full dominance in (5), there are two nodes in the structure in (4) that do not fully dominate the contents of the VP, namely T′ and TP. These are precisely the nodes which we want to be ignored for the linearization of the VP. We can therefore add full dominance as a prerequisite for linearizing the daughters of a node. Thus, I will redefine the *Flexible Linearization Algorithm* to now include an additional qualification in clause (b) that only terminals fully dominated by the node in question are considered for the purposes of linearization at that point:

(8) *Flexible Linearization Algorithm* (final)
For every branching node N with daughters X and Y in a phrase marker P:

a. Let $d(\beta)$ be the set of terminal nodes dominated by β
b. <u>For all terminals fully dominated by N</u>, d(X) $<$ d(Y) or d(Y) $<$ d(X) (*Directionality*)
c. Every terminal node in P must appear in the linearization (*Totality*)
d. No linearization can contain both $x < y$ and $y < x$ (*Antisymmetry*)

With this modification in place, we avoid the linearization conflict as the contents of VP are not considered at the T′ or TP nodes due to the fact that they are not fully dominated by these nodes. Since CP is included in every path (by virtue of being the root), the terminal nodes dominated by VP are linearized as the left daughter of CP (9).

(9) *Correct linearization*



The concept of full dominance will generally force the Spell-Out of all internally re-merged material to be delayed until its highest position in the structure, which one could argue is the null hypothesis for movement (something more has to be said about 'covert movement' which we return to in section 3). Importantly, all paths to the root enter into the calculation of full dominance. This has the advantage that we do not need any special assumptions to ignore lower occurrences of the multidominated node comparable to the Copy Deletion algorithm (Chomsky 1995, Nunes 2004). It is the addition of full dominance, however, that creates a problem in remnant movement configurations, as I will show in the following section. While one might take this as a reason not to adopt full dominance in the first place, I will argue that the repair it requires it comes with an additional benefit for interpretation.

2.2 The problem of remnant movement

Let us now consider remnant movement. Remnant movement describes a derivation in which a constituent containing a trace of a moved phrase α is itself moved to a position in which α no longer c-commands its own trace. This scenario is depicted abstractly in (10).

(10) $[_{\text{XP}}$ X t_{YP}] … YP … t_{XP}

Here, YP has moved out of the constituent XP, which then subsequently moves to a position above YP. There is a long tradition of assuming this kind of derivation for cases of partial VP fronting in German such as (11). (Thiersch 1985, den Besten & Webelhuth 1987, 1990, Grewendorf & Sabel 1994, Müller 1998). Here, the participle *gelesen* ('read') has been fronted to the exclusion of the direct object *das Buch* ('the book') with which it forms a constituent.

(11) Gelesen habe ich das Buch noch nicht
read have I the book yet not
'I haven't read the book yet.'

In addition, remnant movement derivations have been recruited in the analysis of English examples such as (12) (Lasnik & Saito 1992).

(12) How likely to win is Steven?

Here, the subject of the raising predicate *likely* appears postverbally. A standard view here is that the subject *Steven* has raised out the constituent *how likely to win* that subsequently undergoes wh-movement. For now, I will focus on the German example in (11) but will come back to examples like (12) in more detail in section 4.

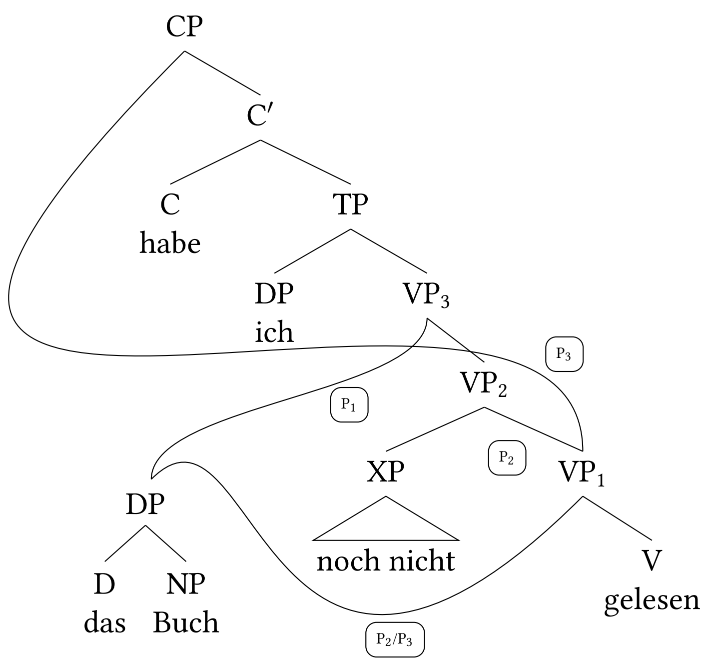
In the remnant movement analysis of (11), the direct object is first scrambled to some position outside the VP (13a). Subsequently, the VP containing the base position of the object is moved to the front of the sentence.

(13) a. [$_{DP}$ das Buch]$_1$ noch nicht [$_{VP}$ t$_1$ gelesen]
the book yet not read

b. [$_{VP}$ t$_1$ gelesen] habe ich [$_{DP}$ das Buch]$_1$ noch nicht t$_{VP}$
read have I the book yet not

What does a remnant movement derivation look like in a multidominant theory of movement? An analysis of (11) with very minimal structural assumptions is given in (14).

(14)



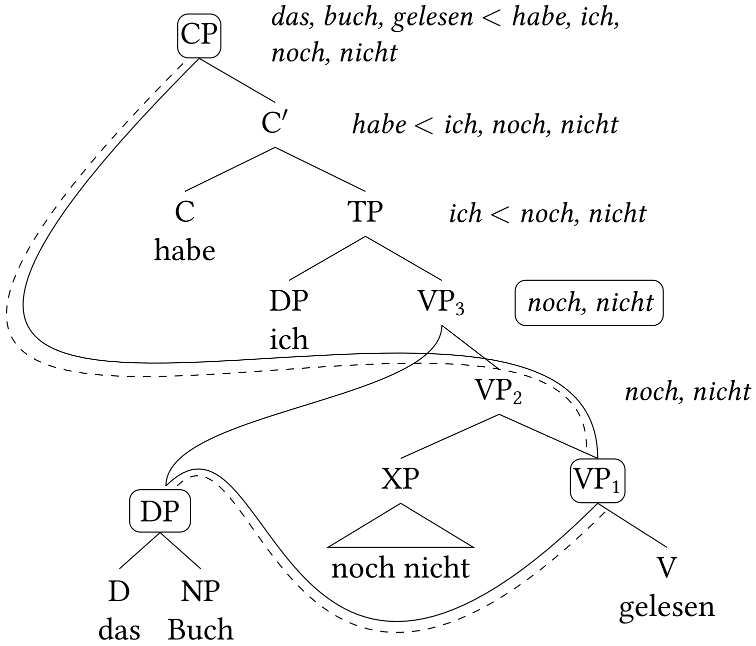
Here, the object DP is re-merged as a VP-adjunct to create VP$_3$. VP$_1$ is then re-merged as the sister of C′. The desired linearization of this structure is the one in (11), namely *gelesen habe ich das Buch noch nicht*. For this to be achieved, the object *das Buch* needs to be linearized as the left daughter of VP$_3$. Recall that, in order to be linearized as a daughter of VP$_3$, the contents of the DP *das Buch* must be fully dominated by VP$_3$. In order to count as fully dominated, VP$_3$ must be contained in every path from *das* and *Buch* to the root. The relevant paths are given below in (15).

(15) Paths from *das* and *Buch* to the root

a. P$_1$: {DP, <u>VP$_3$</u>, TP, C′, CP}
b. P$_2$: {DP, VP$_1$, VP$_2$, <u>VP$_3$</u>, TP, C′, CP}
c. P$_3$: {DP, VP$_1$, CP}

As is apparent, VP_3 is not included in every path to the root, as there is the path P_3 that we get by following the branch marked P_2/P_3 to VP_1 and then directly on to CP. This additional path to the root, which I have highlighted with a dashed line in the tree below, means that VP_3 does not fully dominate the contents of DP and they therefore cannot be linearized at that position. The result we get is shown in (16). The linearized string is a grammatical sentence corresponding to simple VP fronting, as we are forced to wait until CP in order to linearize the terminal nodes inside the object DP.

(16)



This is a serious problem for theories that employ full dominance which has, to the best of my knowledge, not been previously discussed.[5] At this juncture, there are a number of possible conclusions one could draw. Perhaps the most obvious is that this provides a good reason to abandon full dominance as a way of delaying Spell-Out in a multidominance structure. There have been alternative proposals, e.g. that one can choose to ignore certain branches in a multidominant structure. In effect, we can then choose which branch to use for linearization, as long as certain other conditions are met. This is essentially what is proposed by Bachrach & Katzir (2017: 21) and Johnson (2020: 122–123). Once branches can be ignored, the addition path P_3 in (15) would cease to be a problem, as we are no longer forced to consider it, unlike in the full dominance approach.

While this conclusion is perfectly reasonable, I would like to suggest an alternative view. Remnant movement structures clearly require some additional assumptions in order to be linearizable with full dominance. I will argue that whenever a remnant movement configuration arises in a multidominant structure, a repair is necessary for it to be interpretable at the interfaces. This repair comes in the form of Branch Pruning, an idea with a long pedigree (see Murphy 2019 for an overview; also see Belk et al. 2024 for a recent application within multidominance). The idea, to be set out in more formal terms momentarily, is that the path that does not contain VP_3, namely P_3, must be eliminated from the representation. The most economical way to do this is to sever the branch leading from the evacuated DP to VP_1. Although this might seem like a post-hoc patch to fix a theory that appears to generate an unwanted outcome, I will argue that this has a potentially interesting result. Assuming that the repair applies at (or immediately prior to) the point of Spell-Out, the pruned branch will be unavailable at both the PF and the LF interfaces. The unavailability of this branch can immediately

[5] de Vries (2009: 368) alludes to something similar, stating 'if I am not mistaken, LCA-based approaches proposals inevitably run into trouble with remnant movement', but provides no further details about the exact nature of the problem.

derive a well-known and otherwise puzzling property of remnant movement construction, Barss' Generalization. Before I can show this in more detail, let us consider how we can make the conditions for branch pruning more precise.

2.3 Defining branch pruning

Given the general direction outlined in the preceding section, the current task at hand is to provide a way of defining the branch pruning repair so that it only applies in cases of remnant movement. To do this, it is important to consider what characterizes remnant movement in a multidominant approach to syntax in the first place.

In non-multidominant approaches, remnant movement configurations can be singled out by a general condition that all moved phrases must be c-command their trace positions in the final output representation. This is essentially what the *Proper Binding Condition* (Fiengo 1977, May 1977, Saito 1989, Lasnik & Saito 1992) dictated. Of course, the PBC (or anything like it; e.g. Collins & Sabel 2015) does not apply to multidominant structures as there is no sense in which one could treat the moved item and its trace as distinct in any syntactic sense. For this reason, one requires a different way of singling out remnant movement configurations. This is what I will attempt to develop in the remainder of this section.

Considering the bigger picture for a moment, there are two main structural configurations to consider when it comes to moved phrases that contain traces. First, we have a situation where a phrase YP, the evacuee, moves out of some phrase XP containing it (I will call this the 'container phrase'). The container phrase then subsequently moves to a position that c-commands the evacuee (17a). As we have seen, this kind of derivation is referred to *remnant movement*. Another possible derivation involves first moving the container XP and then subsequently sub-extracting YP from that phrase (17b). This particular derivation has been called *smuggling* (Collins 2005, Belletti & Collins 2021).

(17) a. $[_{XP}$ t_{YP} X $]$ $[_{ZP}$ YP $[_{Z'}$ Z $[_{XP}$ t_{YP} X $]$ $]]$ (*Remnant movement*)

b. YP $[_{ZP}$ $[_{XP}$ t_{YP} X $]$ $[_{Z'}$ Z $[_{XP}$ YP X $]$ $]]$ (*Smuggling*)

Sauerland (1999*a*) refers to these as 'diving' versus 'surfing' paths, respectively. The more widely used terms for these derivations are 'remnant movement' and 'smuggling', so I will stick to these. Whether or not these derivations lead to a grammatical output in a given language is subject to factors that are presumably unique to the languages in question. In English, for example, multiple wh-questions can apparently involve a smuggling derivation (18a) (with some degree of marginality), while remnant movement is impossible (18b).

(18) a. ?What student$_1$ did Ann ask [what picture of t_1]$_2$ to put up t_2?

b. *[What picture of t_1]$_2$ did Ann ask what student$_1$ to put up t_2? (Sauerland 1999*a*: 174)

As we have seen, remnant movement derivations have been argued to be possible in German and other languages (see e.g. Ott 2018). Furthermore, there are languages in which in (18a) constitutes a violation of a principle such as Freezing, which prohibits extraction from moved phrases (Wexler & Culicover 1980). Freezing effects do not seem to be an inherent property of derivations like (17b) (see e.g. Fanselow 2001) and should therefore be considered as possible candidates for linearization.

With this in mind, what we need is a constraint that, just like the Proper Binding Condition, distinguishes between remnant movement and smuggling derivations in that it is violated by the former but not the latter. As already mentioned, given the nature of displacement in multidominance theories, we cannot make reference to traces/copies or anything comparable. So, restating the PBC in direct terms is not possible. Instead, I suggest that, from a multidominant perspective, we should seek a constraint that is defined in terms of *paths*. The constraint that I propose is given below in (19). I refer to this as the *Proper Paths Condition (PPC)*, in homage to the PBC.

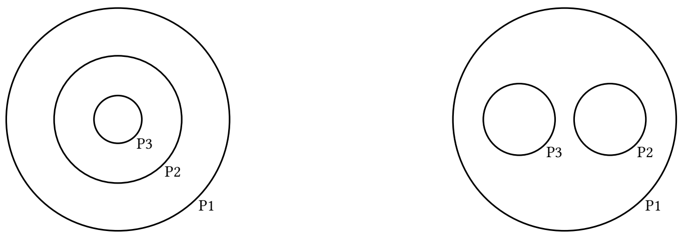
(19) *Proper Paths Condition*
For every multidominated node α, the set of paths from α to the root must be fully nesting.

In addition, we require a definition of what it means to be 'fully nesting'. The simplest way of defining this is given in (20), though I will consider a slightly revised version in section 2.4.

(20) *Fully nesting*
A set of paths Π is fully nesting if for every pair of paths $\langle$P, Q$\rangle$ such that P $\in \Pi$ and Q $\in \Pi$, P $\subseteq$ Q or Q $\subseteq$ P.

The idea here is that, when we consider all of the paths that lead from a multidominated node to the root, they should form a nesting 'Russian doll'-like structure. If there is a pair of paths P_2 and P_3, for example, such that neither is a subset of the other, then this will violate the PPC.[6] A visual representation of this is given in (21).

(21)



fully nesting *not fully nesting*

This notion of fully nesting paths will allow us to successfully distinguish remnant movement from smuggling without making reference to traces or c-command. To see this, consider the multidominant versions of the derivations in (17) that are given below in (22) and (23). In the smuggling derivation in (22), where XP is first re-merged as the daughter of ZP and YP is re-merged as a daughter of the root WP, we have three possible paths from YP to the root. For each pair of these paths, $<P_1, P_2>$, $<P_2, P_3>$ and $<P_1, P_3>$, one member of the pair stands in a subset relation to the other. This structure therefore respects the PPC. For the remnant movement derivation in (23), however, we see that neither of paths P_2 and P_3 is a subset of the other. For this reason, remnant movement (unlike smuggling) generates a configuration in which the paths from a multidominated node to the root are not fully nesting.[7]

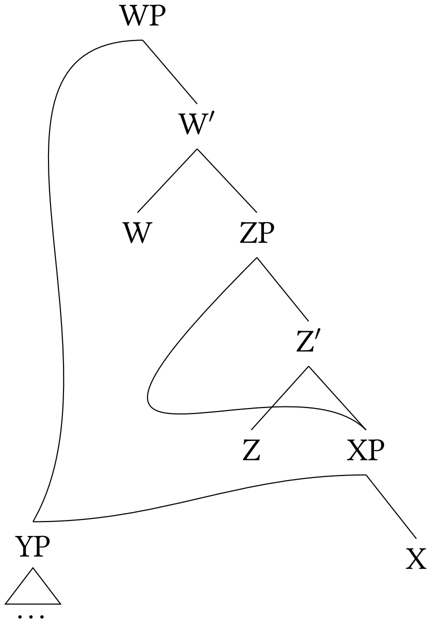
[6] What I propose here is clearly reminiscent of previous proposals such as the *Path Containment Condition* (Pesetsky 1982) that have been invoked to account for multiple Ā-dependencies, as in (i).

(i) a. ?What subject$_2$ do you know who$_1$ to talk to t$_1$ about t$_2$?
b. *Who$_1$ do you know what subject$_2$ to talk to t$_1$ about t$_2$? (Pesetsky 1982: 267)

It has been argued that there is a similarity between these cases in that both cross-serial Ā-dependencies like (ib) and remnant movement can be reduced to violation of *Attract Closest/Shortest Move*, whereby in the latter the relation between the two potential goals is one of domination rather than c-command (Takano 1994, Kitahara 1997, Sauerland 1999*a*, Aravind 2017). As far as I can tell, the PPC will not apply to cases such as (i) as no larger phrase containing a trace of a moved item undergoes movement itself. Consequently, no path from a wh-phrase to the root will contain more than one multidominated node.

[7] It is also important to mention that, since XP also counts as a multidominated node, it is also subject to PPC. As the

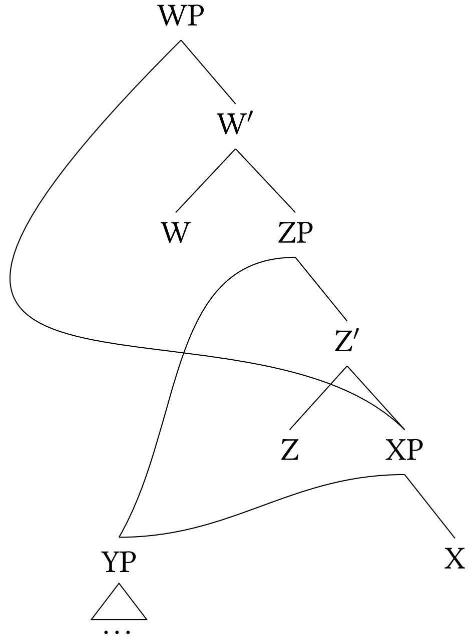
(22) *Smuggling*



Paths from YP to the root
P_1: {XP, Z′, ZP, W′, WP}
P_2: {XP, ZP, W′, WP}
P_3: {WP}

$P_2 \subseteq P_1, P_3 \subseteq P_2, P_3 \subseteq P_1$

(23) *Remnant movement*



Paths from YP to the root
P_1: {XP, Z′, ZP, W′, WP}
P_2: {ZP, W′, WP}
P_3: {XP, WP}

$P_2 \not\subseteq P_3, P_3 \not\subseteq P_2$

This lack of fully nesting paths correlates with the problem of the lack full domination of YP at its desired linearization site. Because ZP is not contained in P_3, YP does not count as fully dominated by ZP. Furthermore, because ZP (and by extension W′) are not included in the path, P_3 fails to be a subset of P_2. We can therefore use a violation of the PPC as the trigger for the pruning repair mentioned above. Let us define the operation of *Branch Pruning* as in (24).[8]

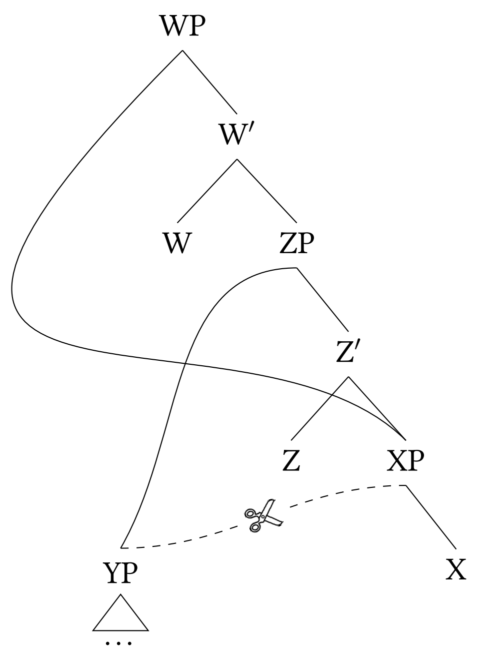
(24) *Branch Pruning*
Let α be a multidominated node in a phrase marker P and $\Pi(\alpha)$ be the set of paths from α to the root node. If α violates the PPC in P, then remove the smallest number of branches in P that eliminates all paths in $\Pi(\alpha)$ containing a multidominated node other than α.

While this definition is a little involved, the intuition is rather simple. The way to repair a non-fully nesting set of paths is to remove the branch from the evacuee into the remnant that creates the unwanted path (P_3). This is illustrated in (25), where a severed branch is indicated by the 'scissors' symbol (✄). This also eliminates P_1, the path that leads from YP through XP and then through the main projection line, but this path is not the one needed for linearization of YP either.

reader can verify, both paths from XP to the root are fully nesting in each case.

[8] I am grateful to Sören E. Tebay for a useful suggestion on how best to formulate this.

(25)



Paths from YP to the root

~~P_1: {**XP**, Z′, ZP, W′, WP}~~

P_2: {ZP, W′, WP}

~~P_3: {**XP**, WP}~~

There are in principle other ways to remove the problematic path P_3, e.g. by deleting the branch from XP to WP, but then this would not allow us to linearize the XP in the correct position. By pruning the branch connecting YP to XP, we eliminate two possible paths to the root that pass through the other multidominated node in the structure XP. This repair is therefore the most economical way to comply with the requirement for fully nesting paths, which is the root of the linearization problem we identified above.

2.4 The scope of the PPC

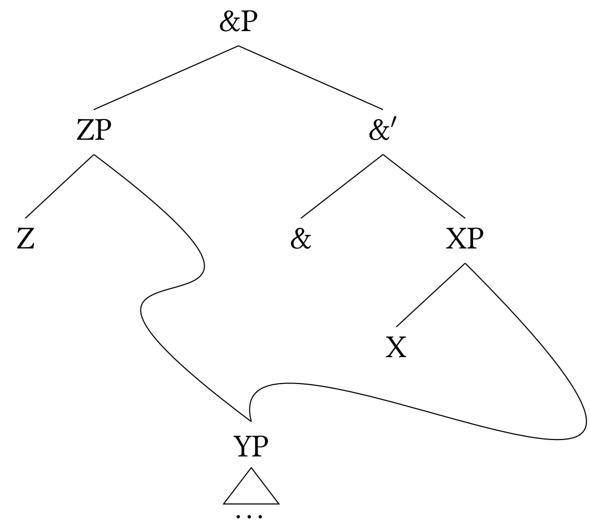
The Proper Paths Condition successfully takes on the role of the Proper Binding Condition in singling out remnant movement. However, the Proper Paths Condition, as it is currently formulated, is actually stronger this. It also rules out a particular application of Merge that has been extensively employed in work on multidominance to derive cross-conjunct 'sharing' constructions such as Right Node Raising, namely *Parallel Merge* (Moltmann 1992, Wilder 1999, Citko 2005, Gračanin-Yüksek 2007, Bachrach & Katzir 2009, 2017, Grosz 2015, Citko & Gračanin-Yuksek 2020).

(26) [James read __] and [Mary reviewed __] a book by a famous author

It has been argued that this and similar cases of cross-conjunct sharing are derived by 'Parallel Merge' whereby a phrase is merged with two distinct elements across workspaces (i.e. prior to the combination of the conjuncts).

The abstract configuration for this kind of sharing to consider here is given in (27), where YP is merged with both X and Z generating a multidominant structure. The important difference here is that there is no internal Merge involved – YP is merged with X and Z separately before they are merged as conjuncts in the coordinate structure. If we consider the paths from YP to the root, then it is clear that they are not fully nesting.

(27)



Paths from YP to the root
P_1: {XP, &′, &P}
P_2: {ZP, &P}

Another operation that derives a similar configuration is what Pesetsky (2013) has dubbed *Undermerge*. This is a case in which a phrase moves to the complement position of some higher head. There are several empirical phenomena for which this analysis seems motivated (see e.g. McCloskey 1984, Johnson 2000, Pesetsky 2013, Yuan 2017), e.g. the data in McCloskey (1984) suggest that a DP can raise to the complement of a higher preposition, while Yuan (2017) argues that ex-situ wh-phrases in Kikuyu merge as the complement of a Focus head in the left periphery. This kind of derivation generates a structural configuration parallel to that in (27). Furthermore, this kind of structure has been proposed by Johnson (2012) for the compositional interpretation of multidominance structures, as we will see in more detail in section 3.[9]

The existence of empirical arguments for Parallel Merge should give us pause, as it generates structures that violate the Proper Paths Condition. There are several responses we could have to this. The first would be to reject such analyses outright and only allow multidominance structures to be generated by Internal Merge. This is clearly undesirable. A multidominance theory that can capture both the standard effects of displacement while simultaneously offering an account of cross-conjunct sharing and Undermerge would clearly be a welcome result.

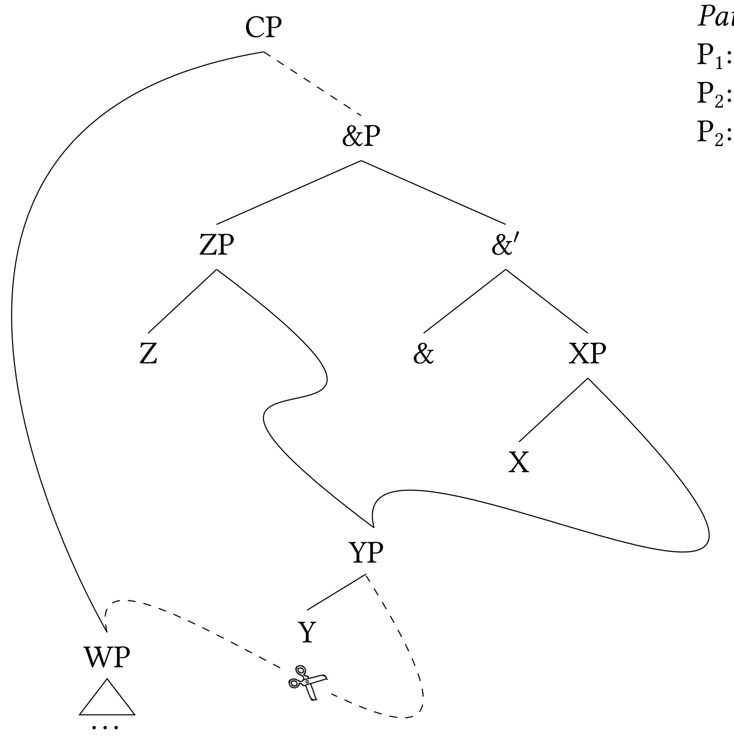
The second option would be to argue that, while Parallel Merge structures such as (27) do fall foul of the PPC, the repair simply cannot apply. Recall that the Branch Pruning repair that I proposed in (24) will have the effect of removing any paths from a multidominated node that pass through another multidominated node in the structure. In the case of (27), there are no other multidominated nodes in the structure. At this point, one might say that this means that, although the PPC is violated, no repair can apply. Of course, we do not want to this to be an accident of the structures we consider. It has been previously noted, e.g. by Sabbagh (2007) and Bachrach & Katzir (2009), that subextraction is possible from a DP that has undergone Right Node Raising (28).

(28) Which author$_1$ did [John read ___] and [Mary review ___] [a book by t$_1$]

In this configuration, illustrated abstractly below in (29), the paths from WP to the root will also not count as fully nesting. The Branch Pruning operation in (24) would then seek to eliminate any paths to the root that pass through YP, the other multidominated node in the structure.

[9] There are also questions about how to linearize structures such as (29). Clearly, the algorithm I have proposed cannot derive the desired linearization of YP in the second conjunct, since full dominance will delay its pronouncation in its structurally highest position. All analyses that I am aware of have to make some additional assumptions to derive this result (see (Bachrach & Katzir 2009, 2017) for an approach based on Edge Alignment constraints).

(29)



Paths from WP to the root

P_1: {YP, XP, &′, &P, CP}

P_2: {YP, ZP, &P, CP}

P_2: {CP}

As indicated, the result of this would be that the branch from WP into the RNR'd constituent YP must be severed. As per the Branch Pruning repair. Interestingly, the theory developed here treats an XP shared across conjuncts by Parallel Merge on a par with a remnant created by movement. If some phrase is subextracted from such an XP, then the branch connecting that phrase to XP must be severed to ensure fully nesting paths. For the purposes of linearization, this is not problematic, as this is not the branch that we need to use. However, an interesting question arises with regard to LF. As we will see, a pruned branch will be unavailable for reconstruction. So, we predict that Barss' Generalization effects should be found for cross-conjunct sharing even though these do not involve remnant movement. At present, it is not clear if this prediction is correct or how best to test it. As I will discuss in section 4.3, establishing whether there is actually a violation of Barss' Generalization requires a very specific configuration that is often difficult to establish.

The third and final option is to revise the Proper Paths Condition, or the definition of fully nesting to be more precise, so it does not apply to structures generated by Parallel Merge. Consider the revised definition of what it means to be fully nesting in (30).

(30) *Fully nesting* (revised)
A set of paths Π is fully nesting if the following holds:
a. Let Π' be the set of paths derived from Π such that each path in Π' contains only those nodes which are present in at least one other path in Π.
b. For every pair of paths $\langle P, Q\rangle$ such that $P \in \Pi'$ and $Q \in \Pi'$, $P \subseteq Q$ or $Q \subseteq P$.

On this definition, we derive from the set of paths leading from a multidominated node to the root $\Pi(XP)$ a second set of paths $\Pi'(XP)$ that contains only those nodes that are contained in at least one other path. In essence then, to derive Π', we remove any nodes from the paths contained in Π that only appear in that path. When applied to (29), we take the set of paths (31a) and we remove XP, &′ and ZP since these are not contained any other path (31b). As we can see the result is a set of fully nesting paths.

(31) a. $\Pi(\text{WP}) = \left\{\begin{matrix}\{\text{YP, XP, \&}', \text{\&P, CP}\}\\ \{\text{YP, ZP, \&P, CP}\}\\ \{\text{CP}\}\end{matrix}\right\}$ b. $\Pi'(\text{WP}) = \left\{\begin{matrix}\{\text{YP, \&P, CP}\}\\ \{\text{YP, \&P, CP}\}\\ \{\text{CP}\}\end{matrix}\right\}$

Of course, it is now crucial to check that this approach still works for the core cases of smuggling vs. remnant movement, in militating against the latter but not the former. Let us consider again the paths from the evacuee YP in the derivation in (22), which are listed in (32a). Given the revised definition of fully nesting above, we now only consider the paths in (32b) where the nodes appearing in only one path in (32a) (in this case only Z′) are disregarded. The paths in question are now fully nesting.

(32) Paths from YP to root in the smuggling derivation in (22)

a. $\Pi(\text{YP}) = \left\{\begin{matrix}\{\text{XP, Z}', \text{ZP, W}', \text{WP}\}\\ \{\text{XP, ZP, W}', \text{WP}\}\\ \{\text{WP}\}\end{matrix}\right\}$ b. $\Pi'(\text{YP}) = \left\{\begin{matrix}\{\text{XP, ZP, W}', \text{WP}\}\\ \{\text{XP, ZP, W}', \text{WP}\}\\ \{\text{WP}\}\end{matrix}\right\}$

Importantly, remnant movement derivations are still not fully nesting on this revised definition. Again, we take the set of paths from YP to the root (33a) and remove from them any nodes that appear in only one path. In this case, this is just Z′. This derives the set of paths in (33b). As one can see, no subset relation holds in either direction between the last two paths. For this reason, the PPC is violated and Branch Pruning will apply, as desired.

(33) Paths from YP to root in the remnant movement derivation in (23)

a. $\Pi(\text{YP}) = \left\{\begin{matrix}\{\text{XP, Z}', \text{ZP, W}', \text{WP}\}\\ \{\text{ZP, W}', \text{WP}\}\\ \{\text{XP, WP}\}\end{matrix}\right\}$ b. $\Pi'(\text{YP}) = \left\{\begin{matrix}\{\text{XP, ZP, W}', \text{WP}\}\\ \{\text{ZP, W}', \text{WP}\}\\ \{\text{XP, WP}\}\end{matrix}\right\}$

For present purposes, let us assume that this how we will deal with cases of Parallel Merge. This approach essentially expresses the intuition that what the PPC really cares about are certain instances of overlapping paths rather than re-Merging a constituent in a non-commanding position. The latter is precisely what we get from Parallel Merge. I take this to be a useful result as Undermerge offers a convenient way of implementing scope-shifting movement in multidominance theories, as I will now outline in the following section.

3 Interpreting movement

In this section, I will lay out some background assumptions about how multidominant structures are interpreted. I mostly follow the ideas presented in Johnson (2012, 2016), which will be important for the discussion of Barss' Generalization to follow. To this end, I will cover the semantics of overt scope-shifting movement (e.g. wh-movement) and covert movement of quantifiers in turn.

3.1 Wh-movement in multidominance

Let us first consider the interpretation of (overt) movement dependencies. In cases of wh-movement such as (34), a classic view is that a trace of movement is interpreted as a variable that is bound by the wh-phrase.

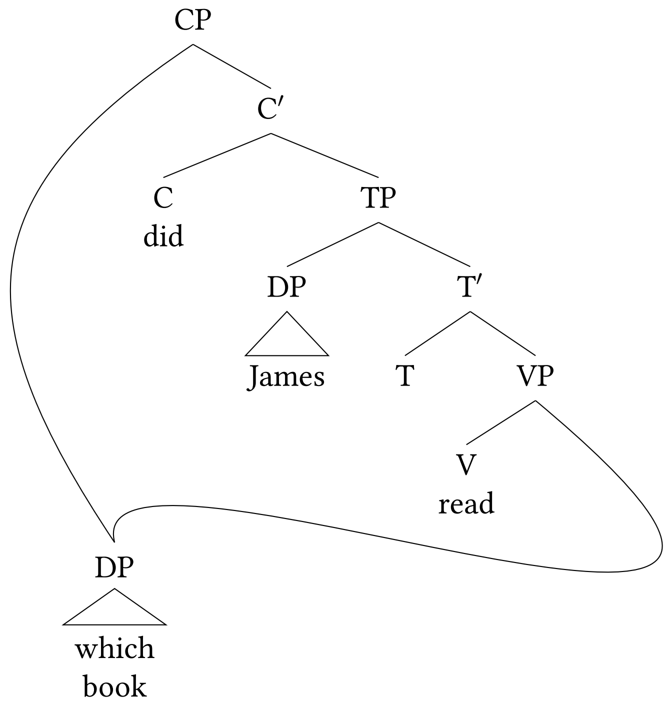
(34) Which book_1 did James read t_1 ?

On a relatively standard semantics for questions where they denote a set of propositions and wh-phrases are existential quantifiers (e.g. Karttunen 1977, Groenendijk & Stokhof 1984), the question in (34) would correspond to a meaning such as (35).[10]

(35) $\lambda p \exists x.\ \mathbf{book}(x) \wedge p = \mathbf{read}(\mathbf{james}, x)$

If we now consider a multidominance analysis of (34), given in (36), the challenge for interpretation becomes clear. It is difficult to see how, in a standard compositional system (Heim & Kratzer 1998), the lower occurrence of the wh-phrase could be interpreted as a variable in one position, while simultaneously being interpreted as a quantifier in its highest position. There is only one item yet it must somehow be interpreted twice in two different ways.

(36)



This is, in some ways, not dissimilar to the challenge faced by the Copy Theory of Movement. Although, here the problem is arguably less acute since there are two distinct terms (copies) that can be potentially manipulated individually. An influential proposal that addresses this problem is to treat the tail of the dependency as a (bound) definite description akin to 'For which book x did James read the book y that is identical to x' (e.g. Engdahl 1980, 1986, Sauerland 1998, Rullmann & Beck 1998, Fox 1999). In the Copy Theory, it has been proposed that there is a rule of Trace Conversion that converts the lower copy into a definite description with a bound index (see e.g. Sauerland 1998, 2004, Fox 1999, 2002, 2003). A rough representation of this idea is given in (37). The higher copy of the wh-phrase is treated as the binder, determining the scope, while the lower copy is a definite description whose referential index is bound by the wh-phrase.[11]

(37) $\underbrace{\text{Which book}}_{\exists x.\ \mathbf{book}(x) \wedge \ldots}$ did James read $\underbrace{\text{which book}}_{\iota y.\ \mathbf{book}(y) \wedge y = x}$

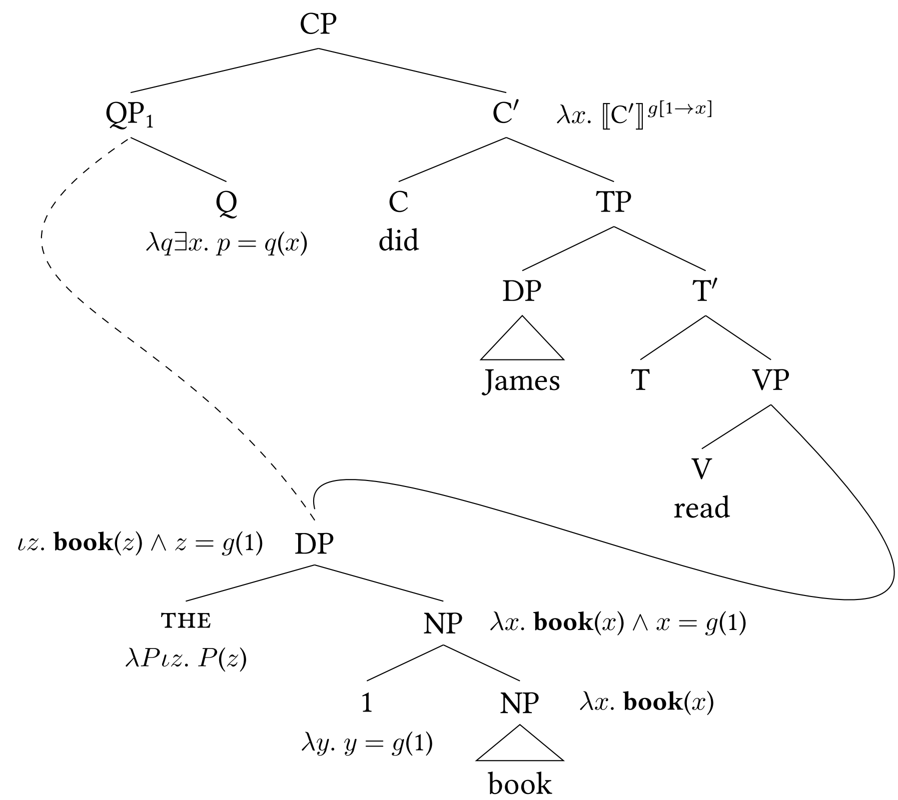
Johnson (2012, 2016) shows how this can be implemented in a multidominant approach to syntax (also

[10]For the sake of simplicity, I am ignoring world variables here.

[11]It is also possible to use this mechanism for a view of questions that involves quantification over choice functions (e.g. Engdahl 1980, 1986, Chierchia 1993, Winter 1995, Sauerland 1998, Munn 1999).

see Poole 2017). His proposal is that the DP alone denotes a definite description and is interpreted this way in its base position. This DP then re-merges with a higher head Q (Parallel Merge) that is responsible for the interrogative component of the meaning (see Cable 2010). The DP also contains a referential index such as 1, which combines with the NP by Predicate Modification (Heim & Kratzer 1998). The definite determiner has a standard denotation. The Q head introduces existential quantification over the variable introduced by the index by means of a rule like Heim & Kratzer's (1998) Predicate Abstraction. The sister of a QP will always be interpreted using such a rule.

(38)



Interestingly, the Q head cannot actually compose with its siter DP due to a type mismatch. Q takes an argument of type ⟨e, t⟩ (ignoring intensions), while the DP is simply of type e. Here, Johnson (2012) assumes that this particular branch is not interpreted, which could be implemented as the kind of branch pruning we assumed above, but applying solely at LF.

The meaning we arrive at is given below, which is a reasonable approximation of the semantics of a wh-question that uses a definite description for the argument position of the wh-phrase.

(39) $\lambda p \exists x.\ p = \textbf{read}(\textbf{james}, \iota z.\ \textbf{book}(z) \wedge z = x)$

The advantage of this approach, as emphasized by Johnson (2012), is that we do not need to assume that the interpretation of the wh-phrase varies depending on its position. It is actually only interpreted in its lower position, but simultaneously contains an index bound by a higher position. For the purposes of pronunciation, of course, the branch connecting DP to QP is interpreted at PF (but perhaps need not be in every language), so that we yield overt displacement.

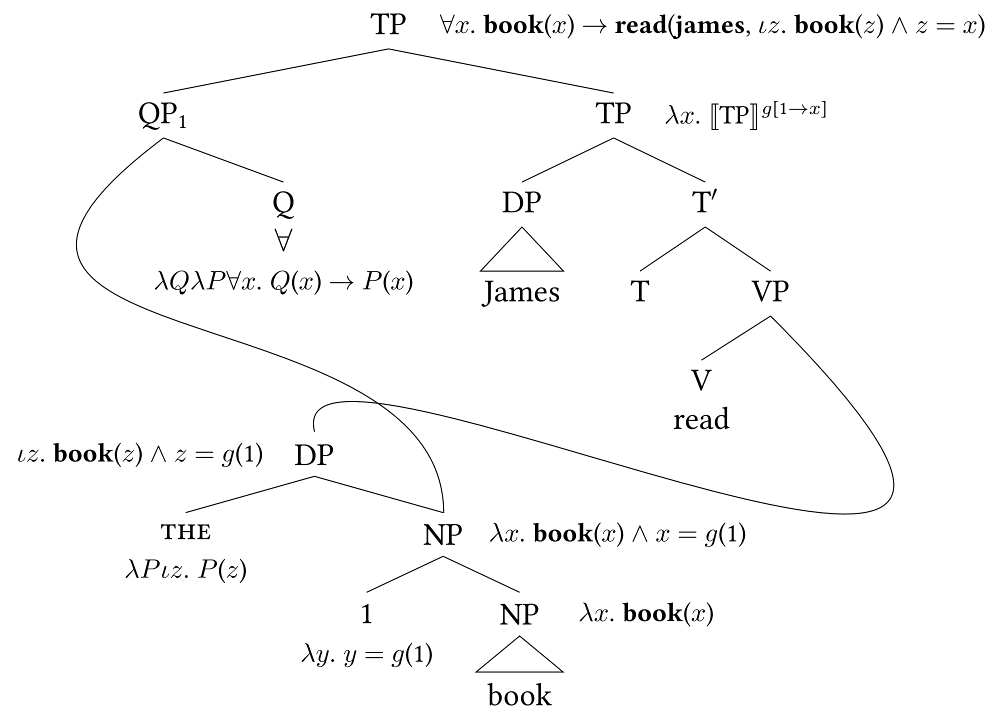
3.2 Inverse quantifier scope

The system developed in Johnson (2012, 2016) also gives us an interesting way of deriving quantifier scope interactions (also see Poole 2017). If we consider the sentence in (40), the quantifier in object position is typically assumed to undergo covert movement (*Quantifier Raising*) to some higher position for type-interpretability reasons.

(40) *James read every book* ⇝ every book λx James read x

As Johnson (2012) shows, this analysis can be recast in multidominant terms in the following way: If we assume, as we did for quantificational wh-phrases, that universal quantifiers like *every* and *some* involve a DP denoting a bound definite description, then these will also re-merge with a higher Q head in its scope position. As can be seen in (41), the important difference here is that it is the NP rather than the DP that merges with Q. Here, the Q head has the standard meaning associated with a generalized universal quantifier. Thus, the NP is interpreted in two positions, as the sister of D and as the sister of Q.

(41)



This double interpretation does not pose any problem from a compositional perspective, however. The meaning we derive is roughly ‘for every book, James read that book’, which seems to be a reasonable characterization of the desired interpretation. There are some issues here regarding Spell-Out that I will not attempt to address here, e.g. how the combination of ∀ and THE results in realization as *every* at the position of the determiner (see Johnson 2012).

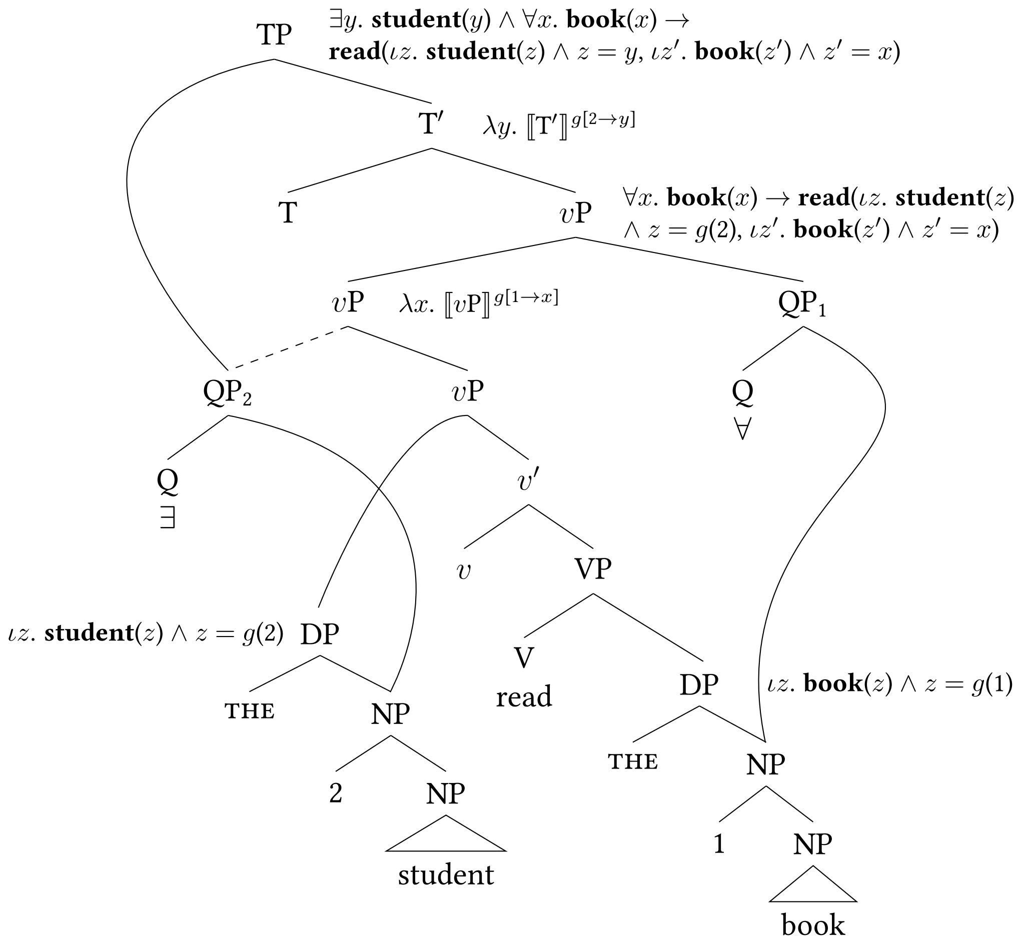
Scope interactions between two quantifiers fall out easily on this approach. Consider (42).

(42) Some student read every book.

Here, we have two possible interpretations. The first corresponds to the surface scope: ‘There is a particular student such that this student read every book’. The second is the so-called inverse scope reading: ‘For every book, there is a (possibly different) student that read that book’. In order to properly discuss such cases, we will have to consider a richer structure for the verbal domain than we have so far. I will therefore now include the base position of the external argument as the specifier of v.

With this in mind, the structure corresponding to the surface scope reading of (42) is given below in (43). The DP portion of the subject quantifier (*some student*) is merged in Spec,vP and is then re-merged with a Q head with an existential quantifier meaning ($\lambda Q \lambda P \exists y.\ Q(y) \wedge P(y)$). This QP occupies a position directly above the base position of the subject and is then re-merged at the surface position of the subject in Spec,TP, where it will be linearized. In this case, this is also where we want to interpret the subject. Since QP_2 can only be interpreted in one of its positions, its lower branch is uninterpreted/pruned at LF (indicated by the dashed line). As in (41), the object, interpreted as a universal quantifier, must take scope in a higher position. From now on, I will assume that this position is an adjoined vP above the position of the subject QP (rather than TP, as previously assumed).[12]

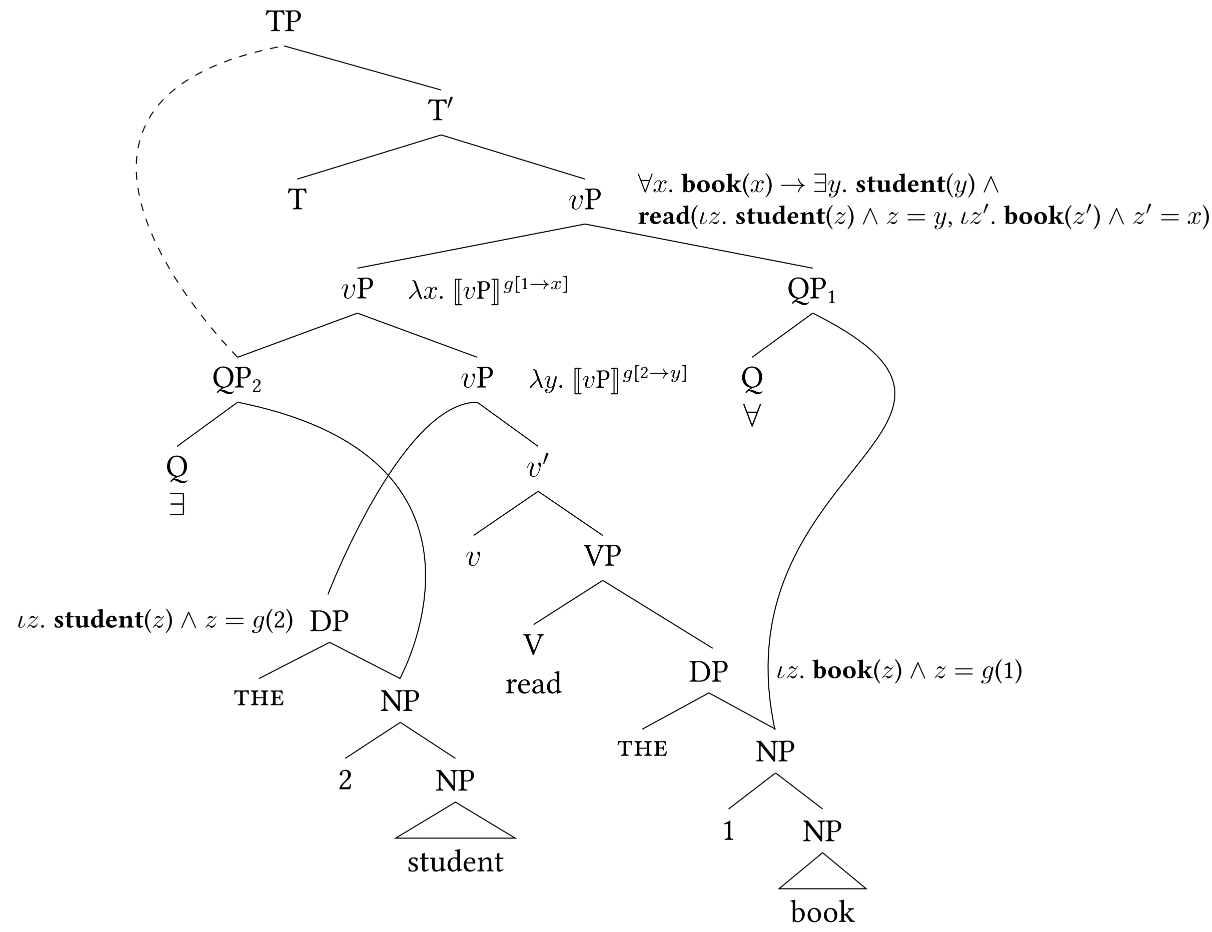
(43)



For the other reading, we can assume, following Hornstein 1995, Johnson & Tomioka 1998 and Fox 1999, that inverse scope of subject and object quantifiers involves reconstruction of the subject. Given the present structure, this is easy to achieve. The object takes scope at the vP edge above the lowest scope position of the subject. The difference between wide and narrow scope of the subject then comes down to which QP position we interpret. If we opt to interpret the lower QP branch rather than the higher one, then we derive the desired inverse scope interpretation (44).

[12]To aid readability, I will linearize the QP associated with the object to the right of its sister. Since this movement is 'covert' and is not relevant at PF, this is relatively inconsequential.

(44)



Thus, a QP can only ever be interpreted in one of its positions. We can assume that the choice of position is free when not limited by other factors. This is what gives rise to quantifier scope ambiguities. These are the core compositional mechanisms we will need to understand the effect of remnant movement on interpretation. With this in place, we will now turn to Barss' Generalization.

4 Barss' Generalization

A well-known property of remnant movement configurations that goes back to observations in Barss (1986) is that reconstruction of the evacuee into the container phrase does not seem to be possible. Abstractly, this can be summarized in (45), a formulation adapted slightly from Heck & Assmann (2014: 529).

(45) *Barss' Generalization* (Barss 1986):
Reconstruction of a phrase α to its trace t_α is only possible if α c-commands t_α overtly.
$[_\beta \ldots \text{t}_\alpha \ldots] \ldots [\ldots \alpha \ldots [\ldots \text{t}_\beta \ldots]] \rightarrow$ *No reconstruction of* α

The primary phenomena that motivate Barss' Generalization are quantifier scope and idiomatic readings. I will focus on these in what follows. I will briefly discuss reconstruction for binding in section 4.3.

4.1 Scope reconstruction

The examples that Barss (1986) adduced to support his generalization were of the following kind. First, consider that, with a raising predicate like *be likely*, a quantificational subject such as *an Austrian* can take scope below it as in (46) (Sauerland & Elbourne 2002: 284). This is typically analyzed as involving reconstruction of the indefinite to its base position below *likely*.

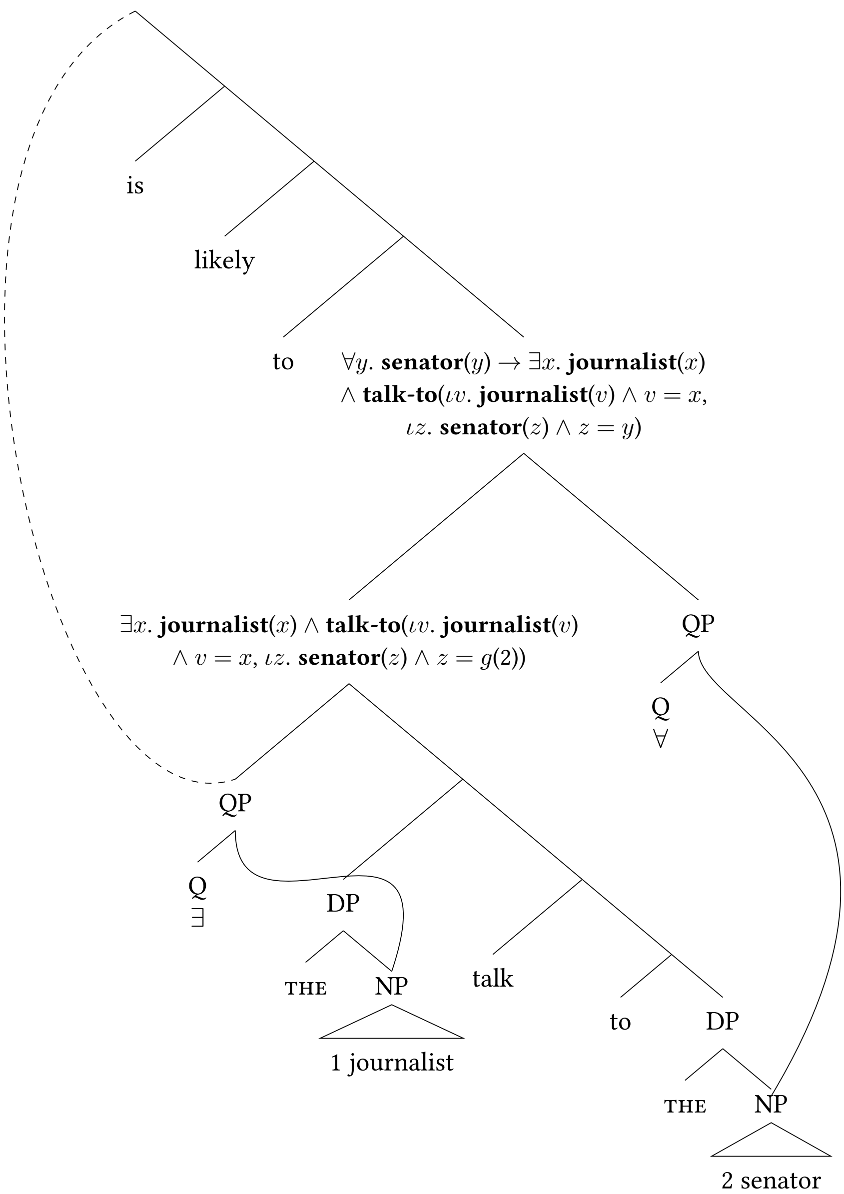
(46) An Austrian$_1$ is likely to __$_1$ win the gold medal (*likely* $> \exists$)

The examples that Barss (1986) discusses have a similar structure, except that the object is also quantificational. For an example such as (47), it is possible to have inverse scope between the subject and object below *likely*, such that the speaker considers it to be likely that a possibly different journalist talks to every politician.

(47) Some journalist$_1$ is likely to __$_1$ talk to every politician (*likely* $> \forall > \exists$)

Given the mulitdominant analysis of quantifier scope reviewed in the previous section, this reading is straightforward to capture. The QP corresponding to *some journalist* is interpreted in its base position below the scope position of the universal quantifier (48). In turn, both of the quantifiers are still within the scope of *likely*.

(48)



The important observation that Barss (1986) makes is that, if a constituent containing *likely* and the infinitival clause is wh-moved, then inverse scope below *likely* is not possible. For this reason, (49) can only have an interpretation in which what is deemed to be likely is that it is the same journalist talking to all the politicians.

(49) [How likely to $\_\__1$ talk to every politician]$_2$ is some journalist$_1$ $\_\__2$? (**likely* $> \forall > \exists$)

This follows from the claim (embodied by Barss' Generalization) that reconstruction of the evacuee into the remnant is not possible. In order to get inverse scope below *likely*, the subject will have to be interpreted in its base position, as in does (49). In other words, it will have to reconstruct.[13]

While there have been various proposals for how to derive Barss' Generalization (Sauerland & Elbourne 2002, Neeleman & van de Koot 2010, Heck & Assmann 2014, Ruys 2015), it is not *a priori* clear why such a constraint should exist in the first place. Ideally, it should follow independently from some other property of remnant movement.[14] On the multidominance theory we have considered so far, Barss' Generalization falls out automatically from the assumption that the Branch Pruning repair needed to create a properly linearizable structure at PF also affects LF. As mentioned, this follows if the repair applies at Spell-Out, prior to the transfer to either interface.

To see this, let us first consider a multidominant analysis of the sentence in (49). The structure of the infinitival clause should be familiar from the preceding discussion. The object undergoes QR to a position above the base position of the subject by merging with a Q head there. The subject has moved to the specifier of the higher TP, labelled TP_2 here. The main difference is now that the constituent headed by *likely* has been wh-moved to Spec,CP. I will call this constituent DegP and assume that *how* (or the degree element that is spelled out as such in conjunction with $\exists$) merges with *likely* directly. The entire DegP re-merges in a higher position.

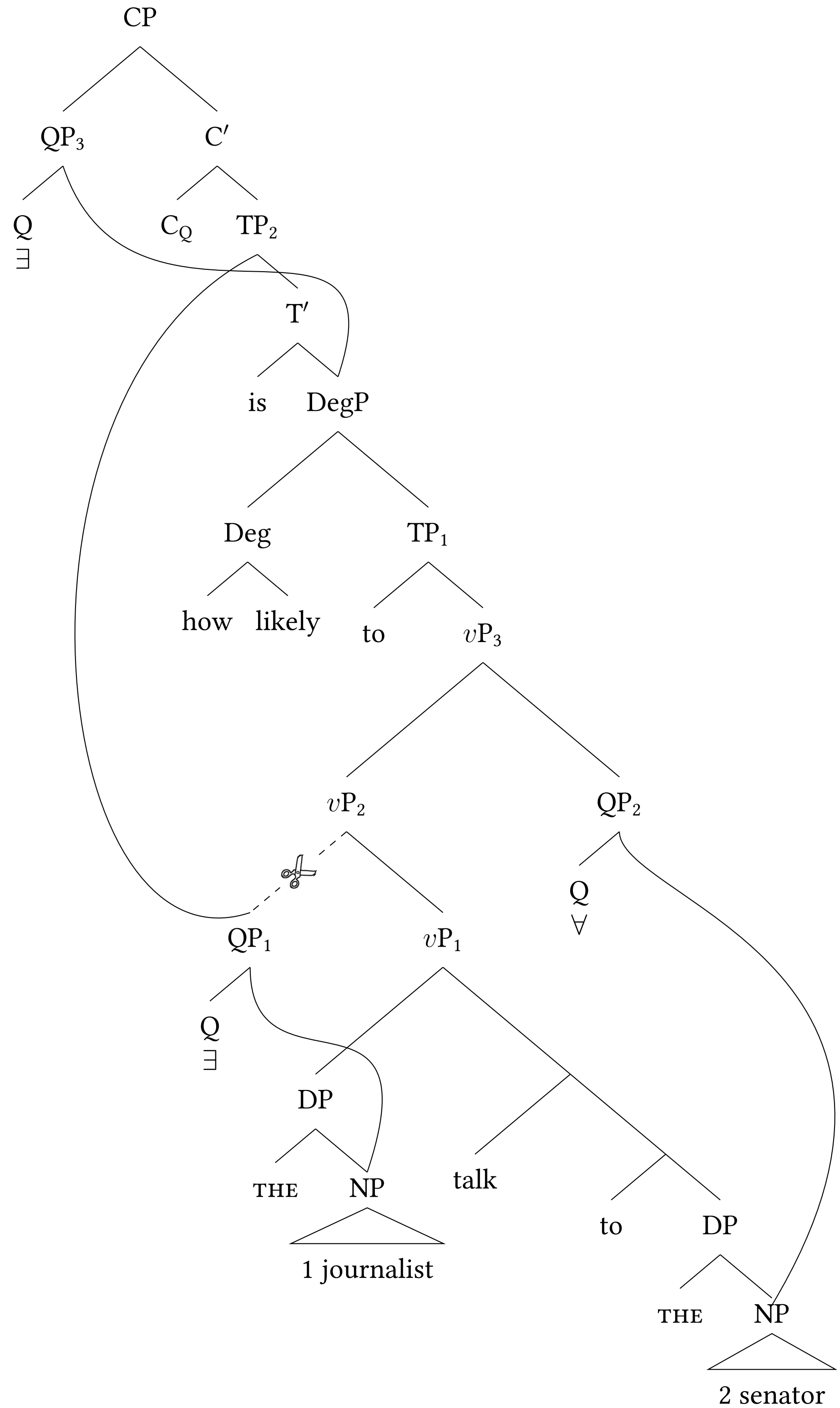
[13]As noted by Sauerland & Elbourne (2002), this account also extends to the observation in Huang (1993: 125) that inverse scope is bled by verb phrase fronting.

(i) a. Some policeman$_1$ will [$_{vP}$ $\_\__1$ stand in front of every embassy] ($\forall > \exists$)
b. [$_{vP}$ $\_\__1$ Stand in front of every embassy] (though) some policeman$_1$ will (*$\forall > \exists$)

If the fronted constituent is assumed to contain a trace of the subject, as indicated above, then this effect also falls under Barss' Generalization (though see Thoms & Walkden 2019).

[14]For reasons of space, I will not review alternative approaches to deriving Barss' Generalization, but see Heck & Assmann (2014) for detailed discussion of problems associated with the analyses in Sauerland & Elbourne (2002) and Neeleman & van de Koot (2010).

(50)



We now have a remnant movement configuration. We can verify this by considering the paths from one of the DP-internal nodes to the root. Let us take the noun *journalist*. There are three paths to the root, all of which are given in (52). As is clear, neither of the last two paths forms a subset of the other, so this set of paths is not fully nesting.[15]

[15]The node QP_3 is the only one that is not contained in another path, so may be excluded from the calculation of whether this set of paths is fully nesting if we were to adopt the revised definition I proposed in section 2.4. The inclusion

(51)
$$\left\{\begin{array}{c}\{\text{NP}, \text{QP}_1, v\text{P}_2, v\text{P}_3, \text{TP}_1, \text{DegP}, \text{T}', \text{TP}_2, \text{C}', \text{CP}\} \\ \{\text{NP}, \text{QP}_1, v\text{P}_2, v\text{P}_3, \text{TP}_1, \text{DegP}, (\text{QP}_3), \text{CP}\} \\ \{\text{NP}, \text{QP}_1, \text{TP}_2, \text{C}', \text{CP}\}\end{array}\right\}$$

As a result the Branch Pruning repair will apply to eliminate all paths that pass through another multidominated node (in this case DegP). The minimal repair to achieve this is pruning the branch connecting QP_1 to $v\text{P}_2$, as in (53). The set of paths we derive from this is given in (52).

(52)

~~{NP, QP_1, $v\text{P}_2$, $v\text{P}_3$, TP_1, **DegP**, T′, TP_2, C′, CP}~~

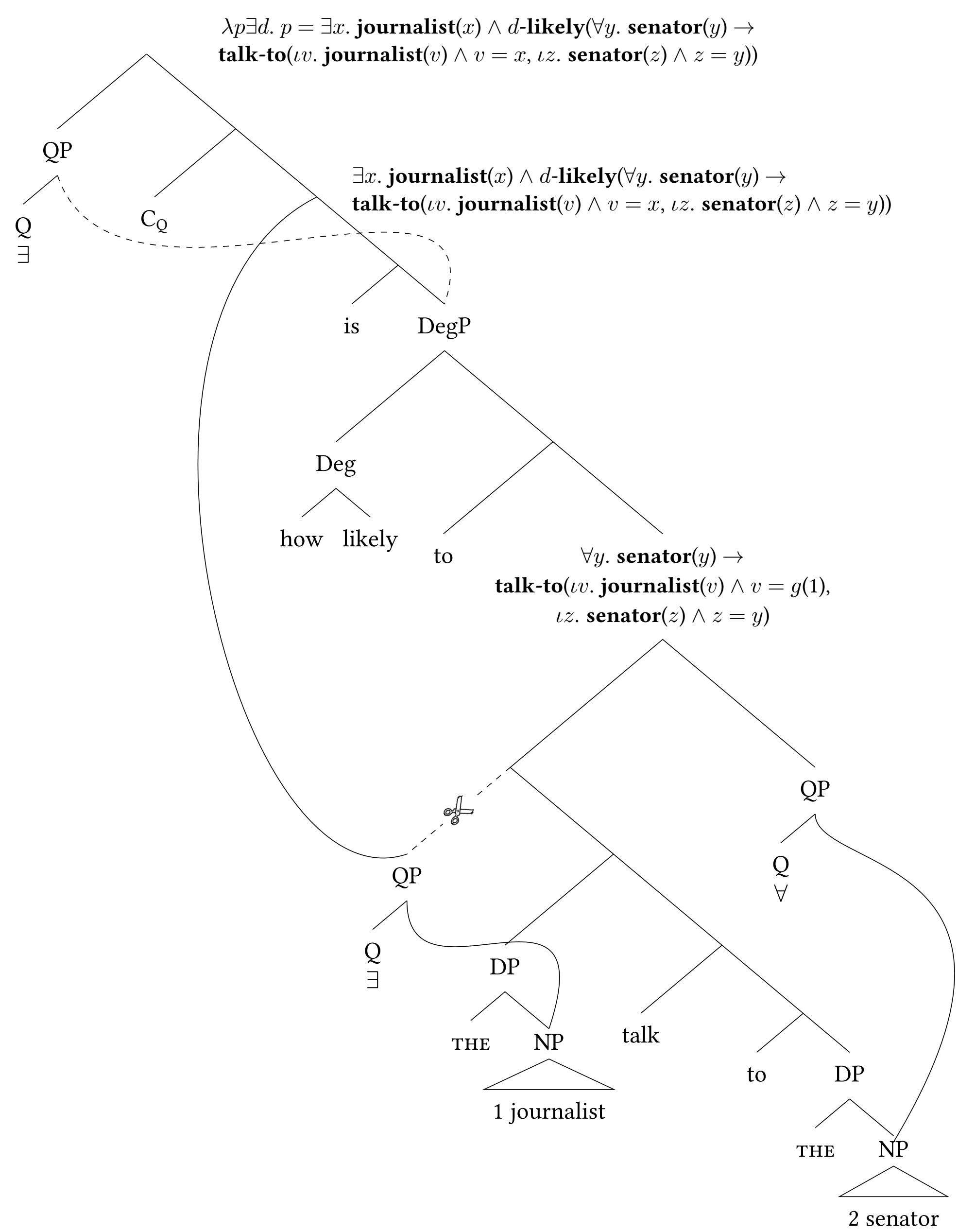
~~{NP, QP_1, $v\text{P}_2$, $v\text{P}_3$, TP_1, **DegP**, (QP_3), CP}~~

{NP, QP_1, TP_2, C′, CP}

If we assume, as I have already suggested, that the Branch Pruning repair affects both interfaces equally, then the branch connecting the QP into the moved *likely*-phrase will not be available at LF. As we have seen, this is precisely the position that we need to generate an inverse scope reading. The general unavailability of this branch for interpretation means that the subject has to be interpreted outside of the moved remnant in its surface position. The details of the compositional interpretation are given in (53). Since the branch connecting the QP corresponding to *some journalist* is unavailable, we are forced to interpret the higher branch and are therefore unable to derive a reconstructed subject reading. This is then essentially how we derive Barss' Generalization.

of this node does not make a difference for the remnant movement structures we are considering presently, however.

(53)



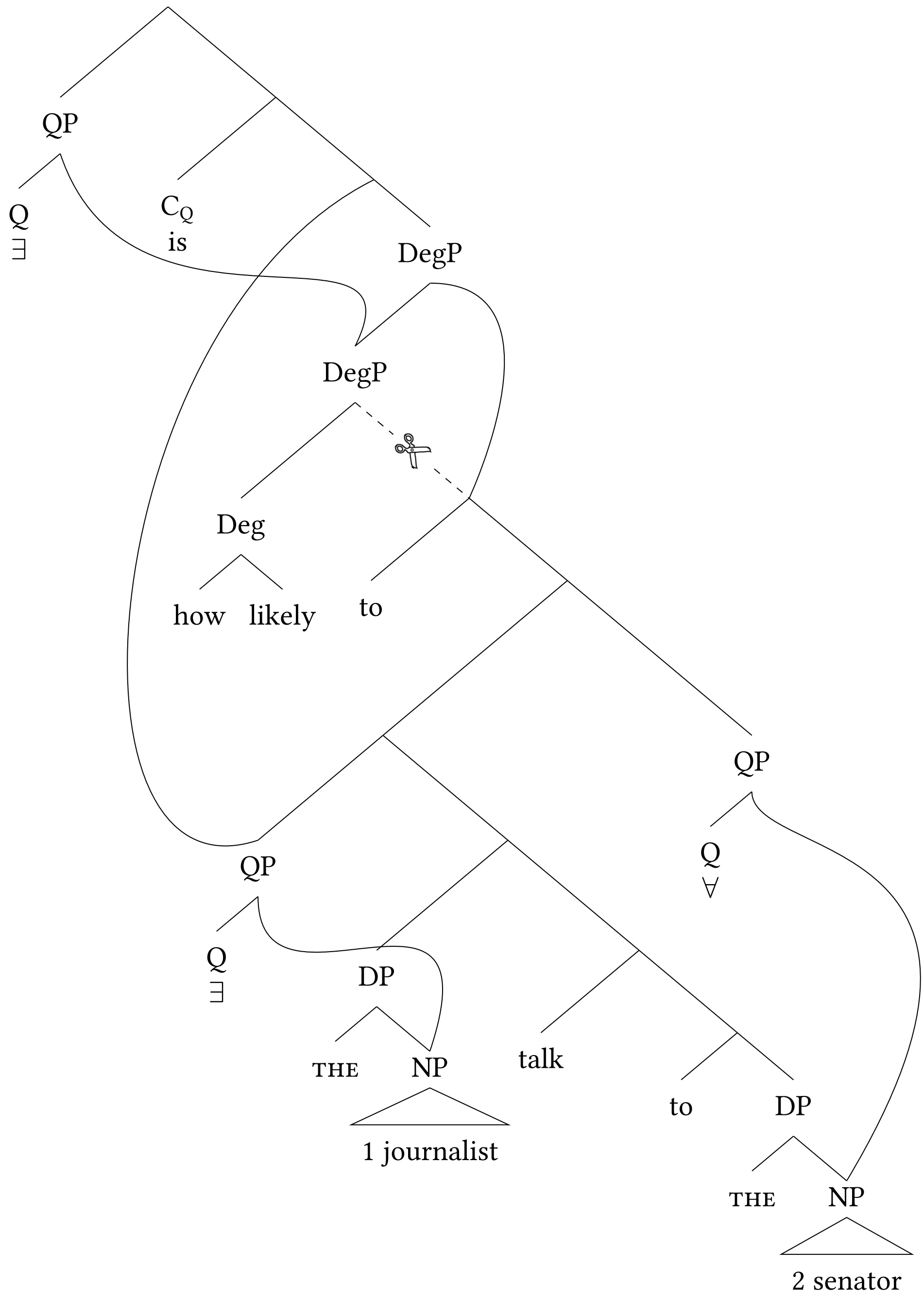
A potential virtue of this account of Barss' Generalization is that it provides a rationale for why Barss' Generalization should exist in the first place. The branch that appears to be available for reconstruction is the same one that causes a problem for full dominance on the PF side. This parallelism across interfaces seems highly suggestive that these two observations could, and perhaps even should, be treated as interrelated.

Before moving on, it is also worth mentioning that the approach developed here can derive another component of Barss' original observation without any problems. If the infinitival clause is extraposed (54), then inverse scope between the subject and object quantifier is possible (Barss 1986: 531–532).

(54) [How likely $\_\__3$]$_2$ is some journalist$_1$ $\_\__2$ [to $\_\__1$ talk to every politician]$_3$?

This follows in the present analysis in the following way. If we assume that extraposition targets an adjoined position directly above the DegP, then the paths into infinitival clause will no longer be fully nesting. The infinitival clause itself becomes the evacuee for remnant movement. This has the consequence, shown in the analysis in (55), that the branch connecting the infinitival clause back into moved DegP must be pruned.[16]

(55)



This has an immediate consequence for the subject. As long as the extraposition site is below the surface position of the subject, we can now use the branch connecting the QP associated with the subject to its lowest position since the infinitival clause is not longer contained in a remnant. As such, we can account for why a Barss effect is avoided by extraposition. It is important to verify that an account of Barss' Generalization can also derive this effect. As Heck & Assmann (2014) point out, this is a challenge for some accounts of Barss' Generalization (e.g. Sauerland & Elbourne 2002).

[16]This raises some questions about how the infinitival clause is interpreted, especially if we assume that it is an argument of *likely*. I will come back to this issue momentarily in section 4.2.

4.2 Idiom reconstruction

Another empirical domain in which Barss' Generalization can be detected is with idioms. The fact that certain idiomatic readings are lost in remnant movement derivations has been observed in earlier literature. The data discussed by Lasnik & Saito (1992), for example, show that, in remnant movement constructions involving raising predicates like *likely*, idiomatic readings are lost.[17] This is easiest to illustrate with fixed subject idioms like *the cat (be) out of the bag* ('for a secret to be known') and *the shit hit the fan* ('for trouble to arise'). While idiomatic readings are retained with raised subjects (56a)/(57a), they are lost when there is remnant movement (56b)/(57b). I use # to signal the unavailability of the intended idiomatic reading. A literal interpretation, however unusual, is still generally available.

(56) a. The shit$_1$ is likely to ___$_1$ hit the fan later today.
b. #[How likely to ___$_1$ hit the fan] is the shit$_1$ ___$_2$ later today?

(57) a. The cat$_1$ seems [likely to ___$_1$ be out of the bag] now.
b. #[How likely to ___$_1$ be out of the bag] does the cat$_1$ seem to be ___$_2$ now?

Similar examples can be found with partial VP fronting in German. As noted by Nunberg et al. (1994), citing observations in Ackerman & Webelhuth (1993), certain idiomatic verb phrases allow for fronting of an object, but not the verb itself. If we take a phrase such as *den Vogel abschießen* (lit. 'to shoot down the bird') (58a), this can also have an idiomatic reading along the lines of 'to do a great job' (also in an ironic usage). Here, fronting the idiomatic object (58b) does not generally affect the availability of the idiomatic reading. However, fronting the verb participle on its own (a derivation typically assumed to involve remnant movement) leads to the loss of the idiomatic meaning. The sentence in (58c) only permits a literal reading.

(58) a. Er hat wieder den Vogel abgeschossen
he has again the bird shot.down
'He did a great job again.'
b. Den Vogel$_1$ hat er wieder ___$_1$ abgeschossen
the bird has he again shot.down
'He did a great job again.'
c. #[___$_1$ Abgeschossen]$_2$ hat er wieder den Vogel$_1$ ___$_2$
shot.down has he again the bird
'He shot down the bird again.' (no idiomatic reading)

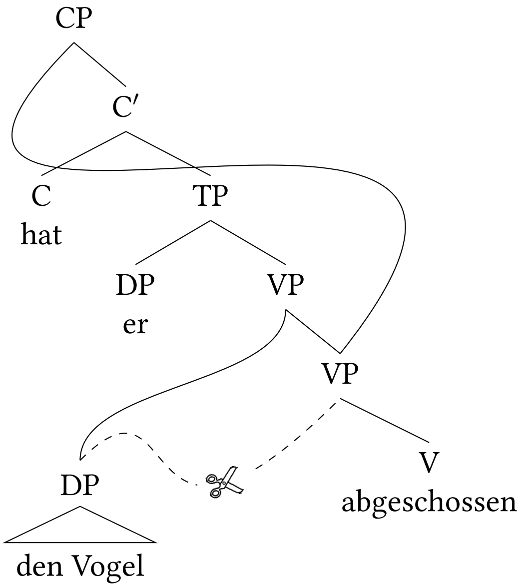
The same pattern can be found with a ditransitive idiom like *jemandem einen Korb gegeben* ('to reject so.', lit. 'to give someone a basket). As discussed by Heck & Assmann (2014), the idiomatic reading is possible with a fronted object (59b), but not when the verb is moved on its own (59c).

(59) a. Sie hat ihm einen Korb gegeben
she has him a basket given
'She rejected him.'
b. Einen Korb hat sie ihm ___$_1$ gegeben
a basket has she him given
'She rejected him.'

[17] Lasnik & Saito (1992) argue that examples with *likely* are ambiguous between raising and control. On this view, the putative remnant movement cases actually involve control rather raising, which is incompatible with a non-referential idiomatic controller. Lasnik & Saito's proposal is controversial, however, and faces several problems (see e.g. Sauerland 1999*b*, Abels 2002).

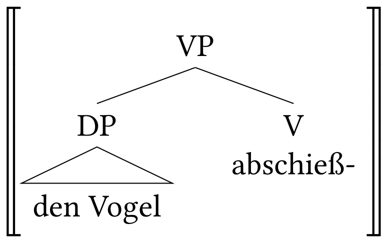
c. #[$\_\__1$ Gegeben]$_2$ hat sie ihm einen Korb$_1$ $\_\__2$
given has she him a basket
'She gave him a basket.' (no idiomatic reading)

Heck & Assmann (2014) note that this effect can be subsumed under Barss' Generalization, given the assumption that reconstruction is required for idiomatic interpretation (e.g. Chomsky 1993). Let us consider a multidominant analysis of the example in (58c). As (60) shows, the branch connecting the DP *den Vogel* ('the bird') into the fronted VP will have to be pruned.[18] As a consequence, it will be unavailable for interpretation.

(60)


One way in which we can implement the idea that idiom chunks must be reconstruct for their interpretation is to say that they involve the interpretation of an entire constituent. As such, the verb *abschießen* would have an entry such as (61a) when used compositionally. In addition, there is the option of selecting a non-compositional meaning for the entire VP (61b).

(61) a. ⟦abschieß-⟧ $= \lambda y \lambda x.$ **shoot-down**(x, y)

b. 

$= \lambda x.$ **do-well**(x)

Crucially, however, the DP *den Vogel* must be the sister of the verb at LF in order for the entry in (61b) to be used. In (60), the sister branch of *abschießen* is unavailable, which can therefore account for why the idiomatic meaning in (61b) is not a possibility here. In doing so, we directly account for why Barss' Generalization also holds for idioms.

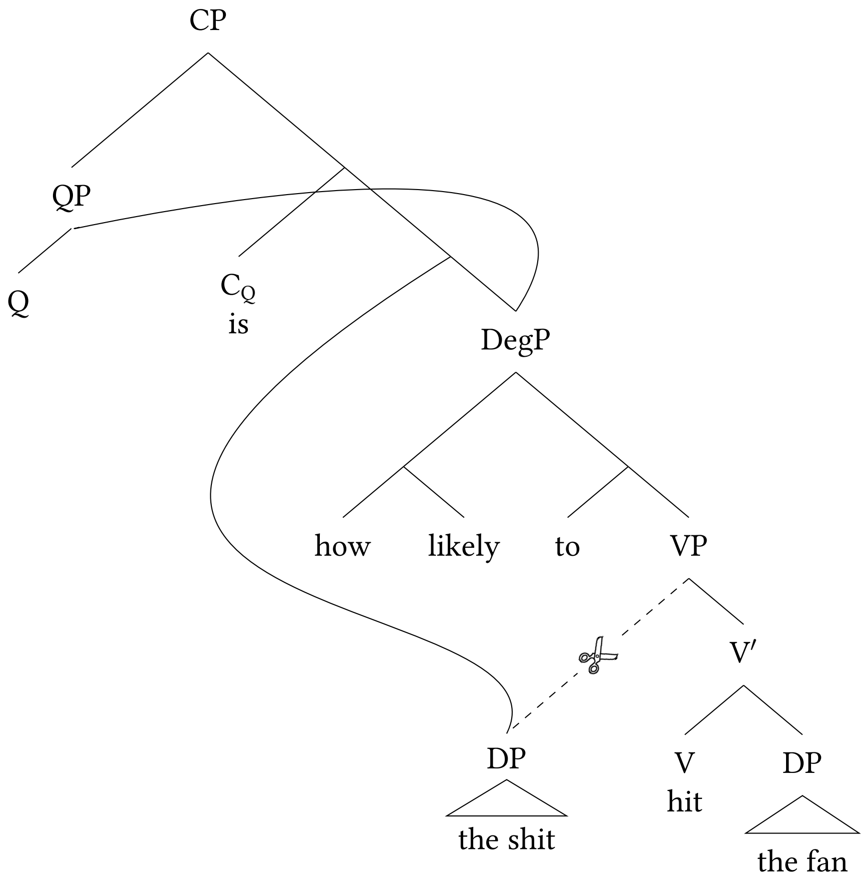
The unavailability of the branch connecting an argument in an idiomatic expression to its base position does, however, raise questions about how we derive the literal reading. While the non-

[18] The verb *abschießen* is a separable particle verb and is therefore probably syntactically complex (see e.g. Wurmbrand 1998). I have not shown this here, as it is not relevant for the remnant movement cases.

compositional meaning in (61b) is correctly ruled out, the object DP (with a referential meaning) must still be able to compose with the verb's entry in (61a), despite the unavailability of its sister constituent. For the structure in (61), this may not prove too challenging as one could assume that the meaning of *abschieß-* in (61a) is simply passed up from V (which would now count as an intransitive verb syntactically) and is therefore available at the lower VP segment. The DP can then compose with the verb (phrase) in the same way it would have in its lower position. However, this kind of approach is less straightforward if the evacuation movement targets a higher position. For the German case, this would be so if the fronted constituent was a larger verbal projection such as *v*P (Müller 2004).

The same problem can be seen by considering the analysis of the English examples such as (56b). The subject *the shit* has evacuated the DegP. Its lower position is unavailable, meaning that a non-compositional idiomatic meaning corresponding to the VP constituent is not possible, as desired.

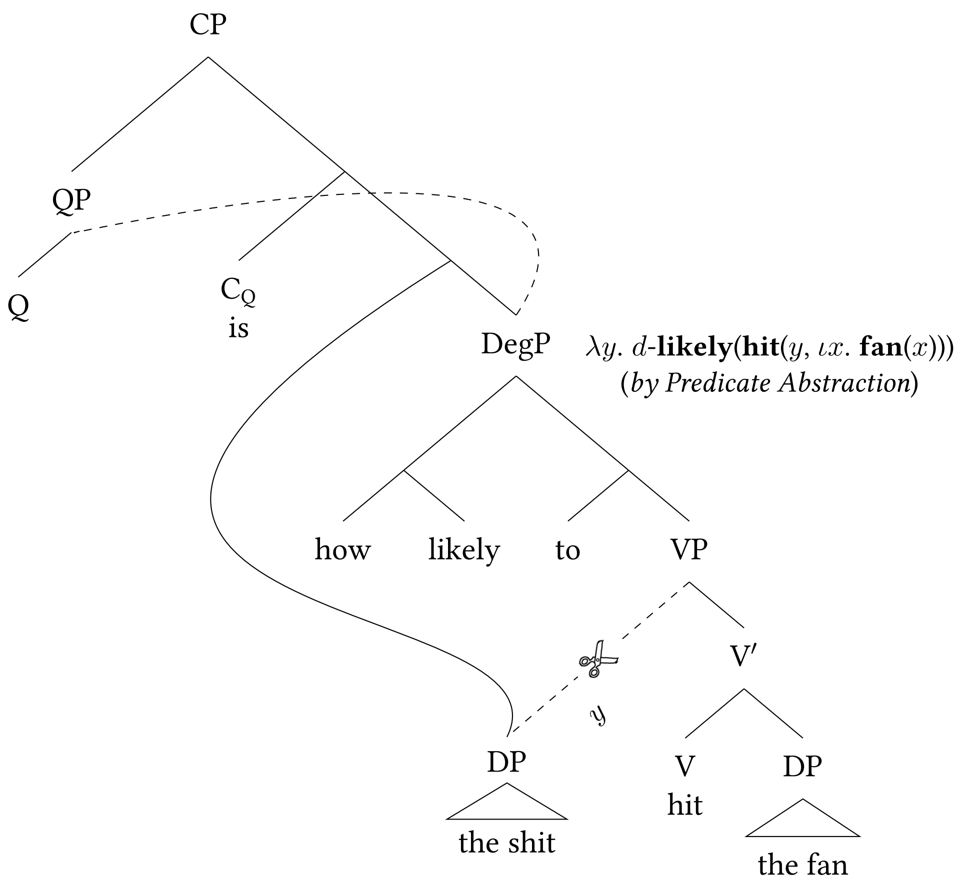
(62)



The question now becomes how we can interpret the subject as an argument of *hit*, however. What we need is the saturation of the outer argument of *hit* to be delayed. Perhaps, one could allow this open argument slot to somehow remain open and be passed up the tree, but it is not entirely clear to me how we can achieve this in a principled way.

An alternative that I would like to consider here is that a pruned branch may receive an interpretation under certain circumstances. We could assume that, if the multidominated phrase is a referential DP (i.e. is of type e), then the pruned branch may be interpreted as a variable. This variable will then be bound at the actual interpreted position of the moved DP by a lambda operator introduced by the rule of Predicate Abstraction. With this mechanism, we can derive the literal meaning, whilst still ruling out the idiomatic one. The internal structure of the verb phrase will be $[_{\text{VP}}\ y$ hit the fan], which will not match the specification of the idiomatic entry.

(63)



This approach can then also be extended to the partial VP fronting examples in German and the previously discussed case of extraposition in (54). The consequence of this is that a pruned branch is presumably not actually absent from the structure at the interfaces, but rather somehow marked as 'deactivated' or unavailable for the standard means of interpretation at that interface. This is not dissimilar to what we have to assume for other branches. For example, the dashed branch in (63) connecting QP to DegP is not necessarily eliminated by pruning, but is unavailable for regular interpretational principles (e.g. functional application) on Johnson's (2012) analysis.

4.3 The scope of Barss' Generalization

So far, we have seen that both reconstruction for scope and idiomatic readings is subject to Barss' Generalization, that is, it is unavailable in remnant movement configurations. Are there other reconstruction phenomena that could instantiate Barss' Generalization? Sauerland & Elbourne (2002) mention at least two others. The first involves the licensing of negative polarity items (NPIs). In (64a), the subject contains the NPI *any reputation* that must be in the scope of negation. Given the grammaticality of this example, they argue that reconstruction to its base position below negation must be possible. This is supported by the ungrammatical example in (64b), for which there is no plausible position for the subject below negation. Crucially, when a constituent containing the base position of the subject is fronted (64c), NPI licensing fails. Sauerland & Elbourne (2002: 298) ascribe this to Barss' Generalization. In order to be in the scope of negation at LF, the subject containing the *any*-phrase needs to reconstruct to its base position, yet it cannot since it does not c-command this position in the syntactic output.

(64) a. [A doctor with any reputation]$_1$ is likely not to be $\_\__1$ available.
b. *[A doctor with any reputation]$_1$ is $\_\__1$ anxious for John not to be available.

c. *[Certain not to be ___$_1$ available]$_2$ though [a doctor with any reputation]$_1$ is ___$_2$, patients were waiting.

A similar set of data can be seen with binominal *each*. The main idea is that a phrase containing *each* must be in the scope of a plural phrase at LF (Safir & Stowell 1988, Burzio 1986). For this reason, Sauerland & Elbourne (2002) assume that the subject must reconstruct in (65a). This is supported by the fact that the phrase containing *each* is not licensed when such a position is not available (65b).[19] When a larger remnant phrase containing the base position of the subject is moved, the licensing of *each* fails (65c). Again, this supports the idea that reconstruction is unavailable in Barss configurations.

(65) a. [One translator each]$_1$ is likely to be [$_{VP}$ assigned ___$_1$ to the athletes]
b. *[One translator each]$_1$ is likely to ___$_1$ [$_{VP}$ give a speech to the athletes]
c. *[How likely to be assigned ___$_1$ to the athletes]$_2$ is [one translator each]$_1$ ___$_2$?

The exact conclusions we can draw from such additional cases will depend largely on the specifics of the analyses in question. For example, if these are really scope phenomena, then their analysis will follow in a similar way to what has been discussed above. It is also possible that these phenomena are more akin to binding, in which case this would not be as similar.

A relevant observation in this regard is that reconstruction for binding has been reported in the literature to not be subject to Barss' Generalization (van de Koot 2004, Neeleman & van de Koot 2010, Heck & Assmann 2014). This can be illustrated with the following example from van de Koot (2004: 176).

(66) [How likely to ___$_1$ perjure himself$_1$]$_2$ does every politician$_1$ seem to be ___$_2$?

The fronted constituent contains both the gap of the quantificational subject evacuee *every politician* and an anaphor *himself* that is bound by the subject. On the commonly accepted view that variable binding requires c-command at LF, this means that we must assume that there is reconstruction for binding in (66). If this were reconstruction of the subject to its base position inside the *likely*-phrase, this would be in contravention of Barss' Generalization.

It is worth mentioning at this juncture, however, that not all cases of reconstruction for binding require that reconstruction proceed into the remnant. For the example in (66), it is sufficient to reconstruct the remnant phrase, as in (67b), to satisfy the c-command requirement on variable binding.

(67) a. [How likely to ___$_1$ perjure himself$_1$]$_2$ does every politician$_1$ seem to be ___$_2$
b. ___ does every politician$_1$ seem to be [how likely to ___$_1$ perjure himself$_1$]

Subsequently reconstructing the evacuee *every politician* is also compatible with the conditions on variable binding, but one cannot determine whether it happens in examples like (66), as it is not obligatory. When testing for a Barss configuration, it is crucial that reconstruction is forced. In the scope examples we have discussed, scope reconstruction is required either by adding in a third scope bearing element like *likely*, as in Barss's (1986) original examples, or by the independently motivated assumption that inverse scope requires reconstruction of the subject to its base position rather than Quantifier Raising the object above its surface position (again, see Hornstein 1995, Johnson & Tomioka 1998, Fox 1999 for the empirical arguments).

In the case of binding, the configuration we want to test is one in which the evacuee is the bindee rather than the binder. This is abstractly shown in (68a). If we were to reconstruct the β constituent,

[19]This raises questions about the internal structure of the VP. If c-command is the crucial relation, then we have to assume that the base position of the passive subject is c-commanded by the PP. This seems to apply that the PP can be structurally higher than the direct object in such cases, as argued for by Janke & Neeleman (2012).

this is not sufficient to create an asymmetric c-command relation between the binder and bindee. Instead, we must reconstruct to the position of α, which is in violation of Barss' Generalization. This contrasts with cases in which the binder is the evacuee, as reconstruction of β alone will suffice to create c-command for variable binding.

(68) a. $[_\beta$ … BINDER … t_α …] … [… BINDEE$_\alpha$ … [… t_β …]]
b. $[_\beta$ … t_α … BINDEE …] … [… BINDER$_\alpha$ … [… t_β …]]

The example in (66) instantiates the latter case in (68b), and is therefore actually not a violation of Barss' Generalization. The examples in (64c) and (65c), on the other hand, would instantiate (68a) if these examples were treated as binding rather than scope phenomena. Due to other factors, it is not straightforward to construct examples parallel to (66) in which it is the bindee rather than the binder that is extracted from the remnant.

German partial VP fronting offers us potentially more flexibility in this regard (Müller 1998). With this in mind, consider the examples in (69). In all of these examples the indirect object *jedem Gast* ('every guest') binds the direct object *seinen Schlafplatz* ('his sleeping spot'). In (69a), both arguments have evacuated the VP. In (69b), the remnant contains just the direct object, while it is just the indirect object inside the remnant VP in (69c).

(69) a. [$\_\__1$ $\_\__2$ Gezeigt $]_3$ habe ich jedem$_i$ Gast$_1$ seinen$_i$ Schlafplatz$_2$ $\_\__3$
shown have I every guest his sleeping.spot
'I showed every guest where he was sleeping.'
b. [$\_\__1$ Seinen$_i$ Schlafplatz$_2$ gezeigt $]_3$ habe ich jedem$_i$ Gast$_1$ $\_\__3$
his sleeping.spot shown have I every guest
'I showed every guest where he was sleeping.'
c. *[Jedem$_i$ Gast$_1$ $\_\__2$ gezeigt $]_3$ habe ich seinen$_i$ Schlafplatz$_2$ $\_\__3$
every guest shown have I his sleeping.spot
'I showed every guest where he was sleeping.'

As indicated above, the speakers I have consulted report that the bound reading is hard, if not impossible, to attain in (69c), in contrast to (69b).[20] With that said, the judgment is rather difficult and for this reason, cannot be taken as conclusive at this point. More detailed experimental verification of this would be welcome. What is relevant for the present discussion here is that, while tentative at this stage, there might turn out to be cases of reconstruction for binding which are subject to Barss' Generalization after all.[21] This would follow without further ado under the analysis developed here.

[20] Doreen Georgi, Johannes Hein, Gereon Müller, Martin Salzmann (p.c.). Martin Salzmann also points out an important complication to this test, namely that remnant VPs of the kind (69c) containing just the indirect object and the verb are not readily accepted by all speakers. Müller (1996: 361) provides an example of this kind marked as grammatical, but this independent degradation and potential interspeaker variation adds an additional complication to testing the availability of reconstruction for binding in such examples, meaning that any conclusions drawn here should be treated with care.

[21] One problematic case in which there is reconstruction of a bindee into an apparent remnant comes from well-known cases of constituency paradoes from Pesetsky (1995) such as (i).

(i) John promised to give the books to them$_1$, and
$[_{VP}$ give the books to them$_1$ $\_\__{PP}]$ he did $\_\__{VP}$ $[_{PP}$ at each other's$_1$ birthdays]

The connection to Barss' Generalization is made in Heck & Assmann (2014) where the remnant movement analysis indicated above is proposed (also see Sauerland 1999*b*). As they rightly point out, reconstruction for anaphor binding should be ruled out by Barss' Generalization here, contrary to fact. There are some potential reasons why this might not be the case. First, there are alternatives to remnant movement here, e.g. an approach that assumes an ascending structure for the adjuncts (although there does seem to be a scope freezing effect that supports a potential remnant movement analysis; see Sauerland 1999*b*). Here, one would have to seek a different explanation for the apparent lack of c-command

5 Conclusion

In this paper, I have tried to show that a linearization algorithm for multidominance trees that makes use of full dominance to derive the 'upward effect' of displacement runs into problems with remnant movement structures. Rather than treat this as a reason to abandon such approaches in favour of alternatives (such as more recent 'path-based' approaches; Poole 2017, Johnson 2020), I have argued that this apparent defect might actually be a virtue once we recognize that the branch that causes a problem for linearization is the same one that appears to be generally unavailable for reconstruction. In providing a Branch Pruning repair for the linearization problem, we automatically have a way to derive the anti-reconstruction effect known as Barss' Generalization. For this reason, full dominance approaches to displacement in multidominant structures can potentially provide a rationale for why Barss' Generalization exists: Reconstruction is unavailable because remnant movement creates a configuration in which the branch connecting the evacuee into the remnant must be eliminated.

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for anaphor binding. A general confound here is that it is known that there are cases of 'exempt anaphora' with reflexives in English (Pollard & Sag 1992), so extra care must be taken to rule out this possibility.

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