C-selection and the verb phrase

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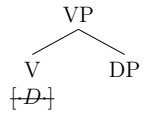
1 Introduction: Syntax vs. Lexicon

This paper discusses the nature and source of features driving Merge in the context of verb phrase syntax. Since Chomsky (1995), many researchers have proposed that Merge is driven by features, which may be checked/deleted under sisterhood. On this view, the structure in (1) can only be built if the head V bears some feature that can be checked by a DP. For instance, V might bear a feature $[\cdot D \cdot]$ (using Müller (2010)'s notation), meaning that it can be satisfied by merging with elements of syntactic category D, in a classic case of c-selection.

(1) C-selection for DPs enables V to Merge with DPs



Granting that there are c-selectional features driving Merge, a central question is where do they come from? What factors make it so that V c-selects for DP in some context? We could imagine either of two views: 1) that Merge features are idiosyncratic properties of individual lexical items, or 2) that Merge features are properties of the syntax proper, for example as properties of syntactic categories. On the first view, a lexical entry corresponding to a verb like *eat* might look like that in (2), which has both category information and c-selectional features listed in the lexical entry itself. On the second view, the lexical entry for *eat* might alternatively look like that in (3), where the lexical entry has no c-selectional features listed – those are entailed by the fact that *eat* is a verb. In other words, the latter perspective creates an implicational hierarchy between category features and c-selectional features. To be of category V entails having $[\cdot D \cdot]$.

(2) Option 1: c-selection in the lexicon
PHON: /it/
SYN: V, $[\cdot D \cdot]$
SEM: λx. eat x

(3) Option 2: c-selection in the syntax (lexicon only contains category info)
PHON: /it/
SYN: V
SEM: λx. eat x

The category V is defined as having the feature $[\cdot D \cdot]$

Each of these views makes substantially different predictions regarding the ways in which verbs' c-selectional requirements may vary within and across languages. If c-selection is a property of the lexicon, we can expect c-selectional requirements to vary in every possible way across verbs and languages. For any number and combination of arguments we can imagine, it should be possible to imagine a lexical verb that selects for it. By contrast, if c-selection is a property of syntactic categories, all lexical verbs should look formally identical from the perspective of syntax, so the c-selectional properties of every verb should be identical to those of every other verb[1].

Of course, reality looks like neither of these two pictures. Verbs don't all select for the same number and types of arguments, but they don't vary in every possible way either. The extended projection of the verb typically has somewhere between 0-4 arguments (before having to add additional verb roots), and usually looks something like (4) (ignoring TAM particles and the fact that verb placement changes from language to language).

(4) (DP) V (DP) (XP) (XP)

To capture the more constrained, yet still flexible profile of verb phrase syntax within and across languages, we either need to adopt something like (2) and impose constraints on the lexicon, or adopt something like (3) and introduce some source of flexibility into the notion of c-selection. I will take up a version of the latter perspective, taking inspiration from Merchant (2019), in which syntactic category predetermines c-selectional features. I add to this the two proposals in (5), which ensure that not all verb phrases look identical to each other.

(5) Proposed properties of c-selectional/Merge features
   a. C-selection is allowed to *fail* (Preminger, 2014; Longenbaugh, 2019) – not every feature that a category possesses needs to be checked in the course of a derivation
   b. Some c-selectional features are *underspecified* – the feature $[\cdot X \cdot]$ can be checked by an element of any category (inspired by Chomsky's 2005 underspecified edge features)

[1]Here, I am using the term 'verb' quite loosely to refer to some terminal node in the extended projection of the verb. Whether we think that 'verbs' correspond to one terminal node in the syntax vs. many doesn't matter for the present argument, which is that *any* head with c-selection requirements needs those c-selectional requirements to be stated somewhere, where each choice makes predictions about how those requirements can vary within and across languages.

The two proposals in (5) have several consequences. First, they ensure that the number of features on a category does not necessarily entail a structure in which each of those features is checked. As such, a category that is defined as having two c-selectional features can have *at most* two arguments, but may also appear in contexts with one or zero arguments. The second is that a category with an unspecified feature $[\cdot X \cdot]$ is compatible with a wide range of possible arguments – the same category can be used to introduce DPs, PPs, CPs, APs, etc. without having to specify different feature bundles for each outcome. As a result, a wide range of lexical items can correspond to the same syntactic feature bundle, each of which may have different s-selectional requirements, without condemning them to all appear in the same exact structure. Moreover, the syntax imposes an implicit constraint on the lexicon (Hale & Keyser, 1993, 2002; Wood & Marantz, 2017) – lexical items whose s-selectional requirements exceed the capacity of their category's c-selectional features cannot exist.

Lastly, the addition of an unspecified feature $[\cdot X \cdot]$ constrains structure building in an important way. If a single head bears both $[\cdot D \cdot]$ and $[\cdot X \cdot]$, merging a DP can in principle check both features, while merging a non-DP can only check $[\cdot X \cdot]$. The superset relationship between the number of features checked by DPs vs. non-DPs in this context impacts the distribution of each in the presence of the other: DPs have an asymmetric ability to block non-DPs from merging in certain positions. Based on this logic, we will see that the distribution of $[\cdot X \cdot]$ across different heads affects complementation relationships, with some familiar and some surprising consequences.

In what follows, we will see how this approach to c-selection in the verb phrase explains many otherwise puzzling facts about the syntax of the verbal domain cross-linguistically. I will argue that we only need two argument-introducing verbal heads in the functional hierarchy (V and v), each of which has two argument-introducing features: one for licensing DPs and one for licensing any argument ($[\cdot X \cdot]$). This second feature may license Merge of non-DP arguments such as clauses and prepositional phrases, as well as other argument-introducing phrases. In addition, the higher head has a clause-building feature that enables it to merge with the lower one ($[\cdot V \cdot]$). These proposals, combined with general assumptions about how Merge works (outlined in Section 2), yield six main results, listed in (6).

(6) Main results

a. An explanation for why, if Merge is feature driven, DPs behave as though they are c-selected but other arguments behave as thought they are s- or l-selected rather than c-selected (Grimshaw, 1979; Pesetsky, 1982; Elliott, 2017).

b. An explanation for why, when a head selects for both a DP and a non-DP argument, the DP always surfaces to the left of the non-DP.

c. An explanation for why clauses have a maximum of four arguments cross-linguistically, without adding additional lexical verbs.

d. A small typology of verb phrases that captures the various argument con-

figurations that we find.

e. An explanation for why some ditransitive constructions permit backwards binding in many languages.

f. An explanation for why many languages permit either object of a ditransitive clause to raise to subject in a passive clause.

The first four results are a direct product of the assumptions about Merge features outlined in Section (2) combined with the proposed inventory of categories and Merge features. The last two results follow partially from the predicted typology of verb phrases, which suggests that UG provides two ways to build a ditransitive clause. In one, there is an asymmetric c-command relationship between the two internal arguments. In the other, there is no c-command relationship between the two internal arguments. We will see that one of these structures promotes raising of either internal argument due to the lack of c-command between them, thus accounting for symmetric passives (result (6f)). To account for backwards binding in ditransitives, I argue that a maximal notion of command can feed binding principles when there is no c-command relationship between two arguments, which is discussed in Section 4.1.

2 Merge features

This paper discusses c-selection, but assuming that c-selection is just Merge conditioned by the categories of merged constituents, many properties of c-selection should reduce to properties of Merge, and claims about c-selection should entail claims about Merge. I will therefore treat the features involved in c-selection as instances of features that drive Merge more generally.

Moreover, I adopt Chomsky (1995)'s proposal that there is no formal distinction between Move and Merge – they are both instances of Merge. When the merging element comes straight from the numeration, it is called external Merge, and when the merging element comes from already built structure, it is called internal Merge. Following Müller (2010) and Longenbaugh (2019), I assume both internal and external Merge are driven by the same kinds of features. I adopt the feature notation from Müller (2010), shown in (7b), who develops a theory of feature driven Merge. The core quality of Merge features is that they are checked under sisterhood. Replacing α with, for example, D, wh, V, etc. yields Merge features which drive structure building of various kinds. Whether these features contain any other machinery, such as the capacity to agree with elements before they merge (as in theories where agreement is a precondition for movement), will be irrelevant for our purposes.

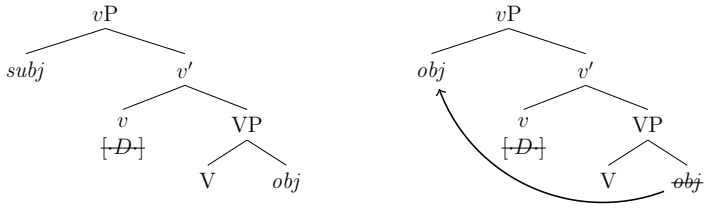
(7) Assumptions about Merge:

a. All Merge (external Merge, A-movement, $\bar{\text{A}}$-movement) is feature driven (Chomsky, 1995).

b. $[\cdot\alpha\cdot]$ = an instruction to Merge with an element bearing α

The unity of Move and Merge predicts that any position which licenses external Merge should also in principle license internal Merge in the absence of an externally merged element (provided that the resulting structure is interpretable and pronounceable)[2]. For example, assuming that the position that licenses external arguments (i.e. v) has a Merge feature specified for DPs ($[\cdot D \cdot]$), that feature should be satisfiable by A-movement in any context where no external argument is introduced. We therefore expect A-movement to be successive cyclic through the edge of vP (Legate, 2003; Sauerland, 2003; Longenbaugh, 2019), not because of phase-hood, but because the features that drive Merge can also drive Move. Importantly, different morphemes of category v might be inserted into the different structures in (8), leading to different interpretations and pronunciations. These different outcomes come from the same starting point, however: the fact that v has a categorial property of hosting a $[\cdot D \cdot]$ feature.

(8) The same $[\cdot D \cdot]$ feature licenses transitive/intransitive derivations



This paper is mainly concerned with situations in which a single head possesses multiple Merge features. Section 2.1 discusses what factors might govern the order of operations in such cases, and how these factors impact clause structure.

2.1 Properties of Merge features

Having established what the features involved in Merge look like and what kinds of Merge they may control, we now turn to the conditions on their satisfaction. Suppose, for example, that a head has two features on it: $[\cdot F \cdot]$ and $[\cdot G \cdot]$. Questions now arise pertaining to the order in which these features may be checked, the number of operations required to check them, and what happens if they never get checked. Following Longenbaugh (2019), I assume that Merge features may be checked in any order: neither UG nor the lexicon impose any particular requirements for some feature to be checked before another (though the resulting structure is subject to interface conditions, which might filter out some derivations). Moreover, I propose that these features can *fail* without crashing the derivation (Preminger, 2014; Longenbaugh, 2019): even if nothing ever checks them, the interfaces will still attempt to assign an interpretation and pronunciation to the resulting structure (9a).

[2]The idea that positions which license external Merge can also license internal Merge echoes the logic of Emonds's (1970) Structure-Preserving movement, as well as the Merge-over-Move logic of expletive insertion vs. raising (Chomsky, 2000).

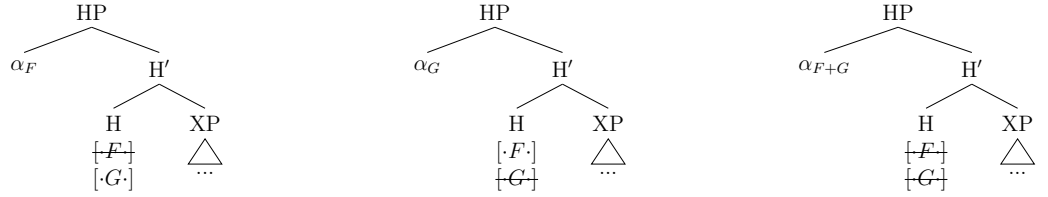
Lastly, in a departure from Longenbaugh (2019), but along the lines of van Urk & Richards (2015), I propose that the features $[\cdot F \cdot]$ and $[\cdot G \cdot]$ may be checked by either one or two Merge operations, depending on the features of the merged element. If the numeration only supplies elements bearing either F or G but not both, checking the features $[\cdot F \cdot]$ and $[\cdot G \cdot]$ will require two separate instances of Merge. However, if an element is merged which bears both F and G, it may check $[\cdot F \cdot]$ and $[\cdot G \cdot]$ simultaneously. The condition in (9b) *enforces* multiple checking in such a case: merging an element bearing both F and G cannot have the result of selectively checking one Merge feature but not the other.

(9) Conditions on the satisfaction of Merge features:

a. Merge features on a head are *unordered* (Longenbaugh 2019, contra e.g. Müller 2010), and can *fail* (Preminger, 2014)

b. Feature Maximality/Multitasking/Free Rider condition: Given a head H with features $[F_1]...[F_n]$, if XP discharges $[F_i]$, XP must also discharge each $[F_j]$ that it is capable of (Chomsky, 1995; Pesetsky & Torrego, 2001; Rezac, 2013; van Urk & Richards, 2015; Longenbaugh, 2019)

(10) Merging a bearer of F or G (but not both) checks one feature on H. Merging a bearer of *both* F and G checks both features on H.

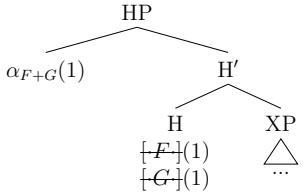


Important to note is that Feature Maximality is not a global economy condition – it does not tell a head which operation to do first. Whatever operation a head happens to choose, Feature Maximality merely requires it to maximize the number of features checked by the operand. Thus, the presence of an element bearing both F and G in the numeration does not necessarily bleed the possibility of merging an element bearing only F or G in Spec HP. However, its presence does impose limits on what orders of operations permit both elements to merge.

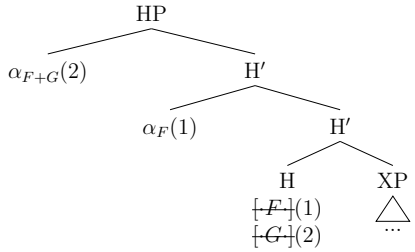
If the element bearing both F and G merges in Spec HP before anything else, it checks all of the features and blocks subsequent Merge steps which would create new specifiers. If an element bearing only F or G merges first, the remaining feature will license a second specifier.

(11) Different orders of operations yield different numbers of specifiers

a. Merging α_{F+G} before $\alpha_F \rightarrow$ HP has one specifier



b. Merging α_F before α_{F+G} → HP has two specifiers



These assumptions about Merge features help define the space of possible structures we can build. We now need to establish an inventory of functional heads and Merge features corresponding to each one.

I argue that we only need two functional categories corresponding to verbal heads: V and v. Every other imaginable verbal morpheme (e.g. *appl*, *caus*, *instr*) must therefore be either an instance of V or v, or must be selected as an argument of V or v, on this view. I additionally propose that there are only three c-selectional features used in constructing verb phrases: $[\cdot D \cdot]$ and $[\cdot X \cdot]$ for arguments, and $[\cdot V \cdot]$ for building the clause (i.e. v selects for VP)[3].

(12) Proposed heads and features:

a. Two functional heads in the verb phrase: V and v (Larson, 1988; Hale & Keyser, 1993; Chomsky, 1995; von Stechow, 1995, a.o.)

b. Three (non-$\bar{\text{A}}$) features: $[\cdot D \cdot]$, $[\cdot V \cdot]$, $[\cdot X \cdot]$

In section (3), we will see how the introduction of an unspecified feature X *has crucial consequences for the order of operations.* Because D and V are instances of X, DPs and VPs can both check $[\cdot X \cdot]$ as well as $[\cdot D \cdot]$ and $[\cdot V \cdot]$. As a result, arguments that are neither DPs or VPs must be merged *first* in their selecting phrase. Otherwise they will be blocked by anything else that merges and checks $[\cdot X \cdot]$. As such, non-DP arguments may disrupt complementation relationships between heads and other selected arguments.

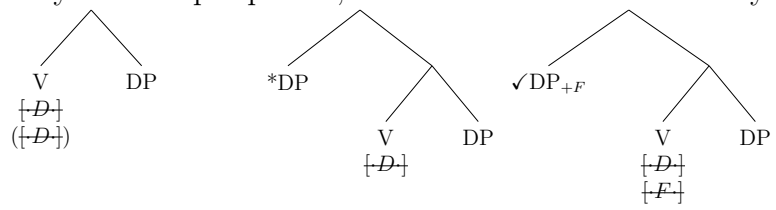
3 Building verb phrases

So far we have established that heads are endowed with features that enable them to Merge with elements of particular categories. Not every Merge feature needs to correspond to a distinct Merge operation (i.e. Merge features can fail), but no Merge

[3] I use the labels V and v to refer to the categories responsible for introducing internal vs. external arguments respectively. These labels vary on different theories – one could imagine replacing V with the label $v + \sqrt{}$ and v with the label *Voice* without changing any fundamental aspects of the theory. Whether we think that verbs are built from category-less roots plus a categorizing head v or are lexically endowed with their syntactic category doesn't affect the central predictions of the present theory, assuming with Merchant (2019) that roots do not control c-selection, categories do.

operation can occur in the absence of a licensing feature (i.e. all Merge is feature driven)[4]. In that sense, once a DP has checked off a head's $[\cdot D \cdot]$ feature, no other DPs are licensed in that maximal projection unless they have other features c-selected by that head[5]. Moreover, Feature Maximality demands that every merged constituent check as many features as it can. Thus, even if a head had multiple $[\cdot D \cdot]$ features, it would still only permit one DP, because a single DP can check multiple features.

(13) Only one DP per phrase, unless another DP licensed by a distinct feature



So far, this proposal is in keeping with proposals like that advanced by Wood & Marantz (2017), who suggest that only one argument is licensed per functional projection in the verb phrase. Where my proposal diverges, however, is in how I treat arguments that are *not* DPs.

It has been often observed that verbs do not select only for DPs as arguments, but also select CPs, TPs, PPs, APs, etc. I will argue that even though these non-DP arguments are still syntactically *arguments* rather than adjuncts, they are not individually c-selected by $[\cdot C \cdot]/[\cdot T \cdot]/[\cdot P \cdot]/[\cdot A \cdot]$ features (Grimshaw, 1979; Pesetsky, 1982; Elliott, 2017). Instead, I propose that they are licensed by a Merge feature that is *unspecified* for category (labelled $[\cdot X \cdot]$ here). On the present approach, there are only two argument introducing features from the perspective of syntax: one for DPs and one for any argument. Thus, all imaginable arguments are *permitted*, but not all imaginable arguments are explicitly subcategorized for.

(14) Arguments of V licensed by $[\cdot D \cdot]$ and $[\cdot X \cdot]$:

a. Jo enjoys <u>fruit</u>. (DP object, licensed by $[\cdot D/X \cdot]$)
b. Amy turned <u>blue</u>. (AP object, licensed by $[\cdot X \cdot]$)
c. Beth depends <u>on Lauri</u>. (PP object, licensed by $[\cdot X \cdot]$)
d. Meg wants <u>to go camping</u>. (TP object, licensed by $[\cdot X \cdot]$)
e. Jo thinks <u>that Marmie likes carrots</u>. (CP object, licensed by $[\cdot X \cdot]$)
f. Meg introduced <u>Jo</u> <u>to Lauri</u>. (DP+PP objects, licensed by both)
g. Amy told <u>Beth</u> <u>that Marmie likes carrots</u>. (DP+CP objects, licensed by both)

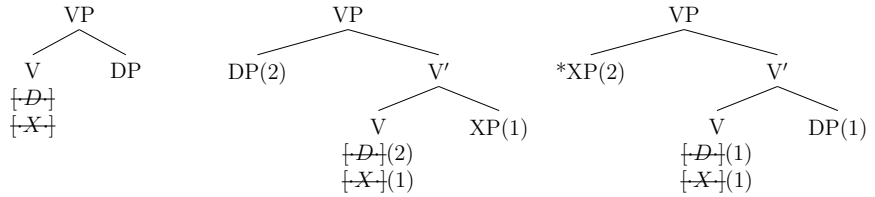
The introduction of an unspecified feature has an important consequence for the order of operations: the fact that DP is itself a kind of XP induces restrictions on the

[4]I mainly leave aside discussion of adjunction for simplicity, though future research should determine whether adjunction obeys the same requirements on Merge advanced here.

[5]I am assuming that features are generally inaccessible to multiple checking operations, but delete once checked.

relative order in which DPs and non-DPs are merged. If a DP is merged first, no other arguments are licensed in that projection due to the fact that Feature Maximality requires that DP to check both $[\cdot D \cdot]$ and $[\cdot X \cdot]$. However, if a non-DP is merged first, it checks only $[\cdot X \cdot]$, allowing a DP to be merged later. Thus, a VP can potentially host *two* arguments, so long as only the second one merged is a DP. For convenience, I will call this ordering restriction *the non-DP first theorem*.

(15) *The non-DP first theorem*: if V merges with a non-DP, the non-DP must merge first.



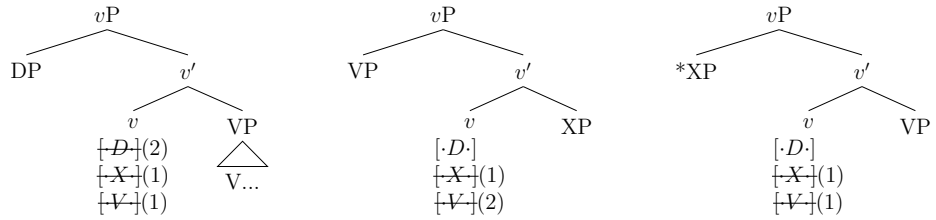
Since only one DP is licensed per functional projection, we need a second verbal head to build a transitive clause (Larson, 1988; Hale & Keyser, 1993; Chomsky, 1995; von Stechow, 1995, a.o.). By convention, I will call the second verbal head v, which is proposed to be like V in having the two argument licensing features ($[\cdot D \cdot]$ and $[\cdot X \cdot]$), but unlike V in additionally having a $[\cdot V \cdot]$ feature, so v can merge with VP (necessary for clause construction). I propose that these two heads, V and v, and these three features, $[\cdot D \cdot]$, $[\cdot X \cdot]$, and $[\cdot V \cdot]$ are the only ingredients we need to derive all and only the verb phrases that we find.

(16) Features for each verbal category
   a. V = $[\cdot D \cdot]$, $[\cdot X \cdot]$
   b. v = $[\cdot D \cdot]$, $[\cdot X \cdot]$, $[\cdot V \cdot]$

The presence of $[\cdot X \cdot]$ on v has the same consequences for the order of operations as it does in VP-construction, but with a more surprising result. When v takes a VP complement, merging VP necessarily checks v's $[\cdot X \cdot]$ feature in the same way that merging a DP would check its $[\cdot X \cdot]$ feature. As a result, whenever v takes a non-DP argument that needs to be licensed by $[\cdot X \cdot]$ (e.g. potentially the experiencer subject in (17a), the dative argument in (17b), or the *by*-phrase in (17c) (Collins, 2005)), VP must merge as a *specifier*.

(17) v can host an XP argument as well as VP
   a. It seems to Beth that Jo likes writing.
   b. Meg bet Amy.DAT a day's pay that Jo would lose her scarf.
   c. A book was given to Meg by Jo.

(18) vPs: a non-DP/non-VP must merge first → makes VP a specifier.



The fact that VP is predicted to be a specifier in these contexts should affect constituency, binding between different arguments, and locality from the perspective of A-movement and Agree. Before discussing these predictions, however, I want to motivate the present proposal by discussing properties of selection that I believe are not accounted for by alternative proposals.

3.1 Why $[\cdot D\cdot]$ and $[\cdot X\cdot]$?

I have argued that there are only two features involved in argument selection, $[\cdot D\cdot]$ and $[\cdot X\cdot]$. In a first result, this explains why the profile of selection for DPs looks like c-selection in the standard sense, while the profile of selection for other categories does not Grimshaw (1979); Pesetsky (1982); Elliott (2017). C-selection for DPs is shown in (19). Here we see that verbs that take DP complements are not particular about which D head is used, so long as the complement is *some* kind of DP.

(19) C-selection for category D

a. Sue devoured **the** cake.
b. Sue devoured **a** cake.
c. Sue devoured **three** cakes.
d. Sue devoured **cake** (for three minutes).
e. Sue devoured **Sally's** cake.
f. Sue devoured **every** cake.

Clausal and prepositional complements, by contrast, do not exhibit this profile. We don't find verbs that select for a PP/CP, which care *only* about their complement being *some* kind of prepositional phrase/clause. Instead, the distribution of PPs and CPs appear to be determined by semantic and lexical factors. Many verbs that select for clausal complements can alternatively take nominal or prepositional complements (20-21), and verbs that select for PPs without semantically selecting them always seem to be particular about *which* P heads their complement (22) (Pesetsky, 1995, p. 246, fn. 86, citing Donca Steriade p.c.). Without positive evidence for a feature $[\cdot P\cdot]$ or $[\cdot C\cdot]$ that can be checked by *any* PP or CP, it would be ad hoc to propose that verbs ever bear such features.

(20) Elliott (2017), example 150

a. Sam promised/said/explained/thought that he would give an extra lecture.

b. Sam promised/said/explained/thought something.

(21) Grimshaw (1979); Pesetsky (1982)

a. Sue asked whether Bill likes carrots.

b. Sue asked the time.

c. Sue asked for the salt.

(22) L-selection for particular P-heads (Pesetsky (1995), p. 246, fn. 86, citing Donca Steriade p.c.)

a. Sue relies **on/*to/*of/*for the bus**.

b. Sue bristled **at/*to/*of/*for Sally's insult**.

A second advantage of replacing non-D c-selectional features with $[\cdot X \cdot]$ is as follows. If features have to be fixed for a given category, assigning the category V features $[\cdot D \cdot]$ and $[\cdot P \cdot]$ would automatically rule out verbs that take clausal rather than prepositional complements. Thus, without $[\cdot X \cdot]$, we would need to endow the category V with every imaginable feature (e.g. $[\cdot P \cdot]$, $[\cdot C \cdot]$, $[\cdot A \cdot]$, $[\cdot T \cdot]$...) to make it flexible enough to host the range of arguments that V can have. Doing so should allow verb phrases to contain more arguments simultaneously than we actually find, however. While it is common to find verbs with two internal arguments, I have never found a verb that selects for four, where each is a different category, as in (23c). According to Hale & Keyser (1993, 2002); Juarros (2003), the number of arguments per verbal head is maximally two cross-linguistically.

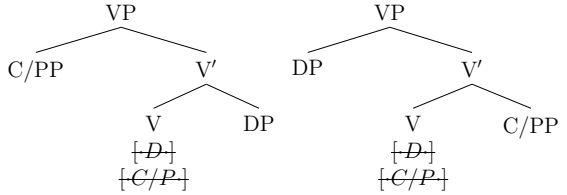
(23) a. Beth told [Lauri] [about syntax]. (D+P)

b. Jo told [Marmie] [that Beth likes carrots]. (D+C)

c. *Jo told [Marmie] [blue] [about syntax] [that Merge is a structure building operation]. (D+A+P+C)

Lastly, if PPs and CPs were introduced by features like $[\cdot P \cdot]$ and $[\cdot C \cdot]$, we would have no expectations about the relative positions of DPs vs. PPs vs. CPs in a clause. We would expect it to be possible to find verbs where the DP merges first, and the PP second, and verbs with the reverse order of feature checking. Each order of Merge should correspond to a different word order. However, (25) shows that only one relative order of DP vs. PP is allowed (even if we make the DP really heavy), showing that only one order of Merge is allowed.

(24) The two kinds of VPs if we replace X with C or P.



(25) a. I told (*about syntax) Lauri's favorite poet's cat (about syntax).
b. I promised (*to eat a carrot) Marmie's mother's friend Ed (to eat a carrot).
c. I told (*that the world is round) Beth's nephew's stuffed animal (that the world is round).

The fact that DP internal arguments routinely appear to the left of non-DP internal arguments suggests that we either need to stipulate constraints on the possible orders of selectional features, or conclude that non-DP arguments are introduced by $[\cdot X \cdot]$. On this approach, features are unordered on V, but one of V's features is unspecified, which requires it to be checked first in the course of a derivation. Thus, the proposed distribution of $[\cdot X \cdot]$ straightforwardly explains facts about word order that are lost on alternative views of c-selection.

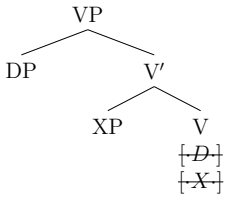
We could alternatively imagine that examples (25) do not reflect the order of Merge, but rather reflect conditions on linear order. For example, Stowell (1981) argues that the position immediately following the verb is a case position. Since DPs need case, but PPs/CPs do not (or can't have case), the only available word orders for DP and non-DP arguments are those in which DPs are adjacent to the verb in their clause, and other arguments show up further to the right.

In addition to much recent work offering new perspectives on case and adjacency requirements, head final languages argue against Stowell's approach and in favor of the present one. In a head final language, the verb shows up to the right of all of the arguments. If DPs' position relative to verbs were driven by case rather than order of Merge, head final languages would order DPs to the *right* of non-DPs in order to appear next to the verb. If their linear order were conditioned by order of Merge, however, the position of DPs relative to non-DPs would be the same, irrespective of the headedness of VP. In fact, the order of DPs relative to non-DPs appears to be the same in Dutch as in English.

(26) *Dutch* (Stowell, 1981, ex. 27, from Koster 1978b)
a. ... dat Peter [John] [naar Amsterdam] stuart
... that Peter John to Amsterdam sends
'that Peter sends John to Amsterdam'
b. ... dat John [Peter] [ziek] maakte
... that John Peter sick makes
'that John makes Peter sick'

On my approach, this result is expected because head-finality switches the relative order of V and its complement but not its specifier. Assuming that non-DPs Merge first, and are thus complements, they should show up immediately preverbally in a head final language, while the second-Merged DP appears further to the left.

(27) Head-final VP with DP and XP



I therefore conclude that there are no argument-introducing features beyond $[\cdot D\cdot]$ and $[\cdot X\cdot]$ on verbal heads. In addition to there not being strong evidence for features like $[\cdot P\cdot]$ and $[\cdot C\cdot]$, both the number and distribution of non-DP arguments are better explained by $[\cdot X\cdot]$. The predictions of the approach are summarized in (28).

(28) Conditions on the orders of operations:

a. DPs are always licensed → can be merged at any time

b. non-DPs are only licensed if merged first → can only be complements of V and v

c. v can't take both a VP and a non-DP complement → non-DP arguments of v force VP to become a specifier

3.2 The space of possible verb phrases

The proposed inventory of functional heads and Merge features predicts verb phrases to have anywhere from 0-4 arguments. If a clause wants to project more than four arguments, it must use one of the $[\cdot X\cdot]$ features on V or v to merge another verb phrase or clause. The space of possible verb phrases, varying the number and types of arguments selected by each verbal head, are shown in (29).

(29) Possible numbers/types of arguments in vP

arguments in V→ arguments in v ↓	∅	DP	XP	DP+XP
∅		1DP	1XP	1DP,1XP
DP	1DP	2DPs	1DP,1XP	2DPs,1XP
XP	1XP	1DP,1XP	2XPs	1DP,2XPs
DP+XP	1DP,1XP	2DPs,1XP	1DP,2XPs	2DPs,2XPs

Both of the extremes are attested – *weather* verbs take no arguments, instantiating the top left quadrant (30), and verbs of *betting* take four (31), instantiating the bottom right quadrant. As long as we treat one of the arguments of *bet* as a dative argument (which could be housed in a prepositional KP, as in Lamontagne & Travis 1987; Bittner & Hale 1996; Neeleman & Weerman 1999; Rezac 2008; Caha 2009; Pesetsky 2013; Levin 2015), the predictions of the theory are therefore borne out – we can have verbs with up to four arguments, at most two of which are DPs.

(30) *Weather* verbs select for no arguments

a. It's raining.

b. It's snowing.

(31) Verbs of *betting* select for 4 arguments

a. Bugs bet Tweety.DAT 7 dollars that Road Runner would escape.

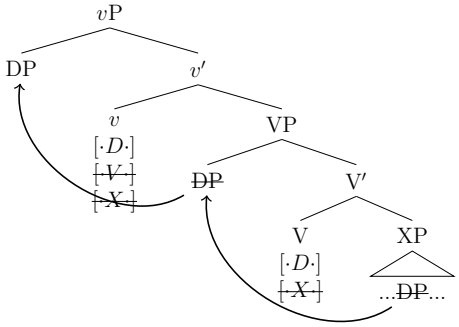
b. Bill wagered me.DAT a day's pay that the world would end on Wednesday. (Pesetsky, 1995, ex. 478)

c. Bill sent Mary.DAT a letter to London.

Though I won't look at examples from every quadrant in (29), a few points are worth highlighting. First, a welcome and unsurprising result: the fact that either/both V and v can select a DP predicts unaccusative, unergative, and transitive clauses straightforwardly. If V merges with a DP, but v does not, the result is an unaccusative clause; the reverse yields an unergative clause; if both features are used to introduce DPs, the result is a transitive clause.

A second and more surprising result comes from the fact that either/both V and v can select a *non-DP* as well, which predicts different raising behaviors. Suppose that V merges with a clause but no DP argument. In this context, some element inside the clause can raise to the edge of VP to check its unused $[\cdot D\cdot]$ feature. Depending on whether v externally merges a DP, the raised element might stay in Spec VP (as in active ECM clauses), or may raise all the way to Spec vP (as in passive ECM clauses).

(32) XP is selected by V (i.e. XP is V's complement)



(33) ECM results from raising to check V's $[\cdot D\cdot]$ feature

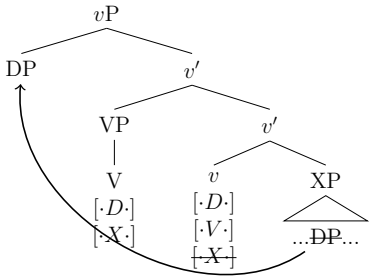
a. Amy believes Jo to be talented/it to be raining.

b. Jo was believed to be talented. *passive*

Assuming that v may in principle merge with a clause as well, licensed by v's $[\cdot X\cdot]$ feature, a different raising profile is expected. Here, raising from that clause can check the $[\cdot D\cdot]$ feature only on v, not V, because raising to check the $[\cdot D\cdot]$ feature on V would require movement to a non-c-commanding position. As such, verb phrases in which a clause merges with v should only exhibit raising to subject, never raising to object. This raising profile is exhibited by *wager*-class verbs (Postal, 1974). In (35),

we see that raising only takes place from the clausal complement of *wager/allege* in the passive, i.e. when there is no external argument – there is no raising to object in an active clause. This is predicted if the clausal complements of *wager/allege* merge with v; only v's $[\cdot D\cdot]$ feature is available for checking by raising, and only if no external argument is merged.

(34) XP is selected by v (i.e. XP is v's complement so VP is a specifier)



(35) *Wager*-class verbs

a. *Amy wagers Beth to be the best pianist.

b. Beth was wagered to be the best pianist.

c. *Jo alleged Meg to be the best actress.

d. Meg was alleged to be the best actress.

Lastly, clauses with two DPs and one non-DP occupy two quadrants in the table in (29), which will form the basis of our discussion of ditransitive clauses in Section 4. The table in (36) provides suggested names for every predicted structure.

(36) Ascribing names to each structure.

args in V→ args in v ↓	∅	DP	XP	DP+XP
∅	*weather* verbs	unaccusatives	raising verbs	ditransitive unacc.
DP	unergatives	transitives	ECM verbs	**ditransitives**
XP	raising verbs	*puzzle/delight*	*seem/appear*	*find*
DP+XP	*wager*	**ditransitives**	*hear*	*bet*

A note on thematic roles: this section focuses on the categorial properties of arguments rather than their thematic properties. It is worth noting that multiple views on theta role assignment are compatible with the present view of argument selection. I have been assuming that DP arguments of V are canonical "objects" (e.g. patients, themes), and DP arguments of v are canonical "subjects" (e.g. agents, causers). This could be achieved in either of two ways, 1) with linking rules that map DP arguments of V vs. v to particular thematic roles (UTAH), or 2) by assuming that the inventory of heads that merge in V vs. v are semantically distinguishable according to what thematic roles they assign to their arguments, as proposed by (Kratzer, 1996; Pylkkänen, 2008; Ramchand, 2008, e.g.). In that sense, the theory

of DP-Merge that I advance doesn't decide between different theories of theta-role assignment.

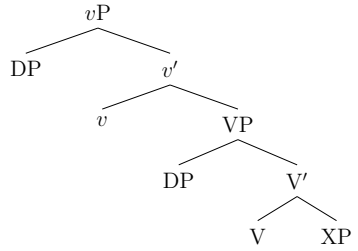
For non-DP arguments, the picture is slightly different. I assume that non-DPs are unlike DPs in that they neither need nor get assigned thematic roles from V or v[6]. Non-DP arguments are therefore not expected to interact with theta role assignment for DPs. If the non-DP argument is s-selected, as long as the order of argument s-selection is specified to interpret the non-DP before the DP argument, theta-role assignment will proceed as usual. If the non-DP argument is not s-selected, I assume it must be interpreted via either predicate modification or event identification (Kratzer, 1996), neither of which disrupt s-selection.

4 The dative alternation

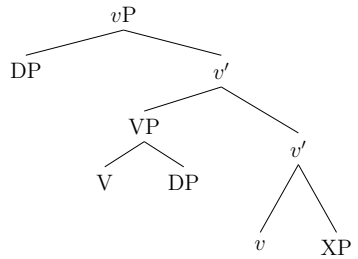
On the present approach, there are only two verbal categories, each of which has one $[\cdot D \cdot]$ feature. If a clause wants to introduce a third DP argument, it must therefore also have a third argument-introducing head, which can be merged in the main clause by checking the $[\cdot X \cdot]$ feature on V or v. Depending on whether that extra phrase merges with V or v, two possible clause structures are predicted, shown in (37). Importantly, because the element that checks $[\cdot X \cdot]$ must be the complement of whatever phrase it merges in, one of these structures breaks the complementation relationship between v and VP – non-DP arguments of v force VP to merge as a specifier.

(37) Two ditransitive structures

a. XP is V's complement



b. XP is v's complement



[6]DPs inside non-DP arguments are assumed to get their theta roles from the functional projections internal to the non-DP phrase.

The fact that VP merges as a specifier in one of these contexts raises the immediate question of where the verb is pronounced. I will largely put aside discussion of verb position, referring the reader to Newman (2021) for arguments from ellipsis that verbs in ditransitive clauses are pronounced in a higher position than vP. For the sake of having a rule of verb placement in the present theory, I adopt the proxy pronunciation rule in (39) for languages like English, which requires pronunciation of the verb in its leftmost position (i.e. to the left of both internal arguments). The main focus of this section will be on the distribution of internal arguments in the dative alternation rather than the position of the verb, however.

(38) English Dative alternation

a. Elmer gave a fake present to Bugs.

b. Elmer gave Bugs.DAT a fake present.

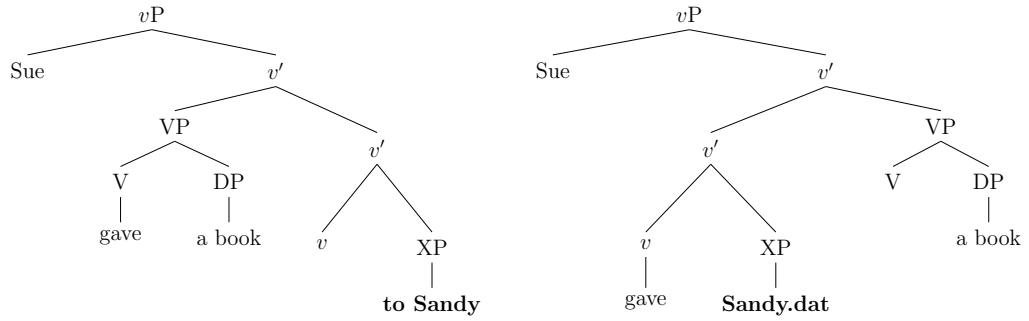
(39) **English verb pronunciation rule**
Pronounce the verb in either V or v, whichever is further to the left.

Before discussing the structures in (37), we must also address the pronunciation of the indirect object. Assuming that the head introducing the indirect object assigns its theta role, the XP containing the indirect object can in principle merge with either V or v without affecting the interpretation of the clause. Nonetheless, English indirect objects have two different morphological realizations – the prepositional phrase in (38a) or the unmarked indirect object in (38b) (labelled with dative case for expository purposes). Even though there is no overt morphology on the indirect object in (38b), I follow (Baker, 1988; den Dikken, 1991; Pylkkänen, 2008, a.o.) in assuming that there is a covert head accompanying it, such as a K head or an applicative head, causing its distribution to be that of a non-DP rather than a DP. I propose that the pronunciation of this head is conditioned by word order, following Levin (2015); Branan (2021), who argue that inherent case is subject to adjacency conditions. The rule in (40) states that the head which introduces indirect objects can only be pronounced as a covert dative if it is linearly adjacent to the pronounced verb. Otherwise it must be pronounced as an overt preposition.

(40) **English inherent case rule**: covert inherent case is licensed for XPs that are linearly adjacent to a pronounced verb or preposition

With the two pronunciation rules in (39) and (40), I argue that the dative alternation as we know it reduces to two facts about ditransitive clauses: 1) their structural ambiguity (on account of the two positions available to XPs), and 2) the word order flexibility introduced by VP-specifier-hood. I propose that when VP is a specifier, it can be projected either as a rightward or leftward specifier. The fact that VP is a more clause-like specifier than a DP might account for its more flexible linear distribution, depending on whether a language has a mechanism for linearizing heavy specifiers differently than lighter ones (for example by simply projecting VP as a rightward specifier, or by extraposing it like a clausal argument). VP extraposition affects pronunciation – when VP is on the right, the verb is pronounced in v, which licenses covert dative case on the adjacent indirect object.

(41) VP extraposition affects word order



In sum, if the indirect object is an argument of V (as in (37a)), it can only be linearized to the right of the direct object; if the indirect object is an argument of v (as in (37b)), it can be linearized either to the left or the right of the direct object, depending on how the VP-specifier is linearized. As a result, (38a), repeated in (42a), is proposed to be structurally ambiguous[7] (the indirect object can merge with V or v) but (38b) is not (the indirect object must merge with v).

(42) English Dative alternation

a. Elmer gave a fake present [$_{XP}$to Bugs]. (XP is complement of V or v)

b. Elmer gave [$_{XP}$Bugs.DAT] a fake present. (XP is complement of v)

When the indirect object XP phrase is the complement of V, it is asymmetrically c-commanded by the direct object. When the indirect object XP phrase is the complement of v, however, neither argument c-commands the other. This proposal therefore makes a clear prediction about binding possibilities in ditransitive clauses. When the direct object linearly precedes the indirect object, there are two structures available, one in which DP may bind XP and one in which it may not. If there are ways of controlling for structure in cases of ambiguity, they should track whether the direct object can bind the indirect object. By contrast, when the direct object linearly *follows* the indirect object, the direct object should never be able to bind the indirect object. These predictions are summarized in (43).

(43) Predicted interaction between word order and structural ambiguity

a. DP V DP XP. (DP can or cannot bind XP)

b. DP V XP DP. (DP cannot bind XP)

I propose that the interaction in (43) is straightforwardly observed in English (44) if we assume that arguments of v can bind arguments of V (to be elaborated on in Section 4.1). To foreshadow, I propose that we adopt a notion of m-command, which decides on binding possibilities when there is no c-command. With this in mind, observe in (44) that when the indirect object (XP) *follows* the direct object (DP) in (44a,b), the direct object can either bind or be bound by the indirect object. When

[7]Janke & Neeleman (2005) also propose a theory of ditransitives in which PP indirect objects are structurally ambiguous, though their proposed structures are different.

the indirect object (XP) *precedes* the direct object (DP) in (44c,d), the indirect object can bind the direct object but not vice versa.

(44) a. Jo showed [$_{DP}$Lauri and Amy$_i$] [$_{XP}$to each other's$_i$ parents] in the mirror. (DP binds XP)

b. Jo showed [$_{DP}$pictures of each other$_i$] [$_{XP}$to Lauri and Amy$_i$]. (XP binds DP)

c. Jo showed [$_{XP}$Lauri and Amy$_i$.DAT] [$_{DP}$each other$_i$'s parents] in the mirror. (XP binds DP)

d. *Jo showed [$_{XP}$each other$_i$'s parents.DAT] [$_{DP}$Lauri and Amy$_i$] in the mirror. (*DP binds XP)

This pattern is not unique to English, but is also observed in Japanese, Greek and Spanish. To clarify the predictions of this account, the English-like word order/structural ambiguity interaction is predicted to be the baseline behavior for ditransitive clauses across languages: DP-XP order is structurally ambiguous while XP-DP order is not. To the extent that languages' dative alternations diverge from this pattern, they should do so in a *more restricted* fashion. For example, Spanish only permits one of these word orders for some reason, namely DO-IO, which shows the same structural ambiguity that we find in the other languages.

Starting with the baseline pattern, observe that Japanese ditransitives are like English relative to binding diagnostics (Hoji, 1985; Takano, 1998; Yatsushiro, 2003; Miyagawa & Tsujioka, 2004). Japanese uniformly marks its indirect objects with dative case, and the dative argument can appear to the right or to the left of the accusative argument. When the dative argument follows the accusative argument, it can bind or be bound by the accusative argument. When it precedes the accusative argument, however, the dative argument must bind the accusative one.

(45) *Japanese* binding in DO-IO order: forwards and backwards Miyagawa & Tsujioka (2004), ex. 61

a. (?)John-ga [Hanako-to Mary]-o$_i$ (paatii-de) otagai$_i$-ni
John-NOM [Hanako-and Mary]-ACC (party-at) [each.other]-DAT
syookaisita.
introduced

'John introduced Hanako and Mary to each other (at the party).'

b. John-ga [otagai$_i$-no sensei]-o (paati-de) [Hanako-to
John-NOM [each.other-GEN teacher]-ACC (party-at) [Hanako-and
Mary]-ni$_i$ syookaisita.
Mary]-DAT introduced

'John introduced each other's teachers to Hanako and Mary (at the party).' (p.c. Shigeru Miyagawa)

(46) *Japanese* binding in IO-DO order: only forwards Miyagawa & Tsujioka (2004), ex. 61

a. John-ga [Hanako-to Mary]-ni$_i$ [otagai$_i$]-o syookaisita.
John-NOM [Hanako-and Mary]-DAT each.other-ACC introduced
'John introduced Hanako and Mary to each other.'

b. *John-ga [otagai$_i$-no sensei]-ni [Hanako-to Mary]-o$_i$
John-NOM [each.other-GEN teacher]-DAT [Hanako-and Mary]-ACC
syookaisita.
introduced
intended: 'John introduced Hanako and Mary to each other's teachers.'
(p.c. Shigeru Miyagawa)

Greek ditransitives exhibit the same pattern as English and Japanese. Greek ditransitives are English-like in having both a prepositional variant for indirect objects (47a) as well as a non-prepositional variant (47b). Greek is also like Japanese in using overt inherent case to mark the non-prepositional variant. Greek is unlike English and Japanese, however, in that it also has optional clitic doubling (47c). Importantly, Greek exhibits the same word order/binding interaction: when the indirect object follows the direct object, binding is flexible; when the indirect object precedes the direct object, binding is rigid (Anagnostopoulou, 2003, Sabine Iatridou, p.c.).

(47) *Greek* ditransitives (Anagnostopoulou, 2003, ex. 5-7)

a. O Gianis estile to grama s-tin Maria.
the Gianis.NOM sent.3SG the letter.ACC to-the Maria.ACC
'John sent the letter to Mary.' *prepositional indirect object*

b. O Gianis estile tis Marias to grama.
the Gianis.NOM sent.3SG the Maria.GEN the letter.ACC
'John sent Mary the letter.' *genitive indirect object*

c. **Tu** edhosa tu Giani to vivlio.
cl.GEN gave.1SG the Gianis.GEN the book.ACC
'I gave John the book.' *with clitic doubling*

(48) *Greek* binding in DO-IO order (Sabine Iatridou, p.c.)

a. O Gianis edhikse [ton Maria]$_{DP}$ [s-ton eafton tis]$_{XP}$ s-ton
the Gianis.NOM showed the Maria.ACC to-the REFL.ACC GEN in-the
kathrefti.
mirror.ACC
'John showed Mary to herself in the mirror.'

b. O Gianis edhikse [ton eafton tis]$_{DP}$ [s-tin Maria]$_{XP}$ s-ton
the Gianis.NOM showed the REFL.ACC GEN to-the Maria.ACC in-the
kathrefti.
mirror.ACC
'John showed herself to Mary in the mirror.'

c. O Gianis edhikse [tis Marias]$_{XP}$ [ton eafton tis]$_{DP}$ s-ton
the Gianis.NOM showed the Maria.GEN the REFL.ACC GEN in-the
kathrefti.
mirror.ACC
'John showed Mary.gen herself in the mirror.'

d. *O Gianis edhikse [tu eaftu tis]$_{XP}$ [tin Maria]$_{DP}$ s-ton
the Gianis.NOM showed the REFL.GEN GEN the Maria.ACC in-the
kathrefti.
mirror.ACC
intended: 'John showed herself.gen Mary in the mirror.' (speaker intuition: extreme word salad)

In sum, we find that three different languages, each with slightly different morphosyntactic realizations of direct and indirect objects, all show the same interaction between binding and word order in their ditransitive clauses. When the indirect object follows the direct object, both forwards and backwards binding are possible, but when the indirect object precedes the direct object, only forwards binding is possible.

Not every language patterns like English, Japanese, and Greek. Spanish, for example, only makes use of one word order for its ditransitives. In Spanish, direct objects always *precede* indirect objects. Like Greek, Spanish indirect objects may be optionally clitic doubled (as can certain direct objects). The indirect object also always appears with a preposition/case marker *a*.

(49) *Spanish* (Anagnostopoulou, 2003)

Miguelito (le) regaló [un caramelo]$_{DP}$ [a Mafalda]$_{XP}$.
Miguelito cl.DAT gave a candy *a* Mafalda

'Miguelito gave Mafalda a piece of candy.'

Even though Spanish does not have variable word order, the word order available to it is in principle predicted to be structurally ambiguous: when the direct object precedes the indirect object, we have seen that binding should be variable. This prediction is born out, as argued by (Demonte, 1995; Cuervo, 2003). What we find is that clitic doubling disambiguates the structural ambiguity of direct object-indirect object word order. Clitic doubled indirect objects are arguments of v, while non-clitic doubled indirect objects are arguments of V.

(50) *Spanish* binding: clitic-doubled IOs are arguments of v; non-clitic-doubled IOs are arguments of V (Demonte (1995), ex. 9)

a. El tratamiento psichoanalítico reintegró [a María]$_{DP}$ [a sí-misma]$_{XP}$.
the therapy psychoanalytic gave-back to Mary.DO to herself.IO
'The psychoanalytic therapy helped Mary to be herself again.'

b. *El tratamiento psichoanalítico reintegró/devolvió [a sí-misma]$_{DP}$ [a
the therapy psychoanalytic gave-back to herself.DO to
María]$_{XP}$.
Mary.IO

intended: 'The psychoanalytic therapy helped Mary to be herself again.'

c. *El tratamiento psichoanalítico **le** devolvió [a María]$_{DP}$ [a la
the therapy psychoanalytic CL-DAT gave-back to Mary.DO to the
estima de sí-misma]$_{XP}$.
esteem of herself.IO

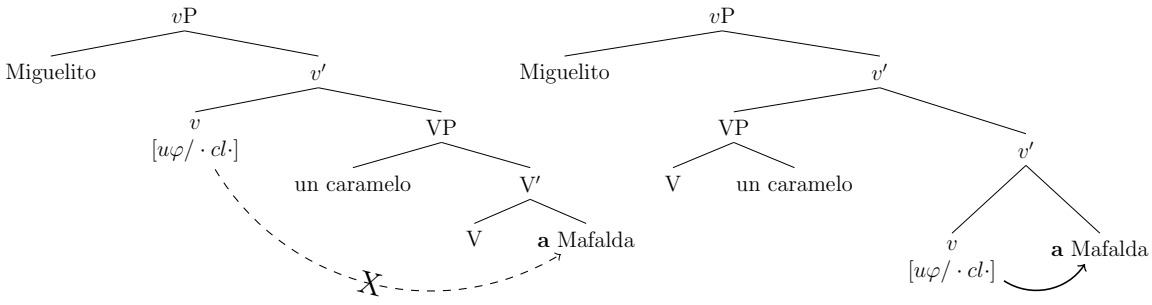
'The psychoanalytic therapy helped Mary to be herself again.'

d. El tratamiento psichoanalítico **le** devolvió [a la estima de
the therapy psychoanalytic CL-DAT gave-back to the esteem of
sí-misma]$_{DP}$ [a María]$_{XP}$.
herself.DO to Mary.IO

'The psychoanalytic therapy helped Mary to be herself again.'

Presumably, the position of the indirect object affects clitic doubling because of relativized minimality. When the indirect object merges with V, the direct object c-commands it, and thus blocks the relevant probe from clitic doubling the indirect object. When the indirect object merges with v, however, neither argument c-commands the other. Moreover, if the clitic doubling probe is on v (as suggested by Longenbaugh 2019, e.g.), the only argument in its c-command domain is the indirect object, making minimality irrelevant to clitic doubling.

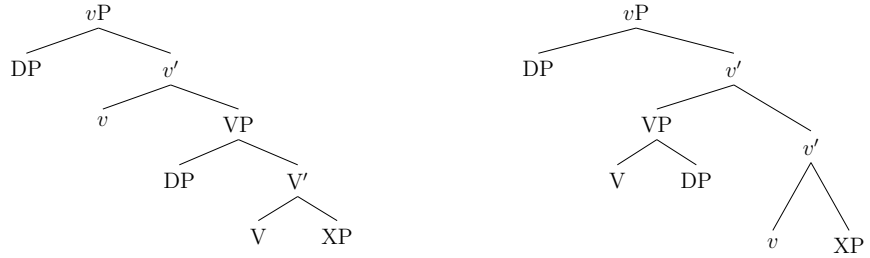
(51) Spanish XPs don't change form – IO bears an overt P-like head, clitic doubling tracks position



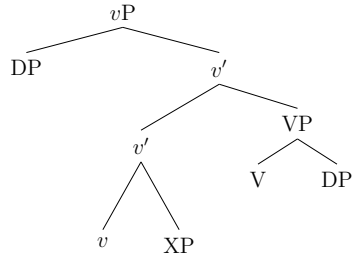
In sum, we have seen binding evidence from several languages whose ditransitive clauses all have different surface properties, which motivate two different ditransitive structures. All of these languages exhibited a particular interaction between word order and structure: indirect objects that follow direct objects are structurally ambiguous, but indirect objects that precede direct objects are not. This pattern is expected on the present account, but not on alternative approaches to the dative alternation.

On the present account, the word order DO-IO can be achieved through either structure in (52), where the indirect object is a complement of V in one case but a complement of v in the other. The word order corresponding to IO-DO word order, however, has only one structure corresponding to it, in which the indirect object is a complement of v (53).

(52) Two ditransitive structures corresponding to DO-IO word order

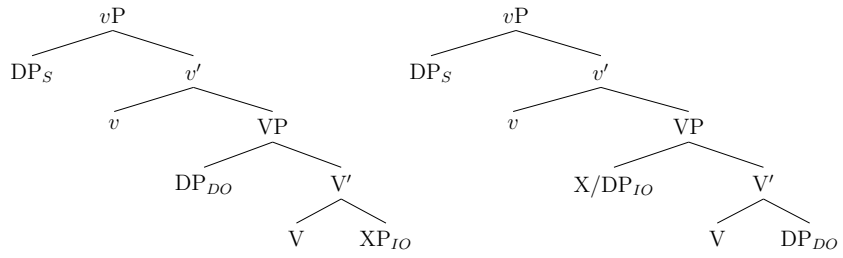


(53) VP-specifier-hood+VP-extraposition required for IO-DO word order



On other views of the dative alternation, the mapping between structure and pronunciation is typically one to one. The word order DO-IO is usually assigned a structure like (54a), called the prepositional dative construction, in which the direct object asymmetrically c-commands the indirect object. The word order IO-DO, is usually assigned a structure like (54b), called the double object construction, in which the indirect object c-commands the direct object. Theories differ regarding whether one of these structures is derived from the other (e.g. *Dative shift*, as in Larson (1988), (Baker, 1997, 91)), or whether they are just independently generated options (as in Harley (2002); Harley & Jung (2015); Harley & Miyagawa (2017)).

(54) Classical prepositional dative vs. double object construction (putting aside labels of functional heads)



Empirically, however, we find that sentences described with the tree on the left cooccur with optional backwards binding, while sentences described with the tree on

the right do not. In the context of backwards binding data, the transformational theory is attractive for languages like Japanese, which independently has scrambling. Supposing that Japanese had just one ditransitive structure, with word order IO-DO, if the direct object scrambles above the indirect object to yield DO-IO order, we would expect the profile of binding that we find. DO-IO word order has two binding possibilities (surface vs. reconstructed), while IO-DO should reflect the base generated structure, where IO asymmetrically c-commands DO.

The problem is that not every language that shows this pattern has scrambling. Moreover, Miyagawa & Tsujioka (2004) argue that Japanese actually has two ditransitive structures instead of just one, so the asymmetric word order/binding interaction is still surprising. The puzzle is therefore why so many languages, irrespective of whether they have object movement, have the identical word order/binding interaction that we find (see Jackendoff 1990 for additional arguments against dative shift).

On the present approach, languages are proposed to have the dative alternation because UG makes two structures available for ditransitive clauses, where one of these structures is compatible with two different word orders, predicting backwards binding. We can therefore understand word order and binding interactions in ditransitive clauses without positing language specific transformational strategies.

4.1 A binding theory

So far, we have seen that the logic of feature driven Merge, combined with the proposed features $[\cdot D \cdot]$, $[\cdot V \cdot]$, and $[\cdot X \cdot]$, jointly predict two available positions for non-DP arguments of the verb: Comp V and Comp v. I proposed that we could diagnose these two positions with binding and word order on the following assumption: the complement of v can bind into the contents of VP but not vice versa.

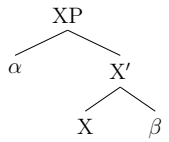
However, given that the complement of v does not c-command the domain of VP, I require a slightly modified binding theory that makes use of *m-command* in order to explain these facts. The modified binding theory is in (55).

(55) Binding theory:
   a. α binds β iff α and β are coindexed, and (i) and (ii):
      i. α m-commands β
      ii. β doesn't c-command α

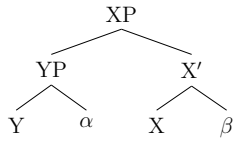
(56) M-command: α m-commands β iff every *maximal projection* that dominates α dominates β

(57) C-command: α c-commands β iff every *node* that dominates α dominates β

(58) a. If α and β m-command each other, but α asymmetrically c-commands β, α binds β and not vice versa



b. If β asymmetrically m-commands α, β binds α and not vice versa



Treating β as an indirect object explains the binding patterns observed in Section 4[8]. When the indirect object is an argument of V, it is c-commanded by the direct object and cannot bind it, and the only possible word order is DO-IO. When the indirect object is an argument of v, it asymmetrically m-commands the direct object and can bind it, and there are two available word orders: DO-IO or IO-DO, depending on how VP is linearized. As a result, DO-IO word order can result in both forwards and backwards binding, but IO-DO order is only compatible with forwards binding[9].

We will now look at what these two ditransitive structures predict for A-movement in passives. When the indirect object is merged as a complement of v, we expect either object of a double object construction to be able to raise to subject position without violating relativized minimality. However, we will see that the relative position of indirect vs. direct objects still introduces a derivational asymmetry between them, which makes the indirect object an earlier target for agreement.

5 Passives of ditransitives

In the passive, the external argument is represented as a PP (e.g. a *by*-phrase in English) instead of a DP. Since non-DPs have different structural requirements than

[8]I assume throughout this investigation that a DP inside a prepositional phrase can bind another DP if the *entire prepositional phrase* m-commands the other DP. The intuitive description of the phenomenon is that arguments of a verb, regardless of category, can bear indices and engage in binding relations. However, a technical explanation for this property of XP arguments in a Minimalist framework is elusive (see for example Pollard & Sag 1994 for discussion and a solution from HPSG).

[9]This approach to binding theory takes some inspiration from Bruening (2014), who proposes that we abandon c-command and m-command altogether and take up a different notion, namely phase-command. On his proposal, DPs inside PPs can bind elements that they neither c-command or m-command so long as they phase-command them, on the assumption that P is not a phase head.

(i) Phase-command: α phase-commands β iff every *phase* that dominates α dominates β

His approach, however, is not restrictive enough to account for the profile of anaphor binding, which leads him to propose additional processing conditions on anaphors that undergenerate in cases of backwards binding. The present approach with m-command doesn't require additional principles and straightforwardly captures backwards binding.

DPs, the position of the PP external argument is expected to be different than that of its DP counterpart – it must be the complement of either V or v. Moreover, the $[\cdot D\cdot]$ feature on v that would normally have licensed the external argument is now available for checking by movement (60).

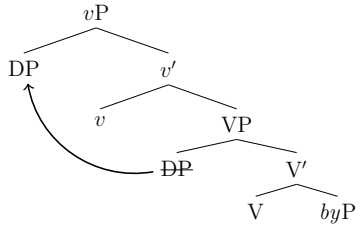
(59) Transitives vs. Passives

a. Jo wrote a novel. (2 DPs)

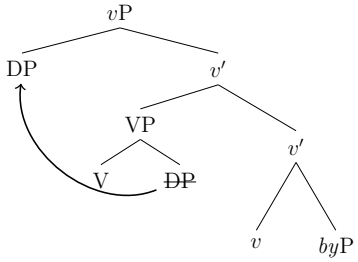
b. A novel was written by Jo. (1DP, 1XP)

(60) Two ways to build a passive of a monotransitive

a. *by*-phrase is in Comp V



b. *by*-phrase is in Comp v

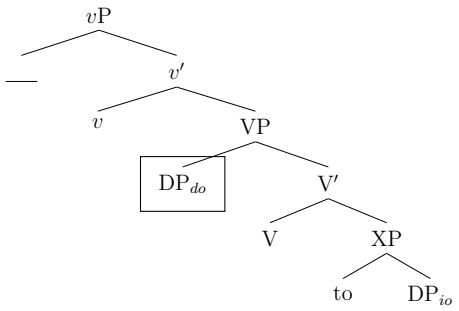


In Section 4, we saw that there are two positions available to indirect object XPs: Comp V and Comp v. I propose that *by*-phrases have these same options, so both options in (60) are utilized. We will now see how the variable positions of *by*-phrases and *to*-phrases interact to predict the different profiles for raising and binding in passives of ditransitives. Section 5.1 addresses the question of which argument raises to subject position in different contexts. Section 5.2 addresses how the position of the *by*-phrase interacts with binding.

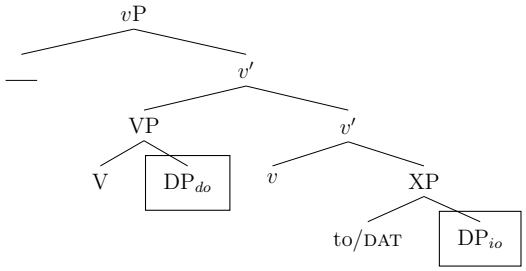
5.1 Promotion to subject position

Assuming A-movement is constrained by relativized minimality (Rizzi, 1990), if there is no transitive subject in Spec vP, the closest DP to it should raise and check that feature. What counts as the "closest" DP depends on the presence and position of any other XPs in the clause. Section 4 motivated two positions for XP arguments in a ditransitive: the complement of V (low) or the complement of v (high). Looking at each possibility separately, we see that clauses with a low XP argument unambiguously promote the DP argument of V in a passive, since the DP asymmetrically c-commands the XP. Clauses with high XP arguments, by contrast, should optionally promote either the complement of X or the DP argument of V, since neither c-commands the other.

(61) Passive where IO is in Comp V: only the theme can raise due to locality.



(62) Passive where IO is in Comp v: either the theme or the recipient can raise.



We therefore expect direct object passives to be structurally ambiguous but indirect object passives to be structurally unambiguous: direct objects can raise to Spec vP in either (61) or (62), but indirect objects can only raise to Spec vP in (62). The predictions of this approach to the dative alternation are different from those of standard approaches. Traditionally, ditransitive structures always establish a c-command relationship between the direct and indirect objects, so each structure should only promote one argument. On the present view, by contrast, one ditransitive structure asymmetrically promotes one but not the other argument, while the other structure promotes either one. In order to test the predictions of this theory compared to others, we crucially need to determine whether direct objects can raise from both (61) and (62). If direct object passives can be shown to be structurally ambiguous, such evidence would support the present theory and be unexpected on alternative views.

Starting with English, notice in (63) that both direct and indirect object passives are possible. We expect indirect object passives to only be derivable from (62), while the direct object passive should be derivable from either (61) or (62). Most varieties of English prefer to use the prepositional form of the indirect object when the direct object raises (63a). On many other theories, the requirement for the preposition in (63a) is taken to indicate that direct object passives are only possible from a structure like (61). We saw in Section 4, however, that morphology is not always a good indicator of structure in ditransitive clauses, but may instead reflect conditions on inherent case licensing.

(63) a. A book was given %(to) Jo.

b. Jo was given a book.

In English, prepositional indirect objects could appear in either structure (61) or (62), which is why they participate in both forwards and backwards binding. Be-

cause the structure in (62) is compatible with either pronunciation of the indirect object, we need some other structural diagnostics to determine whether (63a) with the preposition can be derived from (62). If it can, the fact that many varieties of English require the preposition in (63a) would not be a strong indication of the *raising* possibilities of direct objects, but rather (62)'s possibilities for pronunciation. We will see in Section 5.2 that there is evidence from binding for the structural ambiguity of the prepositional indirect object in (63a), thus showing that both raising possibilities predicted for (62) are found in English – either object can raise, but the indirect object takes its prepositional form when the direct object raises[10]. Before discussing this evidence, however, I want to first show that this result is unsurprising given the profile of raising in ditransitives cross-linguistically.

There are many languages that permit the direct object to raise, even when the indirect object is pronounced with inherent case rather than a preposition (see Holmberg et al. 2019 for a recent survey). Here we will discuss data from Greek and Norwegian, whose passives behave differently from one another in certain respects, but which both have direct object passives in their double object constructions. (47 and (64) show the dative alternation in each language as a baseline. We see that Greek and Norwegian are like English in having both prepositional and dative/genitive indirect objects, each of which occurs in a different linear position in the clause. Norwegian, like English, has no overt exponent for dative case, but Greek has an overt genitive marker on its high indirect objects. We also saw binding evidence for Greek that genitive arguments are always high, i.e. complements of v, just like English. The same is argued for Norwegian by Holmberg et al. (2019) and references there.

(47) *Greek* ditransitives (Anagnostopoulou, 2003, ex. 5-7)

a. O Gianis estile to grama s-tin Maria.
the Gianis.NOM sent.3SG the letter.ACC to-the Maria.ACC
'John sent the letter to Mary.' *prepositional indirect object*

b. O Gianis estile tis Marias to grama.
the Gianis.NOM sent.3SG the Maria.GEN the letter.ACC
'John sent Mary the letter.' *genitive indirect object*

(64) Norwegian ditransitives (Anderssen et al., 2014, ex.2)

a. Jon ga en bok til Marit.
Jon gave a book to Marit
'Jon gave a book to Marit.' *prepositional indirect object*

b. Jon ga Marit en bok.
Jon gave Marit a book
'Jon gave Marit a book.' *dative indirect object*

[10]If this is right, it would indicate that in English, passive morphology intervenes for inherent case licensing, by blocking adjacency between the indirect object and the relevant verbal morpheme.

Both Greek and Norwegian permit raising of the direct object when the indirect object is in its prepositional variant (65), just like English. Unlike English, they both also permit the direct object to raise when the indirect object is in its case-marked variant. In other words, direct objects are permitted to raise even when the morphology indicates that the indirect object must be high. Thus Greek and Norwegian provide support for the structure in (62) – high indirect objects do not block direct objects from raising, because they do not c-command the direct object[11].

(65) Direct object passives with prepositional indirect objects

a. To vivlio charistike s-tin Maria.
the book.NOM award.NACT to-the Maria.ACC
'The book was awarded to Mary.' (Greek; Sabine Iatridou, p.c.)

b. En bok ble git _ til Marit.
a book was given to Marit
'A book was given to Marit.' (Norwegian; Johannes Norheim, p.c.)

(66) Direct object passives with inherent case marked indirect objects

a. To vivlio *(**tis**) charistike tis Marias.
the book.NOM cl.GEN award.NACT the Maria.GEN
'The book was awarded to Mary.' (Greek; Anagnostopoulou 2003, ex. 33)

b. Boka ble gitt Jon _.
the.book was given Jon
'The book was given to Jon.' (Norwegian; Haddican & Holmberg 2015, 145)

Some might object to the treatment of Greek as justification for the structure in (62) due to the profile of clitic doubling. The direct object can only raise in (66a) if the indirect object is clitic doubled (the clitic in (66a) is in bold). The requirement for the clitic in (66a) is often called a *dative intervention effect* (Anagnostopoulou, 2003) – even if the indirect object doesn't raise[12], it still acts as an intervener for

[11]This proposal for direct object passives bears some similarity to Collins's (2005) *smuggling* account of passives, in which one argument may A-move past another if a phrase containing it moves first. On his view, VP-movement smuggles the direct object past the subject, which licenses A-movement of the object in a passive without violating relativized minimality. On my view, ditransitive clauses are base generated with pre-smuggled direct objects, in a sense, so they can move 'past' the indirect object.

[12]Another difference between Greek and Norwegian is that Greek *indirect* objects are not permitted to raise to become the passive subject, a fact which deserves more investigation. However, for the present discussion, I will simply assume that some languages' indirect objects behave like PPs, which are not accessible for raising to check a $[\cdot D\cdot]$ feature, while others' indirect objects behave like DPs, which are accessible for raising to check a $[\cdot D\cdot]$ feature. Greek is such a language whose indirect objects cannot check $[\cdot D\cdot]$ features but Norwegian's indirect objects can. A language with PP-like indirect objects could presumably still license raising of the indirect object if the DP inside it could strand its prepositional shell. However, Greek is not a preposition-stranding language, so its indirect objects should remain obligatorily in situ, unless attracted by a non-D feature.

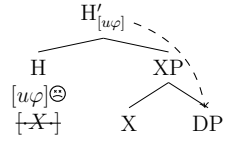
direct object raising, in that it must be clitic doubled in order for the direct object to be able to raise to subject position (clitic doubling is otherwise optional in Greek).

I propose that Greek dative intervention effects are easy to capture without c-command between the internal arguments. On the present theory, indirect objects do not c-command the direct object, and thus don't really cause relativized minimality violations if the direct object A-moves. However, there is a complement-specifier asymmetry among the objects, which according to Béjar & Rezac (2009), should affect which one controls agreement first. Assuming that clitic doubling is mediated by Agree (Anagnostopoulou, 2003; Béjar & Rezac, 2003; Preminger, 2009, 2014), Greek dative intervention effects can be understood through the locality of agreement rather than A-movement.

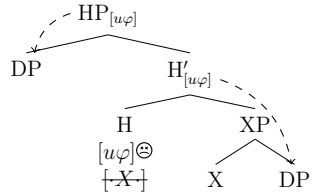
According to Béjar & Rezac (2009), agreement-controlling heads are able to access features on either their complements or their specifiers, *but they must probe their complements first*. As a result, if the complement has an accessible φ-goal, that element will always control agreement. If there is no φ-goal in the complement, or if that goal does not value all of the features on the probe, the probe may *cyclically expand* and search a domain of the head that includes its specifier. They propose that this pattern results from a particular view of feature projection.

Bejar and Rezac assume firstly that φ-probes can only search material that they dominate. As such, a probe must project from the head it was born on to a bar-level node in order to search at all (67). If it doesn't find anything to agree with, it may project again to the maximal projection to probe into a specifier (68). Because the probe must probe before it may project, it always has to search a smaller domain first, accounting for the complement-specifier asymmetry.

(67) If the domain of Agree is based on dominance: $[u\varphi]$ searches and fails in situ – $[u\varphi]$ must project to H′ before H′ can search XP

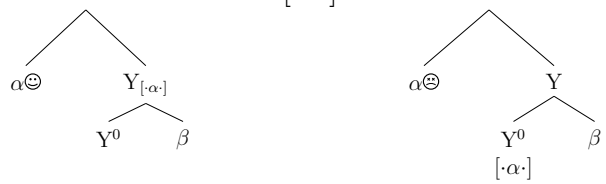


(68) $[u\varphi]$ may project again to probe a specifier



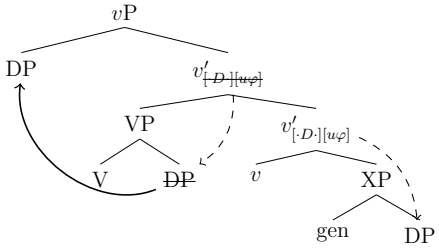
We can now explore how this framework for Agree is expected to interact with the framework of Merge established thus far. Let us suppose that Merge features are checked under sisterhood, in which case $[\cdot D\cdot]$ must also project to a bar-level node to license Merge of a DP specifier (69).

(69) **Feature-driven Merge**: a constituent α may only merge with a constituent Y if Y bears an unsaturated feature $[\cdot\alpha\cdot]$ such that the resulting structure makes the bearer of $[\cdot\alpha\cdot]$ sister to α.



In a structure like (62), according to the rules of φ-agreement and feature checking just laid out, the features $[\cdot D\cdot]$ and φ need to project to different positions in vP in order to agree with the indirect object vs. internally merge the direct object as a specifier. The φ-probe only needs to project once to agree with the indirect object, but φ and $[\cdot D\cdot]$ need to project twice to agree with/A-move the direct object. As such, we expect φ-agreement with the indirect object, which licenses clitic doubling, to precede direct object raising.

(70) Greek passives:



In sum, with Bejar and Rezac's proposal, the locality of Agree constrains the timing of agreement relative to Merge in such a way as to require agreement (+clitic doubling) to precede A-movement in Greek passives. We don't see the same effects in Norwegian because Norwegian has no object agreement/clitic doubling, and thus presumably lacks a φ-probe on v. In the absence of such a probe, the locality of Merge makes no distinction between satisfaction by the indirect vs. direct object – the $[\cdot D\cdot]$ feature may license raising to subject position from the same v'-node, regardless of where the A-moved element originated[13]. With a φ-probe, by contrast, feature projection becomes constrained by the locality of Agree, which can apply in different sized domains depending on where the φ-goal is located.

5.2 The position of *by*-phrases

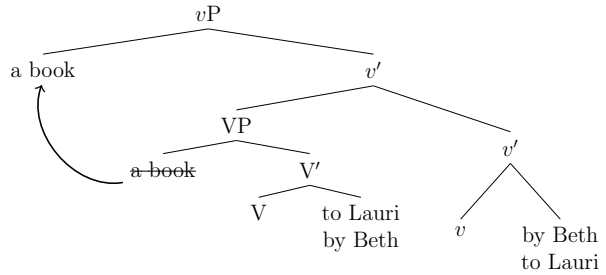
Having discussed how the position of XPs affects raising to subject position, we now turn to the position of the *by*-phrase. As indicated in (60), there are in principle two

[13]Technically, there is a stage in the derivation where $[\cdot D\cdot]$ could attract the indirect object but not the direct object, namely before VP merges as a specifier. Assuming nothing requires the derivation to check $[\cdot D\cdot]$ before $[\cdot V\cdot]$, however, the system always leaves open the possibility that raising can take place from either v's complement or specifier.

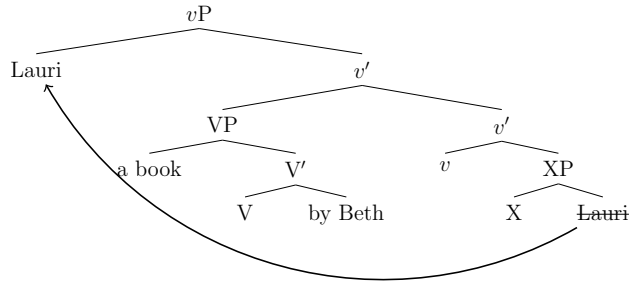
XP positions in which to posit a *by*-phrase, which I propose are both utilized.

The reason the *by*-phrase must be able to occupy either position is because it often co-occurs with other XPs, as in ditransitive clauses. The position of the *by*-phrase must therefore be able to shift according to the positional requirements of the other phrase – there are only so many $[\cdot X \cdot]$ features to go around. If the lower one is checked by the indirect object, the higher one is available to the *by*-phrase, and vice versa[14]. As we saw, the direct object can raise from any ditransitive structure, so the *by*-phrase is predicted to have an ambiguous position in direct object passives. By contrast, indirect objects can only raise if the indirect object is the complement of v, in which case the *by*-phrase must be the complement of V in indirect object passives.

(71) Theme-passive with a low IO/high *by*-phrase and vice versa.



(72) Recipient-passive requires a high IO, so the *by*-phrase must be low.



I propose (71) and (72) account for binding facts that have long eluded theories of the passive. In direct object passives of ditransitives, it is basically impossible to diagnose a c-command relationship between the *by*-phrase and the indirect object[15].

[14]The fact that only two XPs are proposed to be licensed raises the immediate question of whether clauses with two non-DP arguments in the active can be passivized (and thus turned into clauses with 3 non-DPs). It appears that at least some such examples can be passivized, contrary to what we would expect if only two non-DPs were ever licensed in a clause.

(ii) John was bet $[_{XP}\ t]$ 4 dollars $[_{XP}$by Mary] $[_{XP}$that she could eat fifty eggs].

Taking inspiration from Collins (2005), however, it is possible that *by*-phrases are not typical prepositional phrases, but rather contain a Voice/v head themselves. If that is right, they may have an additional $[\cdot X \cdot]$ feature, which would license the extra XP in (ii), though the status of examples with too many non-DPs will need to be more fully investigated in future research.

[15]Collins (2005); Bowers (2010) propose that the profile of NPI-licensing (among other similar

(73) T-passives: Embedded anaphors can be bound in any XP by any XP in any word order

a. ?The books were given to Jo and Marmie$_i$ by each other$_i$'s parents.

b. ?The books were given by each other$_i$'s parents to Jo and Marmie$_i$.

c. The books were given by Jo and Marmie$_i$ to each other$_i$'s parents.

d. ?The books were given to each other$_i$'s parents by Jo and Marmie$_i$.

The data in (73) pose a problem for any theory in which the *by*-phrase has a fixed position. If the *by*-phrase is high (as argued by Collins 2005), we should not expect an indirect object to be able to bind into it as in (73a,b). If the *by*-phrase is low (as argued by Bowers 2010), we should not expect it to bind an indirect object, as in (73c,d). The binding profile in (73) is also observed for Principles B and C. In (74a), no matter where the two phrases are projected, there will either be a principle B or a principle C violation. Further embedding either the R-expression as in (74b), or the pronoun as in (73) will always remedy the situation, because there is always an available structure in which the relevant condition is obviated.

(74) Principles B and C

a. *The money was sent to him$_1$ by John$_1$.

b. ?The money was sent to him$_1$ by John$_1$'s mother.

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tests) is an argument for an asymmetry between the *by*-phrase and *to*-phrase. They also use bound variable anaphora to motivate different conclusions about the position of the *by*-phrase: Collins (2005) argues that it is high, while Bowers (2010) argues that it is low. However, as discussed extensively in Barker (2012); Barker & Shan (2014) (with predecessors including but not limited to Postal 1971, Wasow 1972, Jacobson 1972, Higginbotham 1980, 1983, Gawron and Peters 1990, Bresnan 1994, 1998, Safir 2004, and others), NPI-licensing and bound variable anaphora pattern differently from binding more generally in a number of respects, which is why I have not made use of these tests extensively (though bound variable anaphora would actually support my conclusion that the *by*-phrase is flexible if it were sensitive to m-command). NPI-licensing has been shown to have a linear order requirement and bound variable anaphora is sometimes insensitive to c/m-command entirely.

(iii) NPI-licensing: sensitive to linear order

a. The books were given to no professor by any student.

b. *The books were given by any student to no professor.

c. *The books were given to any student by no professor.

d. The books were given by no professor to any student.

(iv) Bound variable anaphora: insensitive to c/m-command (Barker, 2012)

a. Everyone$_i$'s mother thinks he$_i$ is a genius.

b. Each$_i$ student's advisor paid his$_i$ gambling debts for him$_i$.

c. Everyone$_i$'s mother's lawyer's dog likes him$_i$.

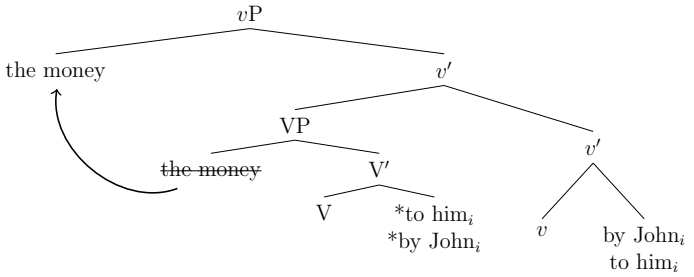
(v) Bound variable anaphora in passives of ditransitives (Bowers, 2010)

a. Money was given to every student by his mother.

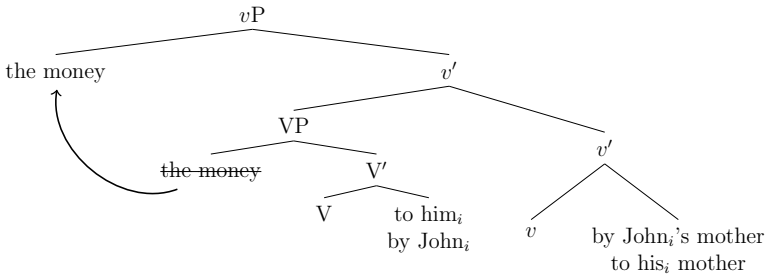
b. Money was given to his mother by every student.

c. The money was sent to his$_1$ mother by John$_i$.

(75) Principles B/C rule out (74a)



(76) Rescue via embedding the R-expression in (74b) or the pronoun in (74c)



As expected, the same principle B/C behavior cannot be replicated when the *indirect* object raises. Indirect object passivization is only permitted for high XP indirect objects, so the *by*-phrase must be low. Principle C therefore blocks (77a,b), regardless of how much we embed the R-expression. Only embedding the pronoun in (77d) avoids a Principle C violation.

(77) Replicating the Principle B/C effect in indirect object passives

a. *Lauri was shown them$_i$ by Jo and Marmie$_i$.

b. *Lauri was shown them$_i$ by Jo and Marmie$_i$'s illustrations.

c. Lauri was shown Jo and Marmie$_i$ by their$_i$ illustrations.

d. Lauri was shown their$_i$ illustrations by Jo and Marmie$_i$ (themselves).

In sum, a direct object passive of a ditransitive, like a passive of a monotransitive, is predicted to be structurally ambiguous: the *by*-phrase can be low or high. An indirect object passive of a ditransitive is *not* predicted to be structurally ambiguous: the *by*-phrase can only be low. We have seen two kinds of evidence for this distinction between direct and indirect object passives, from morphology and binding. We found that direct object passives in some languages are possible with either pronunciation of the indirect object, suggesting that the indirect object can be either low or high in a direct object passive. This was not the case in English, but English provided evidence from binding that the indirect object had a flexible position relative to the *by*-phrase, suggesting that the same structural ambiguity arises. By contrast, indirect object passives showed rigid forwards binding between the direct object and *by*-phrase, suggesting that no structural ambiguity arises for indirect object passives.

6 Conclusion

In this paper, I have entertained the hypothesis that Merge features are categorial rather than lexical properties – in other words, every element of category V was proposed to have the same features as every other element of category V. I showed that this proposal, combined with the addition of an underspecified c-selectional feature $[\cdot X \cdot]$, yielded a very restrictive theory of verb phrase syntax that was flexible enough to capture verb phrases with different numbers and categories of arguments.

I proposed that the co-occurrence of both specific and non-specific features on a head constrained the positions of elements checking each kind of feature by imposing conditions on the order of operations. For example, I proposed that V bears both $[\cdot D \cdot]$ and $[\cdot X \cdot]$ features, which requires non-DPs to merge in VP before any DPs do.

This feature checking logic was shown to interact with the functional hierarchy in a particular way; the same logic that forced DPs to be specifiers in the context of a non-DP argument also forced VP to become a specifier whenever v selected for a non-DP argument. This theory makes it possible for verb phrases to contain more than two arguments without a rich functional hierarchy, while still accommodating the space of derivational morphemes known to introduce arguments. For example, ApplP (in languages that have applicative morphology) doesn't need to be explicitly selected in a functional hierarchy, but rather may be merged with V or v in response to $[\cdot X \cdot]$, which disrupts DP and VP-complementation.

The predictions of this theory were explored primarily in the context of active and passive ditransitive clauses. We saw that the existence of two $[\cdot X \cdot]$ features in vP (one on V and one on v) offered two options for merging an indirect object. Each choice had different consequences for word order and c-command between the two internal arguments, which were proposed to explain the distribution of backwards binding in ditransitives and the availability of symmetric A-movement in many languages' passives of ditransitives. With evidence from binding in direct object passives, I argued that English also has symmetric A-movement in passives, contra standard treatments – either internal argument may raise to subject position in a passive, but conditions on the pronunciation of inherent case may independently require a preposition on the indirect object in some cases.

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