

The precedence component to intervention effects: Evidence from English passives*

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Abstract

This paper reports the following novel generalization: when just one DP can undergo passive A-movement in English, it is invariably the leftmost accessible DP within vP. Such precedence-based intervention effects are wholly unexpected under traditional analyses of intervention based solely on structural prominence or asymmetric c-command (e.g. Relativized Minimality, the Minimal Link Condition, or Attract Closest). Instead, I argue that precedence-based intervention is derivable from procedural aspects of the search algorithm initiated by internal Merge-triggering probes. Specifically, sisters within the search domain are linearly ordered for evaluation and probing delves deeply into internally complex left sisters prior to considering right sisters. Syntactic operations must therefore be able to refer to linear precedence. Alternative conceivable analyses of the attested intervention effects which rely on obligatorily right-branching VPs are shown to be empirically inadequate based on novel evidence from the anti-c-command condition on parasitic gap licensing.

Keywords. intervention; precedence; passive; search algorithm; probing; constituency tests; c-command; verb phrase structure

1 Introduction

One of the core insights of modern syntactic theory is that the formation of syntactic dependencies is subject to intervention-based locality, informally defined in (1).

(1) In the structure:

X ... [... Z ... Y ...]

*Thanks to Karlos Arregi, Ruth Kramer, Zach Lebowksi, Jason Merchant, Andy Murphy, Kutay Serova, and Erik Zyman for their valuable comments on parts of this work and for their judgments on various examples.

a dependency between the syntactic objects X and Y cannot be established across an intervening (or ‘closer’) element Z, where Z could have formed an equivalent dependency with X (modeled after Rizzi 2013: 172, (9)).

Such intervention effects have been argued to be instantiated by, among others, superiority effects in multiple *wh*-questions (on which see Kuno and Robinson 1972 and Chomsky 1973). For instance, \bar{A} -movement of an object bearing a [wh]-feature cannot cross over an intervening subject bearing a [wh]-feature:

- (2) *Wh-subjects intervene for \bar{A} -movement of wh-objects*
- a. Who_i did Joni claim ____i brought what?
 - b. * What_i did Joni claim who brought ____i?

One way to account for this asymmetry is to propose that the interrogative C in *wh*-questions requires its specifier to be filled by a constituent bearing [wh]. Adopting the ‘•’ notation for structure-building features from Heck and Müller (2007) *et seq.*, we can say that C bears a [•wh•] feature. The unacceptability of object *wh*-movement in (2b), then, is attributable to the fact that C_[•wh•] has entered into a dependency (in this case, an \bar{A} -movement dependency) with an object bearing [wh] over an intervening subject bearing [wh], in violation of (1).

This raises the question as to what configurations give rise to intervention; that is, in what sense is Z closer than Y to X in (1). Closeness is commonly defined in terms of asymmetric c-command, as in (3).¹

¹Some relevant definitions:

(i) **C(onstituent)-command**

X c-commands Y iff:

- a. neither X nor Y dominates the other, and
- b. the first branching node which dominates X dominates Y.

(adapted from Reinhart 1976: 32, (36))

(ii) **Asymmetric c-command**

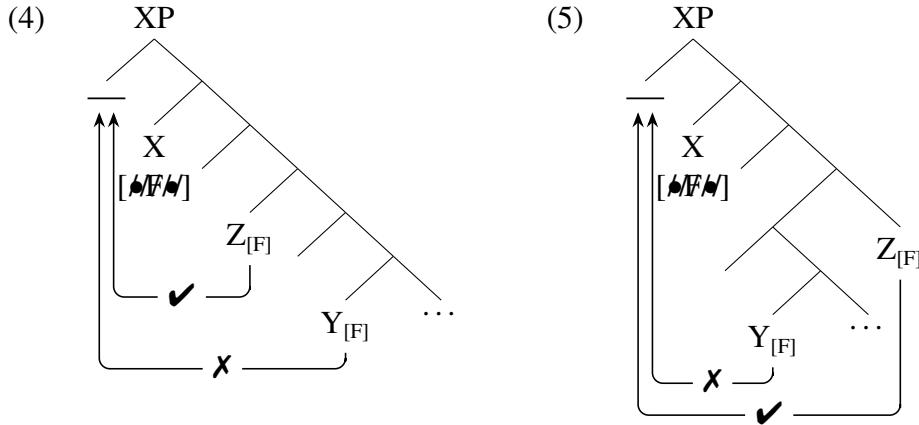
X asymmetrically c-commands Y iff X c-commands Y and Y does not c-command X.

(3) **‘Closeness’ as closest asymmetric c-command**

Given three syntactic objects X, Y, and Z, Z is closer to X than Y is iff:

- a. X asymmetrically c-commands Z, and
- b. Z asymmetrically c-commands Y.

According to this definition of closeness, intervention effects are expected to be uniformly structure-dependent and never sensitive to linear order/precedence. In (4) and (5), the head $X_{[\bullet F \bullet]}$ will only attract $Z_{[F]}$, all else being equal. Structure-building features are crossed out once satisfied (or ‘checked’) by (internal) Merge.²



The claim that closeness is structure-dependent and (in at least some cases³) defined in terms of closest asymmetric c-command, as in (3), can be found in many proposed locality constraints, including Relativized Minimality (Rizzi 1990), the Minimal Link Condition (Chomsky 1995b: ch. 4; Kitahara 1997), and Attract Closest (Pesetsky 2000: 15, (30)) (for other similar principles, see Chomsky 2000: 122, (40), Collins 2002: 51, (18), and Branagan and Erlewine 2022a: 2, (2)), as well as in the path-based accounts of Hornstein (2009: 35ff.) and Müller (2011: 20–21, esp. (25) and fn. 9) and references cited therein.

²For explicit proposals as to how a selectional feature specified on a head can be satisfied under merger of the selectee with a non-minimal projection of that head, see Adger (2003: 109–110), Merchant (2019: 326), and Zyman (To appear: 28–44).

³Other kinds of intervention-based locality have been argued for, including A-over-A locality, which is sensitive to asymmetric (aka irreflexive) *dominance* rather than asymmetric c-command; see Chomsky (1973), Hornstein (2009: sec. 2.5.1), Müller (2011; 2021: sec. 12.4.1.1), Halpert (2019), and Preminger (2019: sec. 7.3), among others.

There is, however, another measure of closeness by which intervention could be calculated: in (2b), the intervener Z not only asymmetrically c-commands Y, it also *linearly precedes* Y. Contrary to conventional wisdom (see e.g. Chomsky 2013: 39, Rizzi 2013: 173, and Chomsky et al. 2019: 233–235), I argue in this paper that linear precedence plays a crucial role in determining intervention effects under syntactic movement. Intervention is *not* calculated solely over asymmetric c-command.

In support of my claim, I report evidence for the novel generalization in (6).

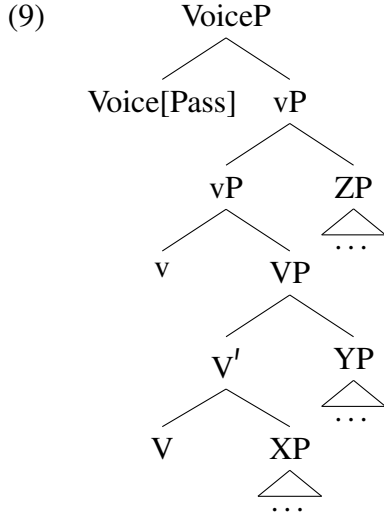
(6) Order dependence in English passivization

When just one DP can undergo passive A-movement in English, it is invariably the leftmost accessible DP within vP.

Example (7) illustrates with a vP containing two PP internal arguments and example (8) illustrates with a vP containing a PP internal argument and a clause-final PP adjunct.

- (7) a. Krishna was [_{vP} depended [_{PP} on ____] [_{PP} for money]].
- b. * Money was [_{vP} depended [_{PP} on Krishna] [_{PP} for ____]].
- (8) a. No group project was [_{vP} [_{vP} worked [_{PP} on ____]] [_{PP} in this classroom]].
- b. * No classroom was [_{vP} [_{vP} worked [_{PP} on this group project]] [_{PP} in ____]].

This finding is arguably unexpected by analyses of intervention based exclusively on structural prominence ((3)), given that there is well-known empirical support for the availability of left-branching (i.e. ascending) structures within the English VP/vP, as in (9) (see Janke and Neeleman 2012 and Bruening 2014 for discussion). If anything, structure-dependent approaches to intervention would lead us to expect that DPs further to the right in (9) should be privileged for extraction (cf. (5)). I show that this expectation is empirically falsified.



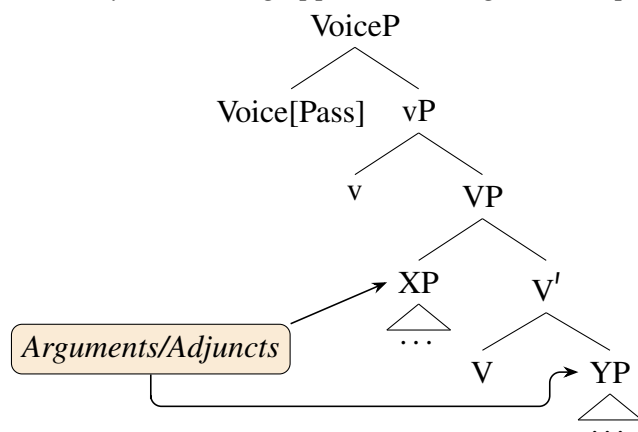
Additionally, I will show that (6) holds even when none of the potential goals c-commands the others, demonstrating that the closeness metric in (3) is too permissive (since it wrongly predicts that any of the potential goals should be able to move in such cases).

Instead, I propose that the generalization in (6) is accounted for if, as has been recently argued by Ke (2019), Preminger (2019), Branen and Erlewine (2022b), and Chow (2022), among others, intervention effects are derived from *procedural* aspects of the search algorithm that is initiated by particular features—called *probes*—on heads. Specifically, I argue that movement-triggering probes initiate a search procedure which proceeds iteratively from left to right in the probe’s search domain and which delves deeper into internally complex left daughters prior to considering right daughters. Search then halts when an accessible, matching goal is found. Because sister nodes are ordered for evaluation, the observed precedence-based intervention effects are accounted for. I therefore conclude that syntactic operations must be able to access information about linear precedence.

Moreover, I argue that conceivable alternative accounts of (6) which eschew the structure in (9) in favor of an obligatory right-branching (i.e. descending) arrangement of arguments and adjuncts within vP, as in (10) (see Pesetsky 1995; Phillips 1996, 2003; Lechner 2003; Larson 2014, 2022), and which rely on purely height-based intervention ((3)) are not

viable for independent reasons: novel evidence from the anti-c-command condition on parasitic gap licensing (e.g. Taraldsen 1981; Chomsky 1982; and Engdahl 1983) shows that, consonant with prior arguments from constituency tests, English VPs/vPs must ascend, as in (9), in at least some cases.

(10) *A strictly descending approach to English verb phrase structure (to be rejected)*



The rest of the paper is organized as follows. Section §2 develops a procedural analysis of intervention effects in movement dependencies which predicts precedence-based asymmetries in probing. Section §3 argues that this prediction is borne out in the domain of passive A-movement: only the leftmost accessible DP within vP can be passivized, regardless of the relative structural prominence of other DPs. This section also presents evidence from *do so*-replacement for the availability of both ascending and descending arrangements of arguments within VP. Section §4 considers and rejects an alternative account of attested passivization asymmetries which combines the traditional assumption that intervention is calculated solely over structural prominence with the proposal that English verb phrases always descend. I cite novel evidence from the anti-c-command condition on parasitic gap licensing which militates against strictly descending verb phrases, favoring instead the precedence-based account of intervention effects. Section §5 concludes by considering the role that precedence might play elsewhere in syntax, for instance in determining intervention in \bar{A} -movement.

2 A search algorithm for internal Merge

In this section, I develop a procedural analysis of intervention effects in movement dependencies, building on ideas in Branan and Erlewine (2022b).

To begin, I adopt a probe-goal framework for analyzing how Merge features find their selectees.⁴ Merge features (e.g. [$\bullet F \bullet$]) are *probes*: they are lexically borne by heads and they initiate a search for a matching *goal*. I adopt the following definition of *matching*, modeled closely after a similar definition given in Zyman (To appear: 31, (42)):⁵

(11) **Definition of *match***

For any selectional feature [$\bullet F \bullet$] and node N, N matches [$\bullet F \bullet$] iff [$\bullet F \bullet$] is keyed to

- a. the categorial feature of N, or
- b. the lexical identity of N.

External Merge and internal Merge are distinguished by the search space of the probe: in the case of external Merge, the probe’s search space is the lexicon (or ‘workspace’ or ‘numeration’), whereas in the case of internal Merge, I propose that the probe iteratively searches nodes in the c-command domain of the head that bears it (see the definition of the search algorithm in (14) below).⁶

In order to derive intervention effects under movement, two things must be true of Merge-based probing. First, probing must halt once a matching goal is found.⁷ Otherwise,

⁴See Keine (2019, 2020) for a related proposal.

⁵In (11), what matches the Merge feature [$\bullet F \bullet$] is the root R of a syntactic object X, whereas according to Zyman (To appear)’s definition of *match*, what matches [$\bullet F \bullet$] is the syntactic object X itself.

⁶This precludes upward Merge-based probing (under the assumption that structure-building features that trigger internal Merge do not project from the heads that bear them), potentially ruling out movement of a constituent from the specifier of a phrase to another specifier of the same phrase. On the absence of phrase-bounded Spec-to-Spec movement, see Abels (2003: 104, 105, fn. 50, 114), Ko (2007, 2011, 2014), Grohmann (2011), Davis (2020: §4.1), and Bondarenko and Davis (2021), and works cited in those references. Also, see Branan and Erlewine (2022b: §4.2) for discussion of a range of possible alternative starting nodes for the search algorithm (i.e. starting nodes which are not the sister of the head bearing the probe).

⁷A number of authors have attributed this property to what Chomsky has called “minimal search” (e.g. Chomsky 2004: 109, 113; 2005: 14; 2013: 39, 43; 2015: 6; 2021: 18; and Berwick et al. 2013: 41–42; see also Epstein et al. 2014). However, “minimal search” does not seem to have been formally defined until

if no goal is found, the derivation crashes.⁸ Second, probing must proceed *sequentially*, node-by-node through the tree, and must not, say, evaluate multiple nodes in parallel (contra Ke 2022: 11–12 and Milway 2023: esp. 16–18; see Richards 2019: 142 for related discussion). Additionally, and quite importantly, I follow Branan and Erlewine (2022b: 4) and Chow (2022: 3) in proposing that sisters are linearly ordered for evaluation—that is, linear precedence must be established during the syntactic derivation, prior to internal Merge-based probing, and cannot be entirely postponed to the postsyntactic component (contra e.g. Chomsky 1995b: sec. 4.8, 2008: 139, 2013: 36, 2020: 16, 27, 30–32; Collins 2017; and Collins and Kayne 2023: 3, among many others).⁹

Two types of algorithms for searching trees, which differ in the order in which they evaluate nodes, have been discussed as potential candidates for probing in recent work by Atlamaz (2019), Ke (2019, 2022), Branan and Erlewine (2022b), Krivochen (2023), and Milway (2023): *breadth-first* search and *depth-first* search. A breadth-first search algorithm evaluates all nodes of a given depth in a tree (e.g. all daughters of node N_1) before moving on to any of those nodes’ daughters (e.g. all granddaughters of N_1). The algorithm then evaluates all nodes at the new depth, and so on. By contrast, a depth-first search algorithm evaluates (successive) daughter nodes in a straight path down the tree, without considering sisters. Assuming that sisters are linearly ordered for evaluation, let us propose

very recently. See, for instance, Atlamaz (2019), Ke (2019, 2022, 2023), Aycock (2020), Epstein et al. (2020: 3–6), Branan and Erlewine (2022b: 2), Chow (2022), Krivochen (2023), and Milway (2023: 11–18) for some exemplars, and see Larson 2015 for an alternative definition and conceptualization. Because there is no current consensus on the definition of minimal search, I avoid using it here.

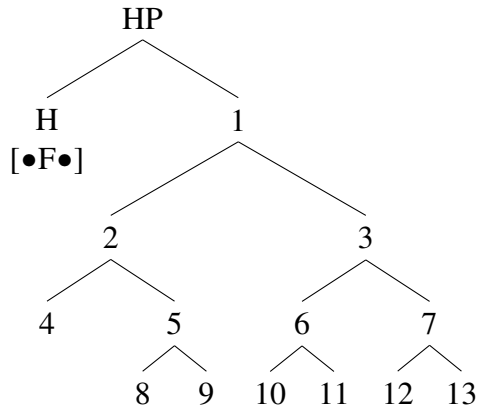
⁸This presumably only applies to Merge-based, and not Agree-based, probing. Selectional features must be checked/satisfied on pain of a crash (see Merchant 2014: 1 and Zyman To appear), whereas Agree has been argued to be fallible (Preminger 2014).

⁹For other work suggesting that precedence is part of the syntax, see Kayne (1994: esp. 48–49; 2011; 2022), Saito and Fukui (1998), Fukui (2001), Zwart (2011), Bruening (2014, 2018), Al Khalaf (2015), and Bruening and Al Khalaf (2020).

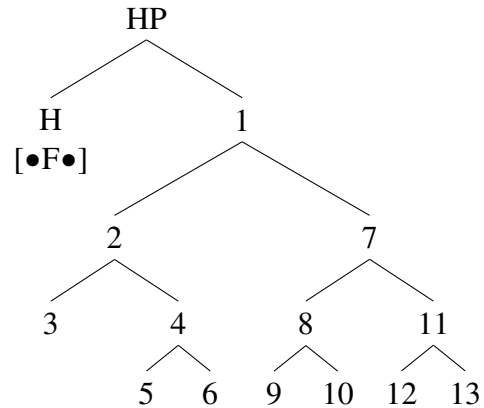
On procedural accounts of intervention effects which hold that probing proceeds node-by-node through the tree, the search algorithm must be sensitive to some asymmetric relation between sister/daughter nodes in order to determine the order of evaluation. Linear precedence is the obvious candidate for such an asymmetric relation and it is the one that I take advantage of here. See Atlamaz (2019: 89–91) for a different approach.

that depth-first search evaluates the left daughter L_1 of some node N_1 , followed by the left daughter L_2 of L_1 , and so forth until a terminal node is reached. At that point, the depth-first search algorithm returns to the minimally dominating node which has an as yet unevaluated daughter and begins the procedure once more from there by evaluating that daughter. The following trees with probe $[\bullet F \bullet]$ on head H illustrate the differences between these two algorithms; the nodes in the trees are numbered according to the order in which they are evaluated (see the works cited above for more in-depth discussion of these two types of search).¹⁰

(12) Breadth-first, left-to-right search



(13) Depth-first, left-to-right search



As these trees show, only a depth-first algorithm exhaustively¹¹ searches an internally complex left sister (e.g. ‘2’ in (13)) prior to probing into an internally complex right sister (e.g. ‘7’ in (13)). In section §3, I will provide evidence from precedence-based intervention effects in English passivization that this ordering is necessary, and hence that breadth-first search should be rejected (*pace* Ke 2019, 2022).¹²

¹⁰Note that the root node is not evaluated for match as it does not fall within the search space of the probe, which is the c-command domain of H; see also footnote 6.

¹¹Save for portions of the structure opaque to probing (e.g. spellout domains that have already been spelled out and are thus syntactically inaccessible), see Branen and Erlewine (2022b: sec. 4.1) for discussion.

¹²If Ke (2019: 48–49; 2022: 10–11) is correct that strict depth-first search as in (13) ought to be abandoned on the grounds that it allows evaluation of a c-commandee to occur prior to evaluation of a c-commander (e.g. ‘6’ and ‘7’ respectively in (13)), then it may be necessary to adopt a search algorithm along the lines of Chow (2022: 4, (4)). According to Chow’s algorithm, the left and right daughters of a node N are evaluated before

I propose a depth-first, left-to-right search algorithm for Merge-based probing in (14), taking inspiration from the algorithms in Atlamaz (2019: 88, (29)), Preminger (2019: 24, (44)), Chow (2022: 4, (4)), and Deal (To appear: 24). I assume that all derivable syntactic objects are binary branching (Kayne 1984; Collins and Stabler 2016: 57).

- (14) **A depth-first, left-to-right search algorithm for Merge-based probing:**
- a. Let [$\bullet F \bullet$] be a syntactic probe on a head H and let node N be H's sister.
 - b. Mark N as visited and QUERY: does N match [$\bullet F \bullet$]?
 - i. If so, halt with the syntactic object of which N is the root as the goal.
 - ii. Else, QUERY: is N a non-terminal node?
 - If so, mark N's left daughter L as visited and QUERY: does L match [$\bullet F \bullet$]?
 - If so, halt with the syntactic object of which L is the root as the goal.
 - Else, return to step (14b-ii), using L as the new "N."
 - Else, minimally backtrack in the reverse of the order in which nodes were visited until a visited non-terminal node is reached with an unvisited daughter node R and return to step (14b) using R as the new "N."
 - c. QUERY: was a goal found?
 - i. If so, Merge(H^{\max} , "goal").¹³
 - ii. Else, abort the derivation.

To see how intervention effects follow from this probing algorithm, consider (15). Suppose there are two nodes bearing the categorial feature [F] in the c-command domain of a head H bearing a probe [$\bullet F \bullet$] (i.e. in the search domain of the probe)— $X_{[F]}$ and $Y_{[F]}$. In (15), $X_{[F]}$ is embedded in a complex left daughter of the starting node, whereas $Y_{[F]}$ is embedded in a complex right daughter of the starting node. According to the algorithm

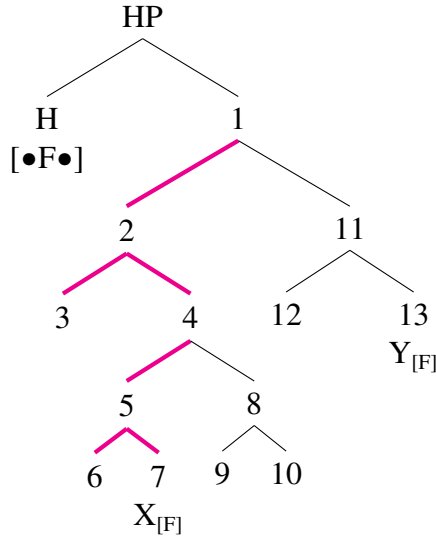
nodes irreflexively dominated by the left daughter are searched; see Chow (2022) for details. As far as I can tell, all of the data in sections §3.3–3.4 would still be accounted for under such an alternative. Note, however, that strict breadth-first algorithms like (12) fail to account for attested precedence-based intervention effects.

Milway (2023: 11–18), on the other hand, rejects both types of sequential search algorithms (i.e. breadth-first and depth-first) for Agree on purely conceptual grounds. He contends that two or more potential goals at equivalent depths from the probe ought to simultaneously match (and satisfy) the probe and he posits a version of breadth-first search which evaluates tiers of nodes, rather than individual nodes. Milway, however, provides no empirical reasons why such an algorithm is to be favored, so I set his proposals aside here.

¹³See Zyman (To appear) on the definition of Merge.

in (14), left daughters will be searched, node by node, until a terminal node is reached, at which point minimal backtracking will allow the algorithm to successively search through right daughters. Consequently, the probe’s search will encounter $X_{[F]}$ prior to $Y_{[F]}$ (as indicated by the numbered labels of nodes).¹⁴ Because probing halts once a goal is reached, and because probing operates from left to right in the tree, this algorithm predicts a precedence component to intervention.¹⁵ Branches of the tree which are traversed during search are colored pink and bolded for salience.

- (15) *Depth-first, left-to-right search predicts a precedence component to intervention with two potential goals*



Branan and Erlewine (2022b: 5–8, esp. 7) note that this prediction of depth-first, left-to-right search may be empirically supported by the existence of *smuggling* derivations (Collins 2005a,b), where extraction out of a fronted phrase in a left specifier preempts extraction of a phrase out of the specifier’s sister. In the next section, I adduce additional, novel evidence (which does not rely on the existence of smuggling derivations) showing

¹⁴In (15), I label nodes in the order in which they would be evaluated by the search algorithm were it not to halt. Strictly speaking, however, once $X_{[F]}$ (i.e. node ‘7’) is reached, none of the subsequently numbered nodes will be searched.

¹⁵As Branan and Erlewine (2022b: 6, fn. 9) observe, breadth-first search as in (12) also predicts a precedence effect among potential goals at the same depth level, though crucially not among goals at different depths.

that precedence-based intervention effects are indeed attested in other types of movement, lending support to this general type of approach.

3 Passive asymmetries within vP: evidence for a precedence component to intervention

This section lays out evidence in support of the novel generalization in (16):¹⁶

(16) **Order dependence in English passivization** (repeated from (6))

When just one DP can undergo passive A-movement in English, it is invariably the leftmost accessible DP within vP.

I argue that attested precedence-based intervention effects in passive A-movement are accounted for with the depth-first, left-to-right search algorithm for Merge-based probing I proposed in section §2. I set aside conceivable alternative accounts of (16) based solely on structural prominence—which, to recall the discussion from section §1 (see especially (10)), would require an obligatorily descending arrangement of arguments and adjuncts within vP—until section §4.

Before considering the data in detail, however, I summarize my analysis of the structural geometry of the low, verbal domain in section §3.1. Then, in section §3.2 I sketch my analysis of passive A-movement: a [**•D•**] probe on Voice[Pass] initiates depth-first, left-to-right search and attracts the leftmost accessible DP within vP to its specifier. Sections §3.3–§3.4 document precedence-based intervention effects in English passivization. Section §3.3 discusses intervention among multiple internal arguments of V arranged in a descending structure. Section §3.4 discusses intervention in ascending verb phrases, both with multiple internal arguments and with combinations of arguments and adjuncts. Ascending verb phrases are particularly important: it is with these structures that the predictions of precedence-based and height-based accounts of intervention can be teased apart. I

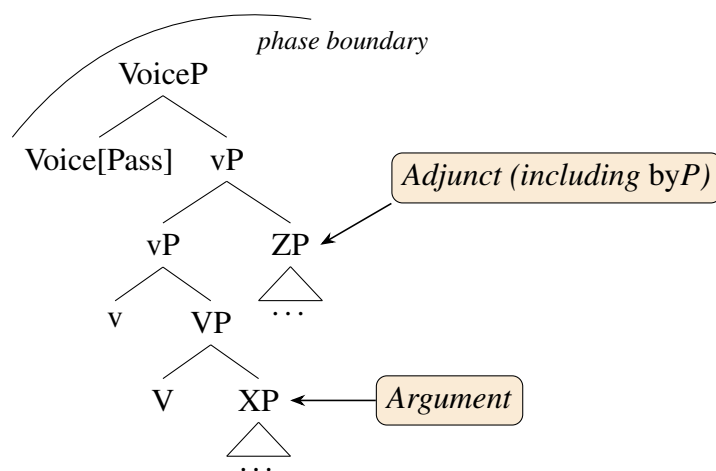
¹⁶For earlier work which ascribed a non-trivial role to (immediate) linear precedence in passivization, see McCawley (1998: 88–90) and Emonds (2017: 54, n. 34).

show that only the predictions of the precedence-based account are borne out.

3.1 The structural geometry of the low, verbal domain

I follow many previous authors in differentiating at least three heads in the low verbal domain: the lexical verb ‘V,’ an argument-introducing head ‘v’ which, among other things, introduces the external argument and determines the attachment site for *by*-phrases (which I analyze as adjoined to the right of vP),¹⁷ and a voice head ‘Voice’ which is the locus of diathetic alternations (see also Collins 2005b, Forthcoming: ch. 8; Merchant 2013; Zyman 2017: esp. §6.1; Roberts 2019: 395; Angelopoulos et al. 2020; Newman 2020: esp. 6–7; Zyman and Kalivoda 2020: §3.1, esp. 8; and Hewett 2023). For the sake of explicitness, I take the clause-internal phase head to be Voice, at least in the passive (see Collins 2005b: 98). Furthermore, I assume that all internal arguments are base-generated as dependents of V and that low adjuncts (at least typically) adjoin to vP on the right, as shown in (17).¹⁸

(17) *Structure of passive VoiceP*



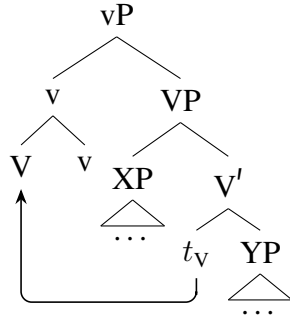
¹⁷My ‘v’ thus corresponds to Kratzer’s (1996) ‘Voice.’

¹⁸The reader should keep in mind that not all aspects of the proposed structure in (17) are crucial. All that is necessary on my procedural account of precedence-based intervention in passive A-movement is that the relevant arguments and adjuncts are introduced within the search domain of the movement-triggering probe on Voice[Pass], namely vP. For instance, the geometries could easily be modified such that some or all (internal) arguments are introduced by low functional heads, as in Borer (2005a,b), Pyllkkänen (2008), Bowers (2010), Lohndal (2012: esp. 121ff.), and De Belder and Van Craenenbroeck (2015: 647–648). Some adjuncts might also attach as low as VP (e.g. Bowers 2002: 187–189).

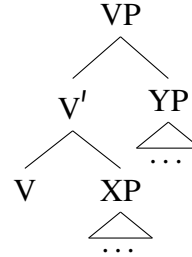
I abstract away from the presence and position of the passive auxiliary, which I take to be higher than VoiceP.

Regarding the arrangement of multiple internal arguments, Janke and Neeleman (2012) have shown with constituency tests that both descending ((18)) and ascending ((19)) structures are possible in English VPs, though the availability of each structure depends on the categorial identities of the internal arguments in question.

(18) *English descending VP*



(19) *English ascending VP*



Particularly compelling evidence for the existence of both structures comes from *do so*-replacement—a phenomenon originally investigated by Lakoff and Ross (1966). Comparing double object constructions, prepositional dative constructions, and constructions with two argument PPs (abbreviated here as ‘V-DP-DP,’ ‘V-DP-PP,’ and ‘V-PP-PP,’ respectively), Janke and Neeleman show that only in the latter two cases can the verb and its linearly adjacent argument be replaced by *do so* ((20)) (see D’Elia 2016: 167–170 for additional examples and discussion).¹⁹

(20) *do so-replacement in VPs with two internal arguments*

a. V-DP-DP

*If he gave_V [DP Mary] [DP anything], he did so [DP a woolen scarf]. (Janke and Neeleman 2012: 157, (13a))

b. V-DP-PP

If he read_V [DP a sonnet] [PP to anyone famous], he did so [PP to Salman

¹⁹There is well-known inter-speaker variation in this domain. For instance, see Zyman (2022: 133–134) for evidence that arguments (including PP arguments) cannot be stranded under *do so*-replacement in many idiolects, in contrast to the behavior of adjuncts.

Rushdie].

(Janke and Neeleman 2012: 157, (14a))

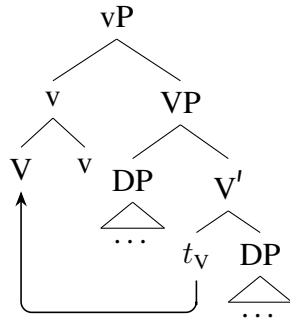
c. V-PP-PP

If he talked_V [_{PP} about literature] [_{PP} with anyone famous], he did so [_{PP} with Salman Rushdie].

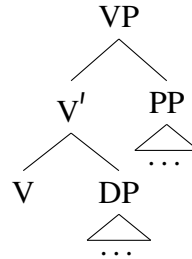
(Janke and Neeleman 2012: 158, (16a))

Under the assumption that *do so* can only replace a constituent, Janke and Neeleman argue that this asymmetry follows if V-DP-DP frames require a descending structure, while V-DP-PP and V-PP-PP frames are compatible with an ascending structure.²⁰

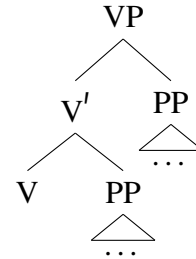
(21) V-DP-DP



(22) V-DP-PP



(23) V-PP-PP



Only in V-DP-PP and V-PP-PP frames do the verb and its linearly adjacent argument form a constituent to the exclusion of the rightmost argument.²¹ Importantly, Janke and Neeleman (2012: 186–187) show that the *do so*–replacement facts cannot be explained by positing extraposition (or another form of \bar{A} -movement) of the PP arguments in (20b–c). This is because \bar{A} -extraction cannot proceed out of *do so* (see also Haddican 2007, Houser 2010: 21–22, Bruening 2019, and references cited in those works):

²⁰ Janke and Neeleman (2012) actually propose that V-PP-PP frames *require* an ascending structure, while V-DP-PP frames admit either an ascending or a descending structure. All that matters for my analysis is that both V-DP-PP and V-PP-PP frames permit an ascending structure where the leftmost argument is not the most structurally prominent one within VP/vP.

²¹ Additionally, see Arregi and Murphy (2022: 13, fn. 7) for the suggestion that some speakers' acceptance of examples like (i), where a direct object gap licenses a parasitic gap in the PP argument in a V-DP-PP frame, could be accounted for with an ascending structure like (22), since a descending structure would violate the anti-c-command condition on parasitic gap licensing (see section §4.2 for references and further discussion of this condition and its usefulness as a diagnostic for constituent structure).

(i) % Which book₁ did you give ____₁ [_{PP} to a fan of pg₁] yesterday? (adapted from Arregi and Murphy 2022: 13, (38b))

- (24) I know who Joni SHOULD read a sonnet to, but I don't know who she SHOULDN'T (*do so).

Thus, the verb and its linearly adjacent argument in V-DP-PP and V-PP-PP frames must form a constituent prior to \bar{A} -movement.²²

Janke and Neeleman's arguments can be extended straightforwardly to VPs with CP internal arguments as well: V-DP-CP frames disallow stranding of any arguments under *do so*-replacement ((25)), while V-PP-CP frames allow stranding of PP, but not of CP ((26)).²³

(25) *do so-replacement in V-DP-CP frames*

²² Janke and Neeleman (2012) (following earlier observations by Pesetsky 1995, Phillips 1996, 2003, and Lechner 2003) also claim that ellipsis provides evidence for ascending VP structures. For instance, they claim that the verb and its linearly adjacent argument can be elided, stranding a rightmost argument, in V-DP-PP and V-PP-PP frames but not in V-DP-DP frames.

- (i) V-DP-DP
*If he gave_V [_{DP} Mary] [_{DP} anything], he did [_{DP} a woolen scarf]. (Janke and Neeleman 2012: 157, (13b))
- (ii) V-DP-PP
If he read_V [_{DP} a sonnet] [_{PP} to anyone famous], he did [_{PP} to Salman Rushdie]. (Janke and Neeleman 2012: 157, (14b))
- (iii) V-PP-PP
If he talked_V [_{PP} about literature] [_{PP} with anyone famous], he did [_{PP} with Salman Rushdie]. (Janke and Neeleman 2012: 158, (16b))

They propose that (ii)–(iii) are accounted for if ellipsis targets V' . Unfortunately, their analysis is confounded by the fact that the preceding data demonstrably involve *pseudogapping* (see also Lechner 2003: 187ff.), which is commonly argued to require \bar{A} -extraction of the remnant out of VP prior to ellipsis of VP or a larger constituent (see Gengel 2013 for discussion and references, and see Kuno 1981 for an important antecedent); for instance, Merchant (2013: 95) suggests that the remnant lands in a position at least as high as [Spec, VoiceP]. Evidence that Janke and Neeleman's examples involve pseudogapping comes from the contrasts in (iv)–(v) (judgments mine): pseudogapping is not licensed immediately under the infinitival marker *to* in English, though VP-ellipsis, which lacks an argumental remnant, is (Aelbrecht and Harwood 2018).

- (iv) Matt tried to read a sonnet to Joni before I tried to (*to Celina).
- (v) Matt tried to talk about literature with Joni before I tried to (*with Celina).

Furthermore, the judgment in (i) that the second object in a double object construction cannot survive ellipsis in pseudogapping is not shared by all speakers; see e.g. Bowers (1998: 5–6) and Gengel (2013: 32, (33)), who cites Takahashi (2004). I therefore conclude that ellipsis does not provide clear evidence for a base-generated ascending structure for English VPs. The ellipsis facts are just as easily accounted for if ellipsis targets a larger constituent like vP after the remnant has escaped that constituent via \bar{A} -movement.

²³ For related observations about the unstrandability of CPs under *do so*-replacement, see Johnson (2004: 44, (126)) and Mita (2009: 132, (29)) on monotransitive and tritransitive verbs, respectively.

- a. * Matt promised_V [_{DP} Joni] [_{CP} that we would bring plates], but Krishna did so [_{DP} Celina] [_{CP} that we would bring cups].
 - b. * Matt promised_V [_{DP} Joni] [_{CP} that we would bring plates], but Krishna did so [_{CP} that we would bring cups].
 - c. * Matt promised_V [_{DP} Joni] [_{CP} that we would bring plates], but Krishna did so [_{DP} Celina].
 - d. Matt promised_V [_{DP} Joni] [_{CP} that we would bring plates], and Krishna did so too.
- (26) *do so-replacement in V-PP-CP frames*²⁴
- a. * Matt said_V [_{PP} to Joni] [_{CP} that we would arrive early], but Krishna did so [_{PP} to Celina] [_{CP} that we would arrive late].
 - b. Matt said_V [_{PP} to Joni] [_{CP} that we would arrive early], but Krishna did so [_{PP} to Celina].
 - c. * Matt said_V [_{PP} to Joni] [_{CP} that we would arrive early], but Krishna did so [_{CP} that we would arrive late].
 - d. Matt said_V [_{PP} to Joni] [_{CP} that we would arrive early], and Krishna did so too.

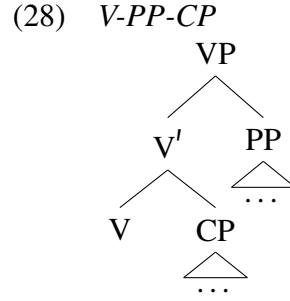
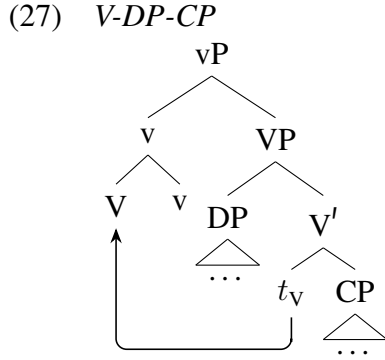
I propose that V-DP-CP frames require a descending structure, whereas V-PP-CP frames allow an ascending structure with CP being base-generated as the complement of V.²⁵

²⁴The same pattern holds for ditransitive verbs selecting a PP not headed by *to*, e.g. *conclude from X that Y* (judgments mine):

- (i) a. * The judge concluded_V [_{PP} from the physical evidence] [_{CP} that the defendant was guilty], but the jury did so [_{PP} from the oral arguments] [_{CP} that she was innocent].
- b. The judge concluded_V [_{PP} from the physical evidence] [_{CP} that the defendant was guilty], but the jury did so [_{PP} from the oral arguments].
- c. * The judge concluded_V [_{PP} from the physical evidence] [_{CP} that the defendant was guilty], but the jury did so [_{CP} that she was innocent].
- d. The judge concluded_V [_{PP} from the physical evidence] [_{CP} that the defendant was guilty], and the jury did so too.

This finding militates against a conceivable alternative analysis of the acceptability of (26b) according to which *do so* selects a “patient-like *to*-phrase,” as proposed by McInnerney (2022: 136–140). Even if *do so* can select such a *to*-phrase in many idiolects, as McInnerney argues, the alternative analysis fails to account for the parallel pattern of judgments in (i) where there is no *to*-phrase. See additionally example (iva) in footnote 44 for evidence that *do so* can replace (certain) verbs and their control CP complements, stranding an *of*-phrase. Thanks to Erik Zyman (*pers. comm.*) directing my attention to this issue.

²⁵The unmarked surface order V-PP-CP arises due to rightward movement of CP (see Bruening 2018 and section §3.4.2 for additional discussion).



In summary, evidence from *do so*-replacement shows that both ascending and descending structures must be available in English VPs.²⁶ Before we can move on to consider intervention effects in sections §3.3–3.4, I must briefly lay out my analysis of passive A-movement in English.

3.2 A sketch of passive A-movement

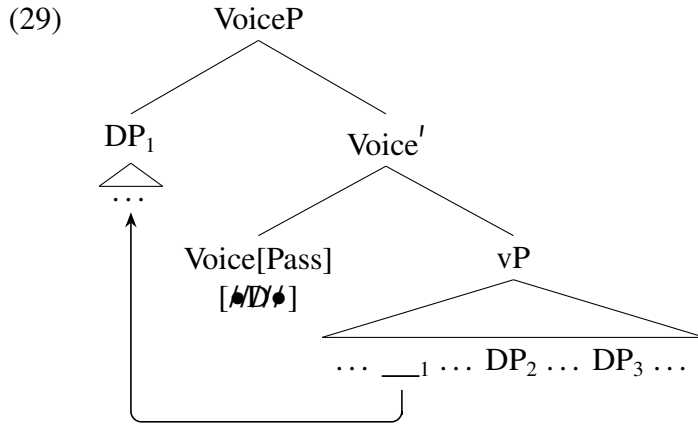
I analyze passive A-movement as follows: (non-expletive) passive subjects obligatorily move from their vP-internal base positions to the specifier of Voice[Pass] (see also Bruening 2011). Following a line of literature which argues that only NPs/DPs can be promoted to subject position, at least in English (see especially Davies and Dubinsky 1998, 2001, 2009; Han 2005a,b; Hartman 2012; and Bruening and Al Khalaf 2020: 22–24; and see Lees 1960 and Rosenbaum 1967 for important precedents),²⁷ I propose that Voice[Pass] bears the structure-building feature [**•D•**].²⁸ This [**•D•**] probe will initiate a depth-first, left-to-right search into the c-command domain of Voice[Pass] according to the algorithm in (14). Importantly, due to the ordered nature of the search procedure, the DP which moves to [Spec, Voice_[Pass]P], checking [**•D•**], is predicted to always be the leftmost accessible DP

²⁶See Janke and Neeleman (2012) for an account of the distribution of these structures based on Case licensing and economy.

²⁷I set aside locative inversion constructions, where it has been argued that the inverted PP displays properties associated with canonical subjecthood; see Diercks (2017) for overview.

²⁸Though see Hewett (2023) for other possible feature specifications for Voice[Pass].

within vP.²⁹



The relative structural prominence of DPs within the search domain of the A-probe is predicted to have no bearing on intervention effects (contra Ura 1996: ch. 5, McGinnis 1998, 2001, Anagnostopoulou 2003, Hartman 2012, and Holmberg et al. 2019, among others). The following sections are devoted to demonstrating that this prediction is empirically borne out in English.

3.3 Precedence-based intervention with multiple internal arguments in descending VPs

I begin with passivization asymmetries among multiple internal arguments in a descending VP. Recall from section §3.1 that *do so*-replacement diagnoses a descending VP structure

²⁹ A DP contained in a domain that is opaque to the [\bullet D \bullet] probe on Voice[Pass] (e.g. a DP in the spell-out domain of a lower phase head) will never be considered by the probe and hence will not count as an intervener (see also footnote 11).

Furthermore, as Erik Zyman (*pers. comm.*) points out to me, because the search algorithm proposed in (14) is sequential and evaluates mother nodes before their daughters, my analysis correctly excludes passives as in (ic) (which are unacceptable even in idiolects like Zyman's which allow possessor extraction under all available forms of \bar{A} -movement, on which see Davis 2021).

- (i) a. Someone keyed [_{DP1} [_{DP2} Katie]'s car].
- b. [_{DP1} [_{DP2} Katie]'s car] was keyed _____{DP1}.
- c. * [_{DP2} Katie] was keyed [_{DP1} _____{DP2}'s car].

The search initiated by [\bullet D \bullet] on Voice[Pass] will encounter the node DP₁ (which dominates *Katie's car*) prior to encountering the node DP₂ (which dominates *Katie*) because the former dominates the latter, thereby accounting for the (A-over-A) intervention effect.

in V-DP-DP frames ((21)) and in V-DP-CP frames ((27)). I will show that in all cases, only the leftmost accessible DP within vP is capable of passivizing.

3.3.1 V-DP-DP

First, consider double object constructions in Standard English, exemplified in the following with the verb *deny*.³⁰ In the active voice, the goal DP obligatorily precedes the theme DP ((30a)–(30b)), and in the passive, only the goal DP can appear as the passive subject (compare (30c) with (30d)).

(30) V-DP-DP

- a. The bank denied [_{DP} Mike] [_{DP} a loan].
- b. * The bank denied [_{DP} a loan] [_{DP} Mike].
- c. [_{DP} Mike] was denied ___ [_{DP} a loan] by the bank.
- d. * [_{DP} A loan] was denied [_{DP} Mike] ___ by the bank.³¹

Thus, when the order of arguments is absolutely fixed in the active, we find a corresponding passive asymmetry: only the goal DP, which appears leftmost on the surface, can be passivized.³²

We can account for this asymmetry as follows. The [**•D•**] probe on Voice[Pass] will initiate a depth-first, left-to-right search for a goal within vP, as shown in (31) (I abstract away from probing into complex heads for the sake of simplicity). This search will always reach a DP dominated by a left daughter node prior to reaching a DP dominated by a right daughter node. Since the goal (indirect object) DP occupies a left specifier of V, it

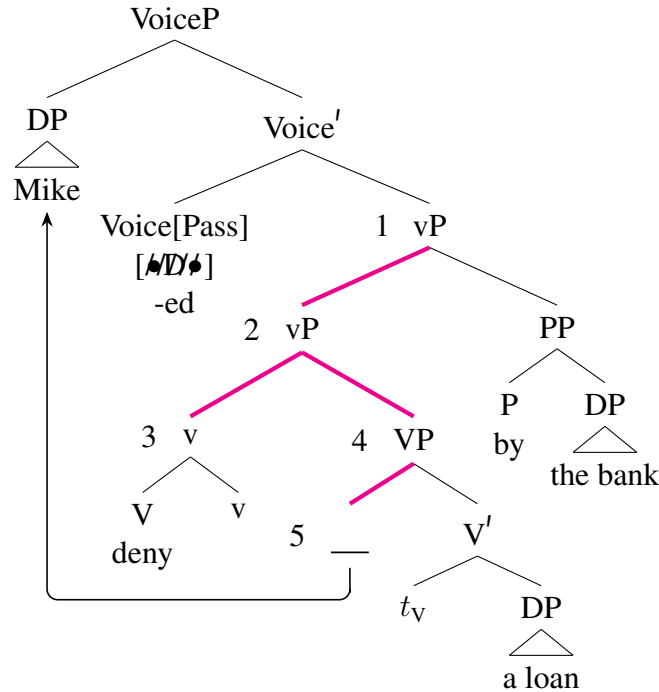
³⁰For me, *deny* only appears in the double object construction frame (see also Jackendoff 1990 and Levin 1993: 47, (119a)). The same facts hold for verbs like *give* which alternate between a double object frame (i.e. V-DP-DP) and a prepositional dative frame (i.e. V-DP-PP), though I omit the data for the sake of brevity.

³¹See footnote 37 for arguments that the unacceptability of (30d) and similar examples cannot be entirely attributed to violations of the Case Filter.

³²To account for languages allowing passivization of the theme DP in double object constructions (so-called ‘symmetric passive languages’), I assume with Ura (1996: ch. 4) and McGinnis (1998, 2001) *et seq.* that the theme DP optionally undergoes a short step of leftward A-movement over the goal DP, landing in an outer specifier of VP/vP, but crucially still within the search domain of Voice[Pass]. After this movement has taken place, the theme DP will linearly intervene for passive A-movement of the goal DP.

will therefore be attracted to [Spec, Voice_[Pass]P], and because the probe never reaches the theme DP, we account for the attested intervention effect. In the following trees, I only number nodes up to the root of the goal which satisfies the probe.

- (31) *Depth-first, left-to-right search predicts precedence-based intervention effects in V-DP-DP passivization*



Note, too, that the left-to-right nature of search means that the DP within the *by*-phrase will never become the passive subject, despite being the most structurally prominent DP within vP,³³ because the *by*-phrase is adjoined on the right—a welcome result (**The bank was denied Mike a loan by*). See section §3.4.3 for more discussion of passivization and

³³ At least according to closeness metrics which calculate the length of a path from the cardinality of nodes (or branches) on that path (see Müller 1998: 130 for a proposal along these lines). The cardinality of nodes/branches on the path from the starting vP node to the root node of the DP within the *by*-phrase is one fewer than the cardinality of nodes/branches on the path from the starting vP node to the root node of the indirect object DP. A similar issue arises if, as suggested by Müller (2011: 20–21, fn. 9), path length is determined by the number of intervening categories (in the sense of May 1985: 56–57 and Chomsky 1986: 7, as opposed to *segments*). This is because, under the segment theory of adjunction, adjuncts are not dominated by the categories to which they are adjoined; hence, the DP within the *by*-phrase adjoined to vP is separated from (the probe on) Voice[Pass] by one fewer category than either internal argument DP within VP and the *by*-phrase DP is therefore expected to intervene, contrary to fact. Finally, if structural prominence is evaluated solely with respect to asymmetric c-command, the DP complement of *by* and the indirect object DP should count as equally close to the probe and we would still fail to predict intervention.

high right adjuncts.

3.3.2 V-DP-CP

Next, consider structures in which the verb selects both a DP and a CP internal argument. For considerations of space, I focus on CPs headed by *that* (abbreviated CP_{that}), but the relevant generalizations extend to many other kinds of CPs, including control infinitivals (abbreviated CP_{Control}), (non-)finite interrogative CPs headed by *whether/if*, and embedded (non-)finite *wh*-questions. The only licit constituent order in the active is V-DP-CP:

- (32) V-DP-CP_{that} order is fixed
- a. The principal assured [DP Reuben] [CP that Judah was not in trouble].
 - b. * The principal assured [CP that Judah was not in trouble] [DP Reuben].

As with V-DP-DP frames, only the immediately post-verbal argument (i.e. DP) is able to passivize (see also Higgins 1973: 184–187, Bach 1980: 326, (40), (42)):³⁴

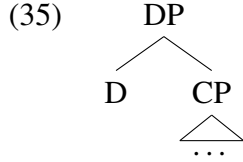
- (33) Only DP can passivize in V-DP-CP_{that}
- a. [DP Reuben] was assured ___ [CP that Judah was not in trouble] by the principal.
 - b. * [CP That Judah was not in trouble] was assured [DP Reuben] ___ by the principal.

Note that we should not attribute this asymmetry to a failure of CPs to match the [•D•] probe on Voice[Pass] that drives passive A-movement. Verbs like *guarantee* which alternate between a ditransitive V-DP-CP frame and a transitive V-CP frame clearly show that CPs can undergo passive A-movement to [Spec, TP] in the absence of a DP intervener.

- (34) *CPs are passivizable in the absence of an intervening DP*
[CP That the judge would make a ruling quickly] wasn't guaranteed (*[DP the defendant]) ___.

³⁴ Other verbs displaying a similar pattern are enumerated by Alexander and Kunz (1964: 24–25), including: *advise, bet, caution, convince, forewarn, guarantee, inform, notify, persuade, promise, remind, show, teach, tell, and warn*.

Instead, I follow Davies and Dubinsky (1998, 2001, 2009), Han (2005a,b), and Hartman (2012), among others, in proposing that (finite and nonfinite) CPs can be encased in a DP shell whose head is null, as in (35).³⁵



This DP shell renders clausal internal arguments (which I continue to refer to as ‘CPs’ for perspicuity) viable potential goals for the [\bullet D \bullet] probe on Voice[Pass].³⁶ Hence, the extraction asymmetry in (33) must arise due to precedence-based intervention in probing. The derivation in (36) illustrates:

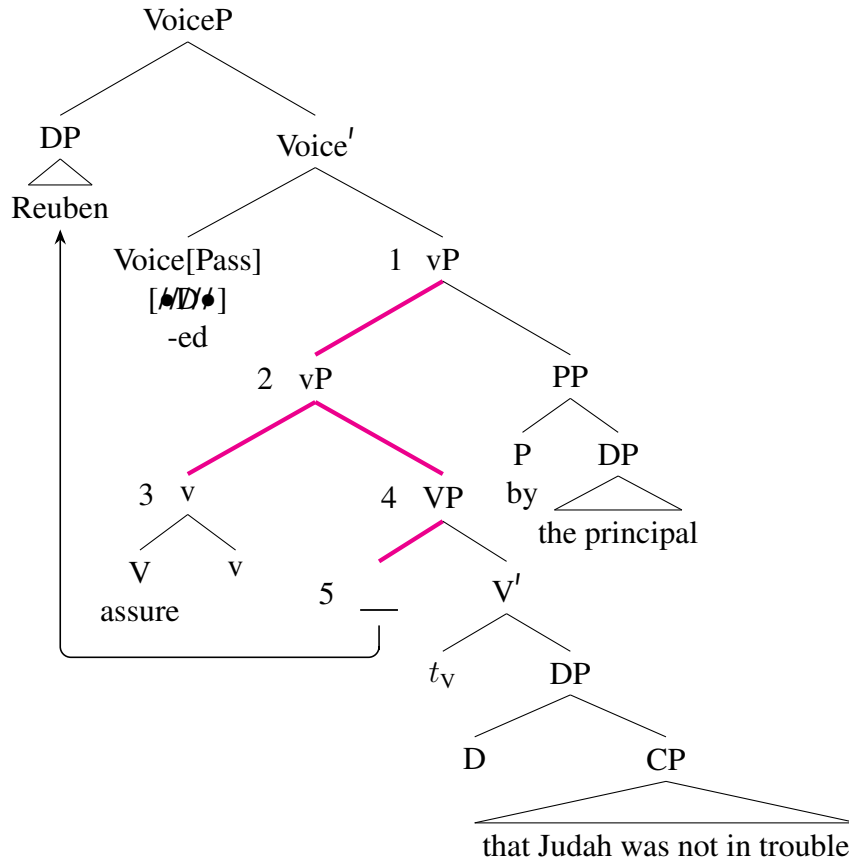
- (36) *Depth-first, left-to-right search predicts precedence-based intervention effects in V-DP-CP passivization*

³⁵ An important question which I set aside here is how to properly constrain the distribution of this DP shell, for instance to rule out CP_{that} complements to prepositions which only select DPs:

- (i) * She isn’t even aware [PP of [DP \emptyset [CP that we are spies]]].

See Hartman (2012: esp. 61–65) and Bruening and Al Khalaf (2020: 23–24) for two relevant proposals.

³⁶ An alternative would be to propose that CP and DP are both potential goals for φ -Agree by Voice[Pass], under the assumption that Agree is a precondition on movement as proposed in Chomsky (2000, 2001). See, however, Halpert (2019: 154) for evidence that CPs are not satisfactory goals for φ -agreement in English.



Thus, in V-DP-CP frames, as in V-DP-DP frames, we observe intervention in passive A-movement that is compatible with the linearity-based generalization argued for here: only the leftmost accessible DP within vP can passivize.

3.4 Precedence-based intervention in ascending structures

In this section, I turn to consider intervention in ascending structures, where structural height and linear order cease to march in lockstep. First, I show that precedence-based intervention is attested with multiple internal arguments in ascending VPs, specifically in V-{DP/PP}-PP frames (section §3.4.1) and in V-PP-CP frames (section §3.4.2) (recall from section §3.1 that *do so*-replacement diagnoses ascending structures in these cases). Second, I show that precedence-based intervention is observed whenever a vP-level adjunct cooccurs with one or more arguments (section §3.4.3). In every case, our generalization

from (16) is substantiated: only the leftmost accessible DP within vP can passivize. Importantly, this section demonstrates that the relative structural prominence of a DP within vP does not affect its ability to undergo passive A-movement—a finding which runs counter to purely height-based accounts of intervention as in (3).

3.4.1 V-{DP/PP}-PP

Precedence-based intervention is observable in ascending VPs with two internal arguments when the second is a PP and the first is either a DP or a PP. In the active voice, the neutral order of arguments is V-{DP/PP}-PP ((37a), (38a), (39a), (40a), (41a), (42a)). Crucially, as with multiple arguments in descending VPs (see section §3.3), passivization only targets the leftmost accessible DP within vP ((37b), (38b), (39b), (40b), (41b), (42b)); pseudopassivization out of the second PP is impossible over the intervening DP/PP ((37c), (38c), (39c), (40c), (41c), (42c)) (see also van Riemsdijk 1978: 219, Hornstein and Weinberg 1981: 65, (38), Stowell 1981: 438–439, 451, and Blight 2000: 85–86).³⁷

(37) V-DP-PP

- a. They loaded [_{DP} the wagon] [_{PP} with the hay].
- b. [_{DP} The wagon] was loaded ____ [_{PP} with the hay] by them.
- c. * The hay was loaded [_{DP} the wagon] [_{PP} with ____] by them.

(38) V-DP-PP

- a. They loaded [_{DP} the hay] [_{PP} onto the wagon].
- b. [_{DP} The hay] was loaded ____ [_{PP} onto the wagon] by them.
- c. * The wagon was loaded [_{DP} the hay] [_{PP} onto ____] by them.

(39) V-PP-PP

- a. The kids depended [_{PP} on Krishna] [_{PP} for money].

³⁷ A skeptical reader might object that (37c) and (38c) are expected to be independently ruled out by the Case Filter: under the assumption that passive verbs do not assign accusative Case (Chomsky 1981; Jaeggli 1986; Baker et al. 1989), the unmoved DP will not be assigned Case and the derivation will crash. While this is certainly true, the objection still fails to address why a DP structurally closer to the probe (e.g. in the higher argumental PP or even in the PP *by*-phrase) can be bypassed by the passive probe—that is, why doesn't the derivation of a passive clause always crash in such examples? The precedence-based approach provides an answer: within the probe's search domain, only linear precedence, and not structural prominence, matters for intervention. Note too that the objection mentioned above fails to explain why there should be intervention in V-PP-PP frames where the assignment of structural accusative Case is never at stake.

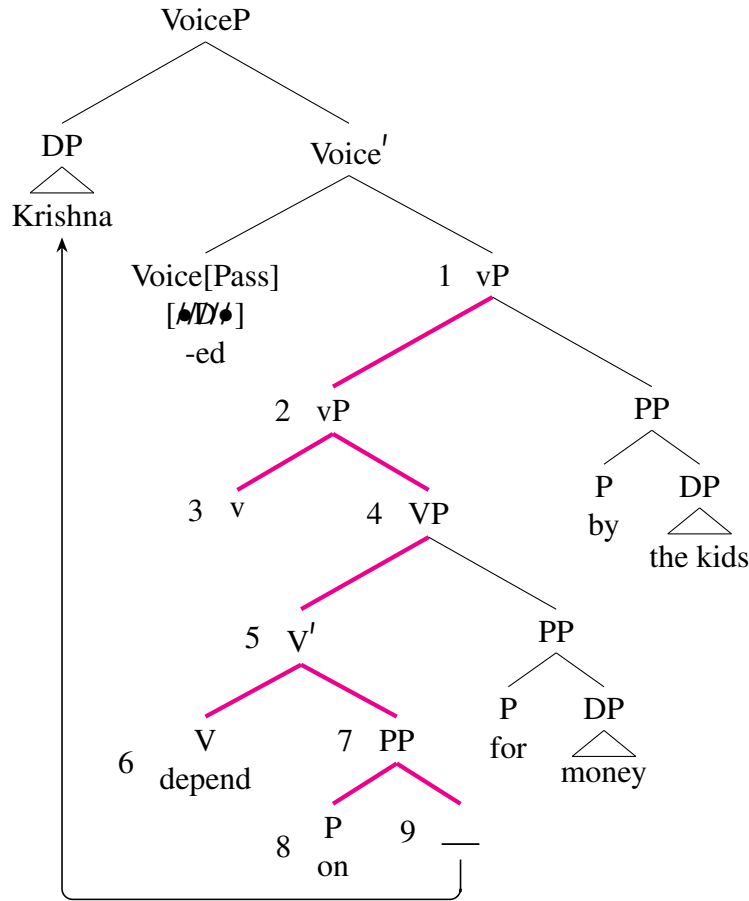
- b. Krishna was depended [_{PP} on ____] [_{PP} for money] by the kids.
 - c. * Money was depended [_{PP} on Krishna] [_{PP} for ____] by the kids.
- (40) V-PP-PP
- a. Judah apologized [_{PP} to Hilary] [_{PP} for the big mess].
 - b. ? Hilary was apologized [_{PP} to ____] [_{PP} for the big mess] by Judah.
 - c. * The big mess was apologized [_{PP} to Hilary] [_{PP} for ____] by Judah.
- (41) V-PP-PP
- a. The defendant pleaded [_{PP} with the judge] [_{PP} for a shorter sentence].
 - b. The judge was pleaded [_{PP} with ____] [_{PP} for a shorter sentence] by the defendant.
 - c. * A shorter sentence was pleaded [_{PP} with the judge] [_{PP} for ____] by the defendant.
- (42) V-PP-PP
- a. The president appealed [_{PP} to Congress] [_{PP} for aid].
 - b. Congress was appealed [_{PP} to ____] [_{PP} for aid] by the president.
 - c. * Aid was appealed [_{PP} to Congress] [_{PP} for ____] by the president.

Such intervention effects are derived straightforwardly from depth-first, left-to-right search.

(43) illustrates for a V-PP-PP frame (the derivation of a V-DP-PP frame in an ascending VP is trivially different, so I do not go through an explicit derivation here).³⁸

(43) *Depth-first, left-to-right search predicts precedence-based intervention effects in V-PP-PP passivization*

³⁸I remain agnostic as to whether V raises to v in ascending structures and I opt not to represent head movement in the relevant trees for ease of exposition. Nothing in my analysis hinges on this point.



By contrast, these asymmetries are unexpected under purely structural approaches to intervention. Neither $[_{DP} \text{ Krishna}]$ nor $[_{DP} \text{ money}]$ in (43) asymmetrically c-commands the other within VP prior to A-movement, so neither should qualify as ‘closer’ to the probe on Voice[Pass] given a definition of closeness like (3).³⁹ Furthermore, path-based definitions of closeness as in Hornstein (2009: 37ff.) which measure distance in terms of the number of maximal projections dominating both the extraction site and the landing site lead us to expect either DP to be passivizable, since they are equidistant from Voice[Pass].⁴⁰

³⁹Furthermore, if PP nodes ‘do not count’ for evaluating command relations (see e.g. Pesetsky’s 1995: 173, (453) *everything-but-PP-command*), then the expectation would be that intervention in passivization should proceed from right to left, contrary to fact.

⁴⁰Concretely, and assuming in line with Bare Phrase Structure (Chomsky 1995a) that the two PP nodes are differentiable by their lexical identities (i.e. *on* vs. *for*): $\text{Path}(\text{Voice}[\text{Pass}]; \text{Krishna}) = \{\text{VoiceP}, \text{vP}, \text{VP}, \text{onP}\}$ and $\text{Path}(\text{Voice}[\text{Pass}]; \text{money}) = \{\text{VoiceP}, \text{vP}, \text{VP}, \text{forP}\}$. Thus, in a Hornstein-style analysis where comparison of path lengths requires one path to form a subset of the other, the two DPs are erroneously predicted to be equally passivizable. Thanks to Erik Zyman (*pers. comm.*) for clarification of these issues.

As observed in Postal (1986: 225–6) and Pesetsky (1995: 275), passive asymmetries in V-{DP/PP}-PP frames persist even when the immediately post-verbal argument undergoes extraposition to the right.

- (44) a. They loaded $__i$ [PP with hay] [DP every wagon that wasn't carrying any passengers] ${}_i$.
b. * Hay $_k$ was loaded $__i$ [PP with $__k$] [DP every wagon that wasn't carrying any passengers] ${}_i$.
- (45) a. They depended $__i$ [PP for money] [PP on every funding source that was available] ${}_i$.
b. * Money $_k$ was depended $__i$ [PP for $__k$] [PP on every funding source that was available] ${}_i$.

We can understand why extraposition of an argument A to the right of an argument B fails to feed pseudopassivization out of B if extraposition necessarily follows (passive) A-movement within VoiceP. Determining why exactly this ordering relation should hold is ultimately a task for future work, but I will make one concrete suggestion here. Adopting the traditional analysis of extraposition/heavy shift of XP as rightward \bar{A} -movement of XP (e.g. Ross 1967), I propose that XP attaches to the right of VoiceP—the clause-internal phase (see Overfelt 2015: 77–82 for discussion of the landing site of heavy shift). If this movement is driven by a feature on Voice—call it $[\bullet\bar{A}\bullet]$ —then we can posit a strict ordering of features on Voice[Pass]: Voice[Pass] $_{[\bullet D\bullet] > \bullet\bar{A}\bullet}$ (where '>' is to be read as 'precedes'). Ideally, such an ordering should not be extrinsically stipulated but should follow from independent principles of grammar. One possibility is that A-features such as $[\bullet D\bullet]$ on a head X are invariably ordered before \bar{A} -features such as $[\bullet\bar{A}\bullet]$ on X, though I will leave exploring this and other possibilities to future work. I offer a similar explanation to account for intervention effects with verbs selecting a PP and a CP argument in section §3.4.2.

It should be noted at this juncture that, unlike *depend*, etc., there are some verbs which

Additionally, if 'closeness' were measured by counting the nodes (or branches) intervening between the probe and the accessible goals (e.g. Müller 1998: 130), we would again expect right-to-left intervention effects, contrary to fact.

freely allow reordering of their multiple PP internal arguments. With such verbs, pseudopassivization out of either PP is possible, though crucially only when that PP appears to the left of its PP coargument(s). The verb *talk* is illustrative in this regard:⁴¹

- (46) a. The investigator talked [_{PP} to the witnesses] [_{PP} about the crime scene].
 b. The investigator talked [_{PP} about the crime scene] [_{PP} to the witnesses].
 c. The witnesses were talked {[_{PP} to ____]} [_{PP} about the crime scene] {*[_{PP} to ____]} by the investigator.
 d. The crime scene was talked {[_{PP} about ____]} [_{PP} to the witnesses] {*[_{PP} about ____]} by the investigator.

We can account for the difference between these two classes of verbs as follows. *Depend-*type verbs only permit one base-generated order of internal arguments (i.e. [_{VP} [_{V'} *depend on X*] *for Y*]), so we only expect pseudopassivization to be possible out of the PP generated as the complement of V. On the other hand, I propose that *talk*-type verbs are compatible with both base-generated orders of internal arguments (i.e. [_{VP} [_{V'} *talk to X*] *about Y*] or [_{VP} [_{V'} *talk about Y*] *to X*]). As a consequence, we expect variation in which DP can undergo passive A-movement corresponding to which DP is generated leftmost within vP.

3.4.2 V-PP-CP

Turning now to verbs which select a PP and a CP internal argument, the facts are somewhat complicated by a frequent preference for CPs to be extraposed. Such extraposition obscures the underlying order of constituents within VP, which I propose is V-CP-PP.⁴² I will show that, if the underlying order is indeed V-CP-PP (a hypothesis that is independently supported by the empirical observations about *do so*-replacement presented in section §3.1), then the depth-first, left-to-right probing algorithm argued for here successfully accounts for the precedence-based intervention effects observed in these clauses. As

⁴¹For many speakers that I have polled, another verb allowing pseudopassivization out of either of its PP arguments is *abscond with X from Y*.

⁴²For important predecessors to my claim that CP is the inner argument of V, see Stowell (1981: 161), Pesetsky (1995: 273–275), and Bruening (2018).

with section §3.3.2, I restrict my attention to verbs selecting CPs headed by *that*, though the patterns can be shown to hold with numerous other kinds of CPs.

Under neutral prosody, the preferred order of constituents in the active voice is V-PP-CP_{that} ((47)). For me and the other speakers I have consulted (see also Bruening 2018: 364, fn. 2), the order V-CP_{that}-PP is acceptable (*pace* Emonds 1970: 97–99, Stowell 1981: 161, (91b), and Postal 1986: 226, (63b)), if a bit awkward ((47b)), though the V-CP_{that}-PP order is strongly dispreferred if CP is considerably prosodically heavier than PP.

- (47) a. V-PP-CP_{that} order is preferred
- i. The doctor suggested [PP to Vandy] [CP that Russ should see a specialist].
 - ii. Joni confessed [PP to the judge] [CP that Matt had done it].
 - iii. Hilary mentioned [PP to Reuben] [CP that Judah was in trouble].
- b. V-CP_{that}-PP order is possible, but often marked
- i. The doctor suggested [CP that Russ should see a specialist] [PP to Vandy].
 - ii. Joni confessed [CP that Matt had done it] [PP to the judge].
 - iii. Hilary mentioned [CP that Judah was in trouble] [PP to Reuben].

Despite the preference for a V-PP-CP_{that} order, only CP_{that} can undergo passive A-movement (see also Higgins 1973: 184–185):⁴³

- (48) CP_{that} can passivize in V-CP_{that}-PP
- a. [CP That Russ should see a specialist] was suggested ___ [PP to Vandy] by the doctor.
 - b. [CP That Matt had done it] was confessed ___ [PP to the judge] by Joni.
 - c. [CP That Judah was in trouble] was mentioned ___ [PP to Reuben] by Hilary.

The DP complement of P cannot pseudopassivize, regardless of the position of the stranded preposition relative to CP_{that} (see Alexander and Kunz 1964: 26, Higgins 1973: 184–185, (83)–(84), Emonds 1976: 124, fn. 7, Bach 1980: 326, (41), (43), Postal 1986: 225, (60), Pesetsky 1995: 275, (670)–(671), and Drummond 2011: 171, (316)):

⁴³ Alexander and Kunz (1964: 28–29) cite numerous other verbs occurring in the V-PP-CP_{that} frame that behave similarly to those discussed in the main text, including: *acknowledge, admit, announce, assert, communicate, convey, declare, demonstrate, disclose, divulge, explain, hint, indicate, point out, relate, report, reveal, say, signal, and whisper*.

- (49) DP cannot pseudopassivize out of PP in V-PP-CP_{that} or V-CP_{that}-PP
- a. * Vandy was suggested {[PP to ____]} [CP that Russ should see a specialist] {[PP to ____]}.
 - b. * The judge was confessed {[PP to ____]} [CP that Matt had done it] {[PP to ____]}.
 - c. * Reuben was mentioned {[PP to ____]} [CP that Judah was in trouble] {[PP to ____]}.

This is despite the fact that, with verbs which allow CP_{that} to be omitted, pseudopassivization is fine in its absence:

- (50) The judge was confessed [PP to ____] by Joni (*[CP that Matt had done it]).
- (51) The gorilla was signaled [PP to ____] by Anthony (*[CP that dinner time was near]).
(Postal 1986: 225, (61d))

Thus, I contend that the failed pseudopassivization in (49) should be attributed to intervention by CP_{that} and not to a lexical incompatibility of these verbs with pseudopassivization.

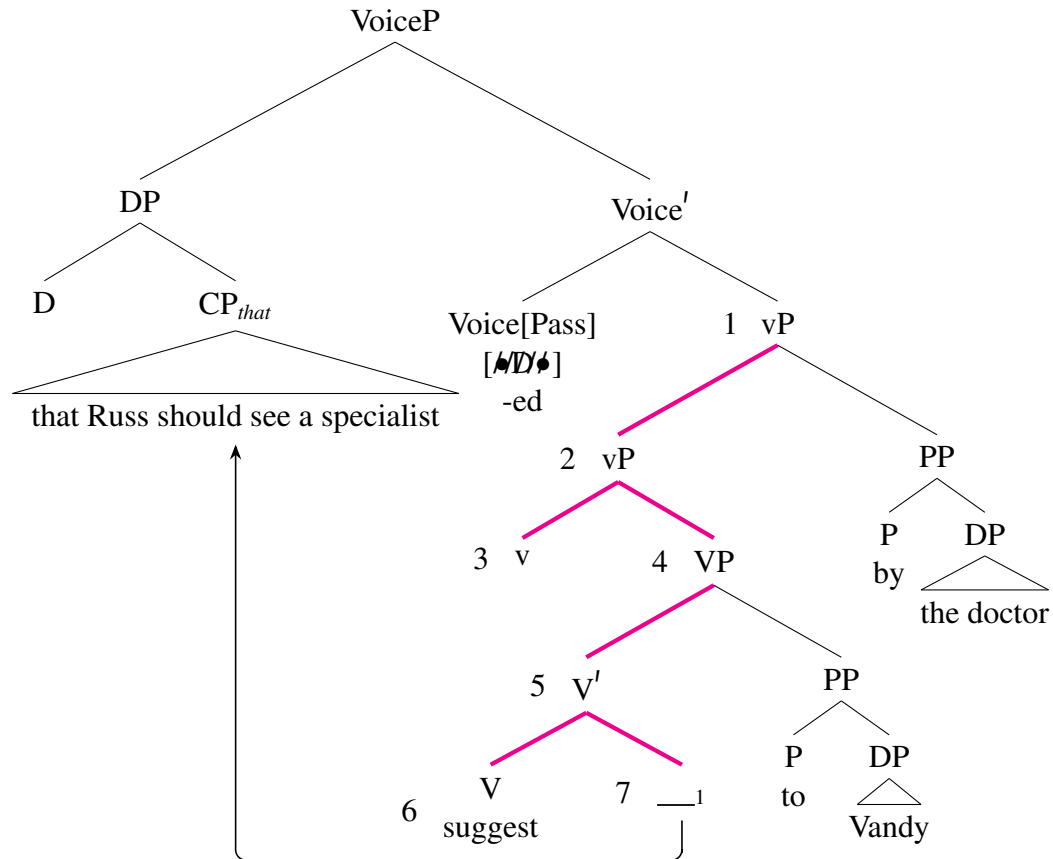
Note additionally that stranding the preposition to the immediate left of CP_{that} as in (49) is not degraded due to the *P-CP_{that} effect familiar from \bar{A} -movement (see, e.g., Kuno 1973: 382, who attributes the observation to Judith Aissen (*pers comm.*), Langendoen and Pullum 1977, Stowell 1981: 207–208, Moulton 2015: 322–324, and Lebowski 2021). In some idiolects, the presence of an intervening adverbial can improve \bar{A} -movement stranding P to the left of CP_{that} (as observed by Bruening 2018: 381–392; see also Rauber 2019: 1–2 and Zyman 2022: 151, fn. 26), but there is no comparable amelioration contributed by adverbials in A-movement (thanks to Erik Zyman (*pers. comm.*) for pointing out the relevance of this paradigm to me); compare the acceptable P-stranding *wh*-questions in (52) with the unacceptable P-stranding passives in (53).

- (52) a. Who did the doctor suggest [PP to ____] on Tuesday [CP that Russ should see a specialist]?
- b. Who did Joni confess [PP to ____] in writing [CP that Matt had done it]?
- c. Who did Hilary mention [PP to ____] in a very subtle way [CP that Judah was in trouble]?

- (53) a. * Vandy was suggested [_{PP} to ____] on Tuesday [_{CP} that Russ should see a specialist].
 b. * The judge was confessed [_{PP} to ____] in writing [_{CP} that Matt had done it].
 c. * Reuben was mentioned [_{PP} to ____] in a very subtle way [_{CP} that Judah was in trouble].

Instead, I propose to account for passive asymmetries in V-PP-CP frames as follows: CP_{that} is base-generated as the complement of V and PP is base-generated in a right specifier of V. Depth-first, left-to-right search in passive A-movement will therefore always reach the clausal internal argument first—which, to recall the discussion from section §3.3.2, I take to be encased in a DP shell (see (35))—explaining the attested intervention effects.

- (54) *Depth-first, left-to-right search predicts precedence-based intervention effects in V-CP-PP passivization*



The order V-PP-CP_{that} that we observe in the active is derived through extraposition of CP_{that}, which I analyze as rightward movement to VoiceP (see Bruening 2018: 365). Be-

cause extraposition must follow passive A-movement (see section §3.4.1), we account for the failure of pseudopassivization in (49) and (53).⁴⁴

⁴⁴As an aside, it is worth mentioning that passive intervention actually reveals two classes of verbs selecting a PP and an infinitival, non-interrogative control CP (i.e. CP_{Control}) for many speakers. With verbs like *plead* (call these ‘class 1 verbs’), only the DP complement of P can passivize, blocking A-movement of CP_{Control} ((i)). Verbs like *beg*, *ask*, *request*, and *demand* (i.e. ‘class 2 verbs’), on the other hand, show the opposite pattern: only CP_{Control} passivization is permitted ((ii)).

- (i) a. The clerk was pleaded [PP with ____] [CP to keep the store open a bit longer].
- b. * [CP To keep the store open a bit longer] was pleaded [PP with the clerk] ____.
- (ii) a. * The clerk was begged/asked/requested/demanded [PP of ____] [CP to keep the store open a bit longer].
- b. [CP To keep the store open a bit longer] was begged/asked/requested/demanded ____ [PP of the clerk].

Other class 1 verbs are *call* [PP on X] [CP to ...], *appeal* [PP to X] [CP to ...], and *depend* [PP on X] [CP to ...]. Another class 2 verb is *suggest* [PP to X] [CP to ...].

This difference suggests that PP and CP occupy distinct structural positions within an ascending VP for the two classes of verb. Class 1 verbs select PP as their complement and CP_{Control} as a right specifier: [VP [V' *plead* PP_{with}] CP_{Control}]. Class 2 verbs project a structure parallel to verbs selecting a *that*-CP, with CP_{Control} as a complement and PP in a right specifier: [VP [V' *beg* CP_{Control}] PP_{of}].

Two lines of evidence support this distinction. First, in my judgment, *do so*-replacement identifies V+CP_{Control} as a constituent with class 2 verbs like *beg* ((iv)) but not with class 1 verbs like *plead* ((iii)).

- (iii) a. * If Matt pleaded_V [PP with anyone] [CP to keep the store open a bit longer], he did so [PP with the clerk].
- b. * If Celina appealed_V [PP to anyone] [CP to reconsider her case], she did so [PP to that judge].
- (iv) a. If Matt begged_V/asked_V/requested_V/demanded_V [PP of anyone] [CP to keep the store open a bit longer], he did so [PP of the clerk].
- b. If Celina suggested_V [PP to anyone] [CP to buy a new suit], she did so [PP to Matt].

Additionally, the availability of *it*-extraposition appears to correlate with the possibility for CP_{Control} passivization: expletive *it* can appear right-adjacent to class 2 verbs in the active, and those same verbs allow CP_{Control} passivization, but class 1 verbs ban expletive *it* in the active and likewise ban CP_{Control} passivization.

- (v) * They pleaded [DP it] [PP with the clerk] [CP to keep the store open a bit longer].
- (vi) They begged/asked/requested/demanded [DP it] [PP of the clerk] [CP to keep the store open a bit longer].

Nevertheless, it may be that CP_{Control} passivization with class 1 verbs like *plead* is ruled out for independent reasons. As Erik Zyman (*pers. comm.*) reminds me, a CP that has been moved leftward in English must always relate to a gap which could have been occupied by a DP in the active voice (see Bruening 2018: 366 for relevant discussion and references). Indeed, only Class 2 verbs allow the CP_{Control} argument to be replaced by a DP (judgments mine):

- (vii) *Class 1 verbs do not alternate with V-DP-PP frames*
*The customer pleaded [DP something unreasonable] [PP with the clerk].

3.4.3 Passive asymmetries among internal arguments and rightward adjuncts

Finally, precedence-based intervention is observable with passive asymmetries obtaining between internal arguments and vP-level adjuncts. Consider verbs which optionally select a DP ((55)), PP ((56)), or CP ((57)) internal argument. When just this internal argument is present, it can passivize (or launch pseudopassivization):

- (55) a. Every guest ate [_{DP} a sandwich].
b. [_{DP} A sandwich] was eaten ___ by every guest.
- (56) a. The students worked [_{PP} on no group project].
b. No group project was worked [_{PP} on ___] by the students.
- (57) a. The conspiracy theorist wrote [_{CP} that the world is flat].
b. [_{CP} That the world is flat] was written ___ by the conspiracy theorist.

When the optional internal argument is omitted, the same verbs permit pseudopassivization out of a locative adjunct PP:

- (58) a. Every guest ate [_{PP} on this couch].
b. This couch was eaten [_{PP} on ___] by every guest.
- (59) a. The students worked [_{PP} in no classroom].
b. No classroom was worked [_{PP} in ___] by the students.
- (60) a. The conspiracy theorist wrote [_{PP} in this notebook].
b. This notebook was written [_{PP} in ___] by the conspiracy theorist.

However, if both the internal argument and the adjunct PP are overtly present, only the DP (contained inside the) internal argument can passivize; pseudopassivization out of the adjunct PP is impossible:

- (61) a. Every guest ate [_{DP} a sandwich] [_{PP} on this couch].
b. [_{DP} A sandwich] was eaten ___ [_{PP} on this couch] by every guest.

(viii) *Class 2 verbs alternate with V-DP-PP frames*
The customer begged/asked/requested/demanded [_{DP} something unreasonable] [_{PP} of the clerk].

To account for these facts, we could propose that class 1 verbs never select a CP_{Control} contained in a DP shell. Consequently, the [_{•D•}] probe on Voice[Pass] is not expected to ever be satisfied by CP_{Control} with class 1 verbs.

- c. * This couch was eaten {[_{PP} on ____]} [_{DP} a sandwich] {[_{PP} on ____]} by every guest.
- (62)
- a. The students worked [_{PP} on no group project] [_{PP} in this classroom].
 - b. No group project was worked {[_{PP} on ____]} [_{PP} in this classroom] {*[_{PP} on ____]} by the students.
 - c. * No classroom was worked {[_{PP} in ____]} [_{PP} on this group project] {[_{PP} in ____]} by the students.
- (63)
- a. Nobody has ever written [_{CP} that the world is flat] [_{PP} in this notebook] before.
 - b. [_{CP} That the world is flat] has never been written ____ [_{PP} in this notebook] by anybody before.
 - c. * This notebook has never been written {[_{PP} in ____]} [_{CP} that the world is flat] {[_{PP} in ____]} by anybody before.

These asymmetries are exactly what is predicted by my proposed account of intervention effects based on left-to-right probing, under the assumption that locative adjuncts attach on the right (I omit an explicit derivation for reasons of space). This is despite the fact that low adjuncts like locatives are standardly assumed to attach higher than internal arguments: as we have seen throughout, relative height within the probe's search space has no bearing on a constituent's status as an intervener.

4 Against radically descending approaches to English vP structure

Let us briefly take stock. Section §3 marshaled empirical evidence in favor of the novel generalization in (64).

- (64) **Order dependence in English passivization** (repeated from (6), (16))
 When just one DP can undergo passive A-movement in English, it is invariably the leftmost accessible DP within vP.

I proposed an analysis of precedence-based intervention effects which relied on procedural aspects of the search algorithm triggered by Merge features: probing exhaustively searches through a complex left daughter of a node N prior to evaluating N's right daughter. Because the search procedure halts when an accessible, matching goal is found, we account

for attested left-to-right asymmetries in passivization. A crucial claim of this analysis is that the relative structural prominence of two or more potential goals within the search domain of the probe makes no difference for intervention effects, which are determined purely linearly. My analysis is therefore compatible with both ascending and descending arrangements of arguments and adjuncts.

4.1 An alternative: height-based intervention + descending vPs?

However, there is a conceivable alternative way to account for (64) that is worth considering here which ascribes no role to linear precedence in the syntax. If we adopt a more traditional metric for closeness based on c-command like (65) (e.g. as in Relativized Minimality, the Minimal Link Condition, or Attract Closest), then we can derive the generalization in (64) if we propose that all arguments and adjuncts strictly descend within vP.

- (65) **‘Closeness’ as closest asymmetric c-command** (repeated from (3))
 Given three syntactic objects X, Y, and Z, Z is closer to X than Y is iff:
- a. X asymmetrically c-commands Z, and
 - b. Z asymmetrically c-commands Y.

In other words, under purely structure-dependent approaches to intervention, it must be the case that “rightward is downward” (Pesetsky 1995: 161).

While such an analysis arguably faces challenges with, among other things, the *do so*-replacement data discussed in section §3.1, it boasts provisional support from well-known binding and licensing asymmetries first reported in Barss and Lasnik (1986) and Larson (1988, 1990) and discussed extensively in subsequent literature (see especially Pesetsky 1995, Phillips 1996, 2003, Lechner 2003, and Larson 2014, 2022). Let us consider five such asymmetries here.⁴⁵ In the domains of variable binding ((66)), reciprocal binding

⁴⁵The first four were discussed originally by Barss and Lasnik (1986) in the context of multiple internal arguments in the double object construction. Condition C violations induced by a direct object binding into an adjunct clause to its right were discussed by Larson (1990: 622), citing observations made by Contreras (1984). For additional discussion of direct objects binding rightward into adjuncts, see Lasnik and Saito (1991).

((67)),⁴⁶ the *each ... the other* construction ((68)), negative polarity item (NPI) licensing ((69)), and Condition C ((70)), binding and licensing seem to only go rightward within vP.

(66) *Variable binding goes rightward in vP*

- a. Which snack did you [_{vP} give to every boy_i despite him_i not liking it]?
- b. * Which snack did you [_{vP} give to him_i despite every boy_i not liking it]?

(67) *Reciprocal binding goes rightward in vP*

- a. What did you [_{vP} present to Matt_i and Joni_j together with each other_{i+j}'s drawings of Pepper]?
- b. * What did you [_{vP} present to each other_{i+j} together with Matt_i and Joni_j's drawings of Pepper]?

(68) *Each ... the other licensing goes rightward in vP*

- a. What did you [_{vP} give to *each contestant* together with *the other's* drawing of Pepper]?
- b. * What did you [_{vP} give to *the other* together with *each contestant's* drawing of Pepper]?

(69) *NPI-licensing goes rightward in vP*

- a. Joni [_{vP} described that painting to no children at any lecture on it].
- b. * Joni [_{vP} described that painting to any children at no lecture on it].

(70) *Condition C goes rightward in vP*

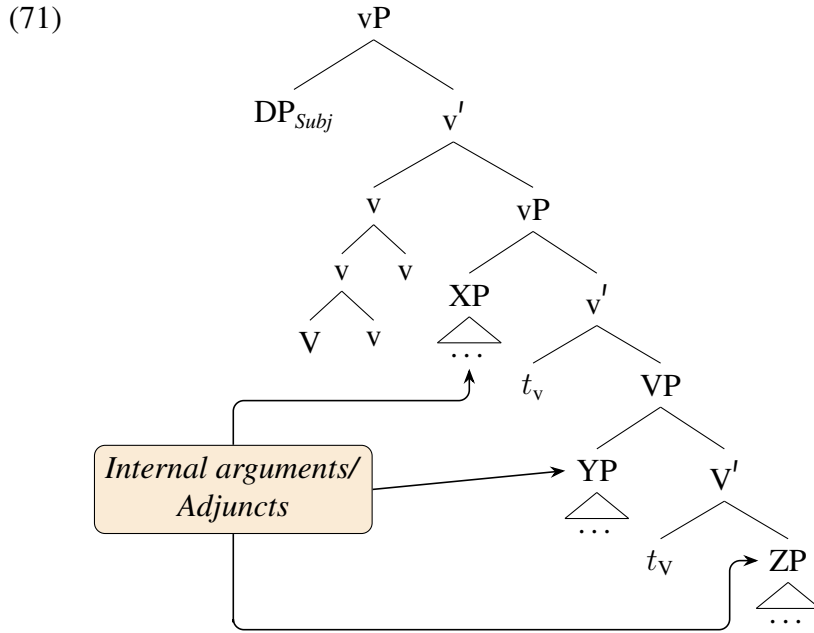
- a. What did you [_{vP} give to Matt_i by throwing it at him_i]?
- b. * What did you [_{vP} give to him_i by throwing it at Matt_i]?

In all of these examples, the licensor is (contained in) an argument while the licensee is contained in an adjunct.⁴⁷ Under the assumption that the above binding and licensing relations require the licensor to c-command the licensee, we seem to have evidence in favor of a radically descending structure like (71), where (traditional) adjuncts can be gener-

⁴⁶But see Pollard and Sag (1992: esp. 266, 269, 277, 290) and Janke and Neeleman (2012: 181–185) for the cautionary remark that *each other* as a possessor passes the relevant criteria for being an *exempt anaphor* and hence may not require a locally c-commanding antecedent to be properly licensed.

⁴⁷See Bowers (2010: 33–37) for the related observation that arguments can bind into passive *by*-phrases. The generalization that binding and licensing always go rightward in the English verb phrase receives additional empirical support from Pesetsky's (1995: 265–267) observation that binding/licensing can proceed out of argument and adjunct PPs and into extraposed/heavy shifted arguments to the right of those PPs (see also Culicover and Jackendoff 2005: 119, 123 and Drummond 2013: 16–18).

ated within the c-command domain of internal arguments.⁴⁸ Additionally, because the binders/licensors in (66)–(70) are complements of prepositions, it must be assumed that PP nodes ‘do not count’ for the purposes of c-command (see Pesetsky’s 1995: 173, (453) *everything-but-PP-command*).



Consequently, if left-to-right order within vP unambiguously maps onto a descending structure as in (71), then the order dependence of English A-movement ((64)) can be chalked up to height-based intervention: the leftmost DP within vP will also be the structurally most prominent, ostensibly accounting for the facts.

However, previous work has noted that the uniformly descending structures seemingly required by binding and licensing asymmetries are not supported by constituency tests, such as displacement and ellipsis, which consistently point to the availability of ascending structures even in clauses where binding goes rightward (so-called *Pesetsky paradoxes*; in addition to the authors cited above (66), see Landau 2007, Janke and Neeleman 2012, and Bruening 2014). Rather than rehearse the arguments of the prior literature here, I will ad-

⁴⁸The structure in (71) is inspired by Larsonian VP shells and shows the result of successive head movement of V, but invoking the cascade structures of Pesetsky (1995) would achieve a similar result.

duce novel evidence from parasitic gap licensing showing that adjuncts must (be able to) attach high on the right within vP and, indirectly, that the relevant binding and licensing relations are not strictly conditioned by c-command. Because ascending structures must be available, I conclude that ‘closeness’ cannot be defined in terms of asymmetric c-command, as in (65), and that the precedence component to intervention cannot be reduced to structural height.

4.2 Against the alternative: the anti-c-command condition on parasitic gaps shows that clause-final adjuncts can be high

Previous work has uncovered the following structural constraint on the distribution of parasitic gaps (see especially Taraldsen 1981: 493, Chomsky 1982: 40, (56), Engdahl 1983: 22, (64), Haegeman 1984, and Safir 1987):

- (72) *The anti-c-command condition on parasitic gaps*
The licensing gap cannot c-command the parasitic gap.

The effects of this constraint can be seen by examining the contrast in (73). A direct object gap can license a parasitic gap contained in an adjunct to its right ((73a)), while a subject gap fails to license a parasitic gap in the same position ((73b)) (*pg* = ‘parasitic gap’).

- (73) a. Which spy_{*i*} did John kill ____{*i*} [before anybody could speak to *pg_i*]?
b. * Which spy_{*i*} ____{*i*} killed John [before anybody could speak to *pg_i*]?
(Safir 1987: 678, (1a–b))

We can make sense of this contrast if the *before*-clause attaches to vP on the right: the direct object gap (in [Comp, VP]) will not c-command into the adjunct clause, while the subject gap (in [Spec, TP]) will.⁴⁹

⁴⁹By similar reasoning, we can conclude that, in V-PP-PP frames, the DP complement of the linearly first preposition does not (or at least does not need to) c-command into the second PP:

- (i) Who_{*i*} did you talk [pp to ____{*i*}] [pp about friends of *pg_i*]? (Richards 2014: 183, (60b))

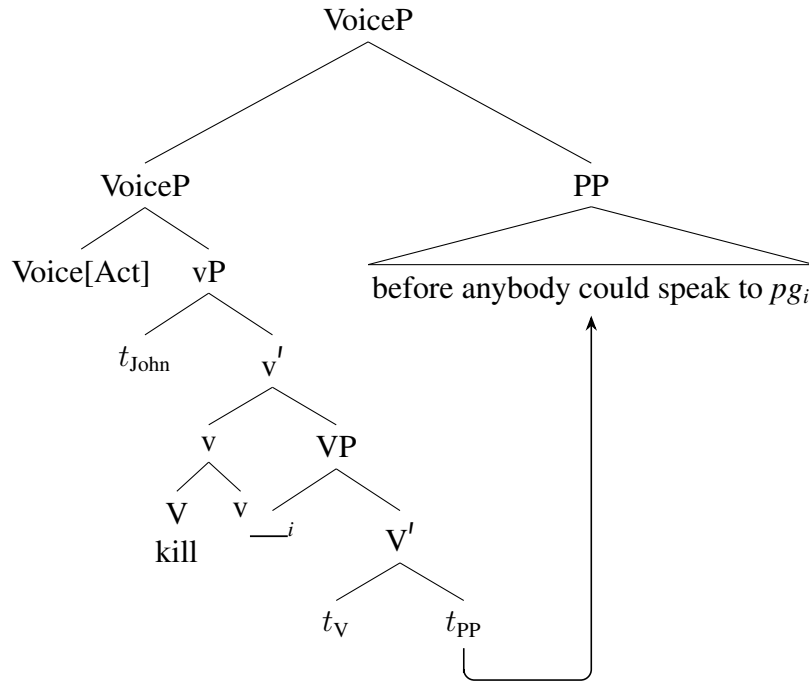
- (74) a. Which spy_i did John [_{VP} [_{VP} kill ____i] [before anybody could speak to pg_i]]?
 b. * Which spy_i [_{TP} ____i [_{VP} [_{VP} killed John] [before anybody could speak to pg_i]]?

Contreras (1984) raised an early objection to the anti-c-command condition in (72), noting that an R-expression in the position of the parasitic gap cannot corefer with a pronoun in the position of the licensing gap—that is, we find a Condition C effect in examples like (75).

- (75) * Adrian killed him_i [before anybody could speak to John_i]. (Safir 1987: 678, (1c))

This is unexpected if (i) Condition C violations only obtain under c-command and (ii) the direct object of V does not c-command into a vP adjunct to its right. To account for the apparent tension between binding and the anti-c-command condition on parasitic gaps, many authors have suggested that adjuncts are base-generated VP-internally but are (optionally) extraposed to the right, as shown in (76) for (73a) (Browning 1987: 205, citing Andrew Barss, Kyle Johnson, and Mamoru Saito, *pers. comm.*; for similar proposals regarding CP complements containing parasitic gaps, see Chomsky 1986: 60–65, citing Luigi Rizzi, *pers. comm.*; Safir 1987; Saito 1991; and Arregi and Murphy 2022: 33–35, esp. fn. 16). That is, ascension in vP is *derived* through extraposition (see also Lechner 2003).

- (76) Which spy_i did John



Post-extraposition, a direct object licensing gap will not c-command a parasitic gap contained in a PP adjunct, satisfying (72). Condition C effects as in (75) could then be attributed to obligatory reconstruction of the extraposed constituent to a VP-internal position where it is c-commanded by the pronoun (see Bruening 2014: 358–363 and Bruening and Al Khalaf 2019: esp. 257–261 on Condition C reconstruction with \bar{A} -moved PPs).

This account is immediately challenged by the contrasts in (77)–(81), which attest to a novel species of Pesetsky paradox. These examples illustrate that parasitic gaps are licensed in vP-level adjuncts at the same time that binding and licensing proceed rightward into the adjunct.⁵⁰

(77) *Parasitic gap licensing with simultaneous left-to-right variable binding in vP*

- a. Which snack_k did you [_{vP} give ____k to every boy_i despite him_i not liking pg_k]?
 - b. * Which snack_k did you [_{vP} give ____k to him_i despite every boy_i not liking pg_k]?

(78) *Parasitic gap licensing with simultaneous left-to-right reciprocal binding in vP*

⁵⁰I will note that, while the (a) examples in (77)–(80) may be marked for some speakers (Erik Zyman, *pers. comm.*, reports to be one such speaker), all the speakers I have consulted report an extremely sharp contrast in acceptability between the (a) and the (b) examples.

- a. What_k did you [_{VP} present _____k to Matt_i and Joni_j together with each other_{i+j}'s drawings of *pg_k*]?
 - b. * What_k did you [_{VP} present _____k to each other_{i+j} together with Matt_i and Joni_j's drawings of *pg_k*]?
- (79) *Parasitic gap licensing with simultaneous left-to-right each ... the other licensing in vP*
 - a. What_k did you [_{VP} give _____k to *each contestant* together with *the other*'s drawing of *pg_k*]?
 - b. * What_k did you [_{VP} give _____k to *the other* together with *each contestant*'s drawing of *pg_k*]?
- (80) *Parasitic gap licensing with simultaneous left-to-right NPI-licensing in vP*
 - a. What_k did Joni [_{VP} describe _____k to no children at any lecture on *pg_k*]?
 - b. * What_k did Joni [_{VP} describe _____k to any children at no lecture on *pg_k*]?
- (81) *Parasitic gap licensing with simultaneous left-to-right Condition C effects in vP*⁵¹
 - a. * What_k did you [_{VP} give _____k to him_i by throwing *pg_k* at Matt_i]?
 - b. What_k did you [_{VP} give _____k to Matt_i by throwing *pg_k* at him_i]?


On the one hand, in order to satisfy the anti-c-command condition, the direct object trace within vP must not c-command the parasitic gap-containing adjunct; this requires an ascending structure (either base-generated or derived by extraposing the adjunct). On the other hand, if the relevant binding and licensing phenomena obtain only under c-command, then a descending structure is required. This is a constituency paradox.⁵²

⁵¹Erik Zyman (*pers. comm.*) notes that, for him, (81a) can be slightly improved by adding a context and tweaking the prosody as in (i) (small caps indicates focus), though the result remains highly marginal.

- (i) A: Hey, can I ask you a question about Matt?
 - B: Yeah, go for it.
 - A: ?? What_k did you give _____k to him_i by THROWING *pg_k* at Matt_i?

See Arregi and Murphy (2022: 34, fn. 16) for discussion of a contrast similar to the one reported in (81) using an embedded complement clause instead of a vP adjunct.

⁵²At this juncture, a defender of the radically descending approach to English verb phrase structure might try to account for (77)–(81) by positing extraposition of a constituent—presumably a kind of VP—containing just the PP headed by *to* and the adjunct to its right (as well as a trace of the verb). Such extraposition would move the parasitic gap out of the c-command domain of the licensing gap and, still assuming that PP nodes do not count for binding, the DP complement of P could bind into the adjunct to its right:

- (i) Which snack_k did you [_{VoiceP} [_{VP} give _____k _____m] [_{VP?} to every boy_i despite him_i not liking *pg_k*]_m]?
 

Similar paradoxes can be constructed with tritransitive verbs like *send* and *trade* which select one DP and two PP internal arguments. The following examples illustrate with variable binding, *each ... the other* licensing, and Condition C, in that order.⁵³

- (82) a. What_k did you stupidly [_{VP} trade/sell _____k [_{PP} to every boy_i] [_{PP} for his_i cheap replica of *pg_k*]]?
 b. *What_k did you stupidly [_{VP} trade/sell _____k [_{PP} to him_i] [_{PP} for every boy_i's cheap replica of *pg_k*]]?
- (83) a. What_k did you stupidly [_{VP} trade/sell _____k [_{PP} to each contestant] [_{PP} for the other_i's cheap replica of *pg_k*]]?
 b. *What_k did you stupidly [_{VP} trade/sell _____k [_{PP} to the other] [_{PP} for each contestant_i's cheap replica of *pg_k*]]?
- (84) a. *What_k did you stupidly [_{VP} trade/sell _____k [_{PP} to him_i] [_{PP} for Matt_i's cheap replica of *pg_k*]]?
 b. What_k did you stupidly [_{VP} trade/sell _____k [_{PP} to him_i] [_{PP} for Matt_i's cheap replica of *pg_k*]]?

That the *for*-phrase in (82)–(84) is an argument of the verb and not an adjunct can be demonstrated by its unstrandability under vP-pseudoclefting. Adjuncts, but not arguments,

Not only is such an analysis unlikely given that predicates which undergo \bar{A} -movement obligatorily reconstruct (see e.g. Huang 1993 and Heycock 1995), since such reconstruction would reintroduce the pathological c-command relation between the licensing and parasitic gaps, such an analysis is also not supported by constituency tests. For example, the alleged 'PP_{Argument} + PP_{Adjunct}' constituent cannot be preposed around *though*:

- (ii) a. But though I will [_{VoiceP} [_{VP} give a healthy snack [_{VP?} to every boy despite him_i not liking it]]], I wish there were a better way to promote good dietary choices.
 b. *But [_{VP?} to every boy_i despite him_i not liking it]_m though I will [_{VoiceP} [_{VP} give a healthy snack _____m]], I wish there were a better way to promote good dietary choices.

This is despite the fact that the extraposition analysis in (i) holds that the putative constituent can be moved rightwards. The onus thus falls on defenders of radically descending approaches to English verb phrase structure to demonstrate that the allegedly extraposed constituent in (i) is not simply ad hoc but can be independently supported.

⁵³The fact that a direct object gap can license a parasitic gap in the clause-final *for*-PP constitutes evidence that these verb phrases ascend (see footnote 21 for a similar conclusion in the context of ditransitive V-DP-PP frames). Additional evidence for left-branching structures comes from *do-so*-replacement:

- (i) If Matt traded_V [_{DP} his shiny Pikachu] [_{PP} to anyone] [_{PP} for anything], he likely did_{so} [_{PP} to Joni] [_{PP} for a first edition Charizard].
 (ii) If Matt traded_V [_{DP} his shiny Pikachu] [_{PP} to Joni] [_{PP} for anything], he likely did_{so} [_{PP} for a first edition Charizard].

can immediately follow *do* (i.e. can be stranded) in a vP-pseudocleft (Zyman 2022: 134–136; see also Hedberg and DeArmond 2009). Crucially, as (85) shows, the *for*-phrase found with verbs like *trade/sell* cannot be stranded under vP-pseudoclefting (though (85) is acceptable under a separate, irrelevant parse where the *for*-phrase is interpreted as a purposive adjunct, i.e. ‘in order to get a knockoff Charizard card’).

- (85) * What I did [_{PP} for a knockoff Charizard card] was [_{VP} trade [_{DP} my shiny Pikachu] [_{PP} to Joni]].

In order to resolve these constituency paradoxes, we must therefore abandon one of our premises: either binding and licensing do not diagnose c-command, or parasitic gap licensing does not diagnose the absence of c-command.⁵⁴ While I am not aware of an alternative account of the anti-c-command condition on parasitic gap licensing, there are alternative analyses of binding which do not rely on c-command. For instance, Bruening (2014) (building on earlier proposals by Langacker 1969, Jackendoff 1972, and Lasnik 1976) argues that binding, as defined in (86), is constrained by the conjunction of two separate relations—linear precedence and phase-command ((87)).

(86) **Binding**

A binds B iff A and B are coindexed and A precedes and phase-commands B. (Bruening 2014: 344, (4))

(87) **Phase-command**

X phase-commands Y iff there is no ZP, ZP a phasal node, such that ZP dominates X but does not dominate Y. (Bruening 2014: 343, (2))

(88) **Phasal nodes**

CP, VoiceP, DP⁵⁵

⁵⁴As Janke and Neeleman (2012: 181, (109a)) note, we could also reject the hypothesis that strings correspond to a single constituent structure (what Phillips 1996: 23 and sec. 2.8 calls the *Single Structure Hypothesis*). Pesetsky (1995) pursues this option by proposing that two structures exist simultaneously for every string: roughly, one that ascends (in so-called *Layered Syntax*) and one that descends (in so-called *Cascade Syntax*). See Janke and Neeleman (2012: 181–182) for conceptual reasons not to pursue such an approach.

⁵⁵I diverge from Bruening (2014) in two regards: (i) I take the clause internal phase, at least in the case of the passive, to be VoiceP rather than vP, and (ii) I propose that the maximal nominal projection, which forms a phase, is DP, not NP.

By adopting Bruening’s definition of binding, we can account for the data in (77)–(81) without abandoning the anti-c-command condition on parasitic gap licensing.⁵⁶

Consider (77) once more, which combines parasitic gap licensing with rightward binding into an adjunct. The parasitic gap-containing adjunct must attach above the direct object licensing gap to comply with the anti-c-command condition and it must attach to the right of it; I assume for simplicity that the adjunct attaches to vP. In order for the QP *every boy* to bind the pronominal variable *him* in the adjunct, *every boy* must precede and phase-command *him*. Because PP is not a phasal node (see (88)), the minimal phasal node dominating *every boy* is VoiceP and this node also dominates *him*. Therefore, *every boy* precedes and phase-commands *him* and can bind *him* despite the lack of c-command:

- (89) Which snack_k did you [VoiceP [vP give ____k [PP to every boy_i]] [PP despite him_i not liking pg_k]]?

Thus, binding and licensing asymmetries can be accounted for without adopting a radically descending approach to English verb phrase structure. Rather, we have seen that there is solid empirical evidence both from *do so*–replacement (section §3.1) and from parasitic gap licensing that arguments and adjuncts can ascend. Contrary to the alternative analysis of precedence-based intervention effects laid out in section §4.1, it cannot be concluded that the leftmost DP within vP will always be the highest. Intervention effects in (A-)movement dependencies are determined with respect to linear precedence, not structural prominence.

5 Conclusion

This paper reported and discussed the novel generalization in (90).

(90) **Order dependence in English passivization**

When just one DP can undergo passive A-movement in English, it is invariably the leftmost accessible DP within vP.

⁵⁶See Janke and Neeleman (2012: sec. 7) for a different account of binding that also does not rely on c-command.

I argued that (90) finds a simple explanation in procedural aspects of probing. Building on recent work by Branan and Erlewine (2022b) and Chow (2022), among others, I proposed an explicit, depth-first, left-to-right algorithm for search triggered by Merge-features: the algorithm exhaustively searches through an internally complex left daughter of a node *N* prior to evaluating *N*'s right daughter. Because search halts when a matching goal is found, the leftmost among multiple potential goals in the probe's search domain will always be privileged for extraction. Unlike most previous approaches to intervention effects, my analysis ascribes no role to *c*-command (asymmetric or otherwise). By not making assumptions about the relative structural prominence of multiple potential goals, my analysis is compatible with both ascending and descending vP structures. Crucially, I showed there to be strong independent evidence for ascending vP structures; in particular, I adduced novel evidence that clause-final adverbials can occupy a relatively high position as right-adjuncts to vP (and, incidentally, for a non-*c*-command-based account of binding) coming from the anti-*c*-command condition on parasitic gap licensing. Radically descending approaches to English verb phrase structure were argued to be empirically inadequate.

The discovery in (90) therefore provides new and independent support for countenancing precedence in the syntax (see also Bruening 2014). A clear prediction of my analysis, which holds that left-to-right⁵⁷ search is initiated by all internal Merge-triggering features, is that precedence-based intervention ought to also be attested in the domain of \bar{A} -movement, as in classical superiority effects. The contrasts in (91) suggest that this prediction may indeed be borne out, though I must leave a fuller investigation of these matters

⁵⁷As Erik Zyman (*pers. comm.*) points out to me, my analysis, on the face of it, leads us to expect that, in languages with dominant VOS or OVS word order, *O* should be privileged for (classical or hyper)raising to subject or object (assuming that independent constraints do not rule out extraction of *O*; see Rackowski and Travis 2000: 124 and Chung 2017 for pertinent discussion). If it turns out that, in such languages, *S* is actually privileged for extraction, my analysis could nonetheless be maintained by positing cross-linguistic parameterization of the direction of search: either left-to-right or right-to-left. I will leave this important question for future work.

for future research.⁵⁸

(91) *Superiority-based intervention in wh-questions is sensitive to linear precedence, not structural prominence*⁵⁹

- a. i. Who_i did you talk [PP to ____] [PP about what]?
ii. * What_i did you talk [PP to who] [PP about ____]_i?
(McInnerney 2022: 285, (147); see also Jackendoff 1990: 433, (25c–d) and Larson 2014: 317, (48d))
- b. i. Which painting_i did you look [PP at ____] [PP in which exhibit]?
ii. * Which exhibit_i did you look [PP at which painting] [PP in ____]_i?
(McInnerney 2022: 285, (148))
- c. i. Who_i were these cookies given [PP to ____]_i [PP by who(m)]?
ii. ?? Who_i were these cookies given [PP to who] [PP by ____]_i?
(cf. Who_i were these cookies given [PP to Chris] [PP by ____]_i?)
- d. i. Which girl_i did you give the cookies [PP to ____] [PP on which boy's birthday]?
ii. * Which boy's birthday_i did you give the cookies [PP to which girl] [PP on ____]_i?
(cf. Which boy's birthday_i did you give the cookies [PP to Joni] [PP on ____]_i?)

⁵⁸ Additionally, Erik Zyman (*pers. comm.*) reports the following series of judgments to me which seem to provide additional strong support for my conjecture that intervention effects in *wh*-movement are (or can be) determined by linear precedence rather than asymmetric c-command (thanks also to Kutay Serova (*pers. comm.*) for valuable discussion):

- (i) a. You introduced [DP the inventor of the Xbox] [PP to [DP the promoter of the Wii]].
b. Wait, you introduced [DP the inventor of WHAT] [PP to [DP the promoter of WHAT]]?!
c. What did you introduce [DP the inventor of ____] [PP to [DP the promoter of what]]?
d. ?* What did you introduce [DP the inventor of what] [PP to [DP the promoter of ____]]?
- (ii) a. You wanted [DP the inventor of the Xbox] to meet [DP the promoter of the Wii].
b. Wait, you wanted [DP the inventor of WHAT] to meet [DP the promoter of WHAT]]?!
c. What did you want [DP the inventor of ____] to meet [DP the promoter of what]?
d. ?* What did you want [DP the inventor of what] to meet [DP the promoter of ____]?

⁵⁹ See Bruening (2001: 264) and Müller (2011: sec. 2.2.2) for related empirical observations from English and German, respectively, that deserve further scrutiny in this context.

References

- Abels, Klaus. 2003. Successive cyclicity, anti-locality, and adposition stranding. Doctoral Dissertation, University of Connecticut.
- Adger, David. 2003. *Core Syntax: A Minimalist Approach*. Oxford: Oxford University Press.
- Aelbrecht, Lobke, and William Harwood. 2018. Predicate ellipsis. In *The Oxford Handbook of Ellipsis*, ed. Jeroen van Craenenbroeck and Tanja Temmerman, 504–525. Oxford: Oxford University Press.
- Al Khalaf, Eman. 2015. Coordination and linear order. Doctoral Dissertation, University of Delaware.
- Alexander, D., and W. J. Kunz. 1964. *Some Classes of Verbs in English*. Bloomington: Indiana University Linguistics Research Project.
- Anagnostopoulou, Elena. 2003. *The Syntax of Ditransitives: Evidence from Clitics*. Berlin: de Gruyter.
- Angelopoulos, Nikos, Chris Collins, and Arhonto Terzi. 2020. Greek and English passives, and the role of *by*-phrases. *Glossa* 5:1–29.
- Arregi, Karlos, and Andrew Murphy. 2022. Argument-internal parasitic gaps. Ms., The University of Chicago.
- Atlamaz, Ümit. 2019. Agreement, case, and nominal licensing. Doctoral Dissertation, Rutgers University.
- Aycock, Seth. 2020. A third-factor account of locality: Explaining impenetrability and intervention effects with minimal search. *Cambridge Occasional Papers in Linguistics* 12:1–30.
- Bach, Emmon W. 1980. In defense of passive. *Linguistics and Philosophy* 3:297–341.
- Baker, Mark, Kyle Johnson, and Ian Roberts. 1989. Passive arguments raised. *Linguistic Inquiry* 20:219–251.
- Barss, Andrew, and Howard Lasnik. 1986. A note on anaphora and double objects. *Linguistic Inquiry* 17:347–354.
- Berwick, Robert C., Noam Chomsky, and Massimo Piattelli-Palmarini. 2013. Poverty of the stimulus stands: Why recent challenges fail. In *Rich Languages from Poor Inputs*, ed. Massimo Piattelli-Palmarini and Robert C. Berwick, 19–42. Oxford: Oxford University Press.

- Blight, Ralph. 2000. Pseudo-passives and adjacency. In *Proceedings of the 9th Student Conference in Linguistics (SCIL 9)*, ed. Ljuba Veselinova, Susan Robinson, and Lamont Antieau, volume 36 of *MITWPL*, 75–91. Cambridge, MA: MIT Press.
- Bondarenko, Tatiana, and Colin Davis. 2021. Sub-extraction asymmetries and linearization in russian. *Journal of Slavic Linguistics* 29:1–13.
- Borer, Hagit. 2005a. *Structuring Sense*. Vol. 1, *In Name Only*. Oxford: Oxford University Press.
- Borer, Hagit. 2005b. *Structuring Sense*. Vol. 2, *The Normal Course of Events*. Oxford: Oxford University Press.
- Bowers, John. 1998. On pseudogapping. Ms., Cornell University.
- Bowers, John. 2002. Transitivity. *Linguistic Inquiry* 33:183–224.
- Bowers, John. 2010. *Arguments As Relations*. Cambridge, MA: MIT Press.
- Branan, Kenyon, and Michael Yoshitaka Erlewine. 2022a. \bar{A} -probing for the closest DP. *Linguistic Inquiry* 1–27. Early Access article.
- Branan, Kenyon, and Michael Yoshitaka Erlewine. 2022b. Locality and (minimal) search. Ms. Available at <https://ling.auf.net/lingbuzz/005791>.
- Browning, Marguerite. 1987. Null operator constructions. Doctoral Dissertation, MIT.
- Bruening, Benjamin. 2001. QR obeys superiority: Frozen scope and ACD. *Linguistic Inquiry* 32:233–273.
- Bruening, Benjamin. 2011. Pseudopassives, expletive passives, and locative inversion. Ms., University of Delaware.
- Bruening, Benjamin. 2014. Precede-and-command revisited. *Language* 90:342–388.
- Bruening, Benjamin. 2018. CPs move rightward, not leftward. *Syntax* 21:362–401.
- Bruening, Benjamin. 2019. Passive *do so*. *Natural Language & Linguistic Theory* 37:1–49.
- Bruening, Benjamin, and Eman Al Khalaf. 2019. No argument-adjunct asymmetry in reconstruction for Binding Condition C. *Journal of Linguistics* 55:247–276.
- Bruening, Benjamin, and Eman Al Khalaf. 2020. Category mismatches in coordination revisited. *Linguistic Inquiry* 51:1–36.
- Chomsky, Noam. 1973. Conditions on transformations. In *A Festschrift for Morris Halle*, ed. Stephen A Anderson and Paul Kiparsky, 232–286. New York: Holt, Rinehart and Wilson.

- Chomsky, Noam. 1981. *Lectures on Government and Binding: The Pisa Lectures*. Dordrecht: Foris Publications.
- Chomsky, Noam. 1982. *Some concepts and consequences of the theory of government and binding*. Cambridge, MA: MIT Press.
- Chomsky, Noam. 1986. *Barriers*. Cambridge, MA: MIT Press.
- Chomsky, Noam. 1995a. Bare phrase structure. In *Government and Binding Theory and The Minimalist Program*, ed. Gert Webelhuth, 383–439. Cambridge, MA: Blackwell.
- Chomsky, Noam. 1995b. *The Minimalist Program*. Cambridge, MA: MIT Press.
- Chomsky, Noam. 2000. Minimalist inquiries: The framework. In *Step by Step: Essays on Minimalist Syntax in Honor of Howard Lasnik*, ed. Roger Martin, David Michaels, and Juan Uriagereka, 89–155. Cambridge, MA: MIT Press.
- Chomsky, Noam. 2001. Derivation by phase. In *Ken Hale: A Life in Language*, ed. Michael Kenstowicz, 1–52. Cambridge, MA: MIT Press.
- Chomsky, Noam. 2004. Beyond explanatory adequacy. In *Structures and Beyond: The Cartography of Syntactic Structures*, ed. Adriana Belletti, 104–131. Oxford: Oxford University Press.
- Chomsky, Noam. 2005. Three factors in language design. *Linguistic Inquiry* 36:1–22.
- Chomsky, Noam. 2008. On phases. In *Foundational Issues in Linguistic Theory*, ed. Robert Freidin, Carlos P. Otero, and Maria Luisa Zubizarreta, 133–166. Cambridge, MA: MIT Press.
- Chomsky, Noam. 2013. Problems of projection. *Lingua* 130:33–49.
- Chomsky, Noam. 2015. Problems of projection: Extensions. In *Structures, Strategies, and Beyond: Studies in honour of Adriana Belletti*, ed. Elisa Di Domenico, Cornelia Hamann, and Simona Matteini, 3–16. Amsterdam: John Benjamins.
- Chomsky, Noam. 2020. The UCLA lectures. Ms. Available at <https://ling.auf.net/lingbuzz/005485>.
- Chomsky, Noam. 2021. Minimalism: Where are we now, and where can we hope to go. *Gengo Kenkyu* 160:1–41.
- Chomsky, Noam, Ángel J. Gallego, and Dennis Ott. 2019. Generative grammar and the faculty of language: Insights, questions, and challenges. *Catalan Journal of Linguistics* Special issue:229–261.
- Chow, Keng Ji. 2022. A novel algorithm for minimal search. *Snippets* 42:3–5.

- Chung, Sandra. 2017. VOS languages: Some of their properties. In *The Wiley Blackwell Companion to Syntax*, ed. Martin Everaert and Henk C. van Riemsdijk. Malden, MA: Wiley-Blackwell, 2nd edition.
- Collins, Chris. 2002. Eliminating labels. In *Derivation and Explanation in the Minimalist Program*, ed. Samuel David Epstein and T. Daniel Seely, 42–64. Oxford: Blackwell.
- Collins, Chris. 2005a. A smuggling approach to raising in English. *Linguistic Inquiry* 36:289–298.
- Collins, Chris. 2005b. A smuggling approach to the passive in English. *Syntax* 8:81–120.
- Collins, Chris. 2017. Merge(X,Y) = {X,Y}. In *Labels and Roots*, ed. Leah Bauke and Andreas Blümel, 47–68. Berlin: De Gruyter.
- Collins, Chris. Forthcoming. *Principles of Argument Structure: A Merge-Based Approach*. Cambridge, MA: MIT Press.
- Collins, Chris, and Richard S. Kayne. 2023. Towards a theory of morphology as syntax. *Studies in Chinese Linguistics* 44:1–32.
- Collins, Chris, and Edward Stabler. 2016. A formalization of minimalist syntax. *Syntax* 19:43–78.
- Contreras, Heles. 1984. A note on parasitic gaps. *Linguistic Inquiry* 15:698–701.
- Culicover, Peter W., and Ray Jackendoff. 2005. *Simpler Syntax*. Oxford: Oxford University Press.
- Davies, William D., and Stanley Dubinsky. 1998. Sentential subjects as complex NPs: New reasons for an old account of subjacency. In *CLS 34: The Main Session (The Proceedings from the Main Session of the Chicago Linguistic Society's Thirty-fourth Meeting, Volume 1)*, ed. M. Catherine Gruber, Derrick Higgins, Kenneth S. Olson, and Tamara Wysocki, 83–94. Chicago, IL: Chicago Linguistic Society.
- Davies, William D., and Stanley Dubinsky. 2001. Functional architecture and the distribution of subject properties. In *Objects and Other Subjects: Grammatical Functions, Functional Categories, and Configurationality*, ed. William D. Davies and Stanley Dubinsky, 247–279. Dordrecht: Kluwer.
- Davies, William D., and Stanley Dubinsky. 2009. On the existence (and distribution) of sentential subjects. In *Hypothesis A/Hypothesis B: Linguistic Explorations in Honor of David M. Perlmutter*, ed. Donna B. Gerdts, John C. Moore, and Maria Polinsky, 111–128. Cambridge, MA: MIT Press.
- Davis, Colin. 2020. The linear limitations of syntactic derivations. Doctoral Dissertation, MIT.

- Davis, Colin P. 2021. Possessor extraction in colloquial English: Evidence for successive cyclicity and cyclic linearization. *Linguistic Inquiry* 52:291–332.
- De Belder, Marijke, and Jeroen Van Craenenbroeck. 2015. How to merge a root. *Linguistic Inquiry* 46:625–655.
- Deal, Amy Rose. To appear. Current models of Agree. In *Move and Agree: towards a formal typology*, ed. James Crippen, Rose-Marie Dechaine, and Hermann Keupdjio. Amsterdam: John Benjamins. Available at <https://ling.auf.net/lingbuzz/006504>.
- D’Elia, Samuel C. 2016. The spray/load and dative alternations: Aligning VP structure and contextual effects. Doctoral Dissertation, University of Kent.
- Diercks, Michael. 2017. Locative inversion. In *The Wiley Blackwell Companion to Syntax*, ed. Martin Everaert and Henk C. van Riemsdijk. Malden, MA: Wiley-Blackwell, 2nd edition.
- Drummond, Alex. 2011. Binding phenomena within a reductionist theory of grammatical dependencies. Doctoral Dissertation, University of Maryland, College Park.
- Drummond, Alex. 2013. The case for extraposition as movement. UMass Amherst Class Handout. Available at <https://adrummond.net/umasstalk2.pdf>.
- Emonds, Joseph. 1970. Root and structure-preserving transformation. Doctoral Dissertation, Massachusetts Institute of Technology.
- Emonds, Joseph E. 1976. *A Transformational Approach to English Syntax: Root, Structure-Preserving, and Local Transformations*. New York: Academic Press.
- Emonds, Joseph Embley. 2017. Adjectival and analytic passives. In *The Wiley Blackwell Companion to Syntax*, ed. Martin Everaert and Henk C. van Riemsdijk, 1–60. Malden, MA: Wiley-Blackwell, 2nd edition.
- Engdahl, Elisabet. 1983. Parasitic gaps. *Linguistics and Philosophy* 6:5–34.
- Epstein, Samuel David, Hisatsugu Kitahara, and T. Daniel Seely. 2014. Labeling by minimal search: Implications for successive-cyclic A-movement and the conception of the postulate “Phase”. *Linguistic Inquiry* 45:463–481.
- Epstein, Samuel David, Hisatsugu Kitahara, and T. Daniel Seely. 2020. Unifying labeling under minimal search in “single-” and “multiple-specifier” configurations. In *Coyote Papers 22: Proceedings of the Arizona Linguistics Circle 13*, ed. Remo Nitschke, Damian Y. Romero Diaz, Gabriela De La Cruz Sánchez, and John W. W. Powell, 1–11.
- Fukui, Naoki. 2001. Phrase structure. In *The Handbook of Contemporary Syntactic Theory*, ed. Mark Baltin and Chris Collins, 374–406. Malden, MA: Blackwell.

- Gengel, Kirsten. 2013. *Pseudogapping and Ellipsis*. Oxford: Oxford University Press.
- Grohmann, Kleanthes K. 2011. Anti-locality: Too-close relations in grammar. In *Oxford Handbook of Linguistic Minimalism*, ed. Cedric Boeckx, 260–290. Oxford: Oxford University Press.
- Haddican, Bill. 2007. The structural deficiency of verbal pro-forms. *Linguistic Inquiry* 38:539–547.
- Haegeman, Liliane. 1984. Parasitic gaps and adverbial clauses. *Journal of Linguistics* 20:229–232.
- Halpert, Claire. 2019. Raising, unphased. *Natural Language & Linguistic Theory* 37:123–165.
- Han, Hye Jin. 2005a. A DP/NP-shell for subject CPs. In *Proceedings of the 31st Annual Meeting of the Berkeley Linguistics Society: General Session and Parasession on Prosodic Variation and Change*, ed. Rebecca T. Cover and Yuni Kim, 133–143. Berkeley: University of California, Berkeley Linguistics Society.
- Han, Hye Jin. 2005b. A nominal-shell for CPs: Beyond subject CPs. In *CLS 41: The Main Session. Proceedings from the Main Session of the Forty-First Meeting of the Chicago Linguistic Society, Volume 1*, ed. Rodney L. Edwards, Patrick J. Midtlyng, Colin L. Sprague, and Kjersti G. Stensrud, 95–109. Chicago, IL: Chicago Linguistic Society.
- Hartman, Jeremy. 2012. Varieties of clausal complementation. Doctoral Dissertation, Massachusetts Institute of Technology.
- Heck, Fabian, and Gereon Müller. 2007. Extremely local optimization. In *Proceedings of the 34th Western Conference on Linguistics (WECOL 2006)*, ed. Erin Bainbridge and Brian Agbayani, volume 17, 170–182. Fresno, CA: California State University.
- Hedberg, Nancy, and Richard C. DeArmond. 2009. On complements and adjuncts. *Snippets* 19:11–12.
- Hewett, Matthew. 2023. The (lack of) Case for A-movement. Ms., Georgetown University.
- Heycock, Caroline. 1995. Asymmetries in reconstruction. *Linguistic Inquiry* 26:547–570.
- Higgins, Francis R. 1973. On J. Emonds’s analysis of extraposition. In *Syntax and semantics*, ed. John Kimball, volume 2, 149–195. New York: Academic Press.
- Holmberg, Anders, Michelle Sheehan, and Jenneke Van der Wal. 2019. Movement from the double object construction is not fully symmetrical. *Linguistic Inquiry* 50:677–722.
- Hornstein, Norbert. 2009. *A Theory of Syntax: Minimal Operations and Universal Grammar*. Cambridge: Cambridge University Press.

- Hornstein, Norbert, and Amy Weinberg. 1981. Case theory and preposition stranding. *Linguistic Inquiry* 12:55–91.
- Houser, Michael John. 2010. The syntax and semantics of *do so* anaphora. Doctoral Dissertation, University of California, Berkeley.
- Huang, C.-T. James. 1993. Reconstruction and the structure of VP: Some theoretical consequences. *Linguistic Inquiry* 24:103–138.
- Jackendoff, Ray. 1972. *Semantic Interpretation in Generative Grammar*. Cambridge, MA: MIT Press.
- Jackendoff, Ray. 1990. On Larson’s treatment of the double object construction. *Linguistic Inquiry* 21:427–456.
- Jaeggli, Osvaldo. 1986. Passive. *Linguistic Inquiry* 17:587–622.
- Janke, Vikki, and Ad Neeleman. 2012. Ascending and descending VPs in English. *Linguistic Inquiry* 43:151–190.
- Johnson, Kyle. 2004. Introduction to Transformational Grammar. Ms., University of Massachusetts, Amherst.
- Kayne, Richard S. 1984. *Connectedness and Binary Branching*. Dordrecht: Foris.
- Kayne, Richard S. 1994. *The Antisymmetry of Syntax*. Cambridge, MA: MIT Press.
- Kayne, Richard S. 2011. Why are there no directionality parameters? In *Proceedings of the 28th West Coast Conference on Formal Linguistics*, ed. Mary Byram Washburn, Katherine McKinney-Bock, Erika Varis, Ann Sawyer, and Barbara Tomaszewicz, 1–23. Somerville, MA: Cascadia Proceedings Project.
- Kayne, Richard S. 2022. Antisymmetry and externalization. *Studies in Chinese Linguistics* 43:1–20.
- Ke, Alan Hezao. 2019. The syntax, semantics and processing of agreement and binding grammatical illusions. Doctoral Dissertation, The University of Michigan.
- Ke, Alan Hezao. 2022. Can Agree and Labeling be reduced to Minimal Search? *Linguistic Inquiry* 1–33.
- Ke, Alan Hezao. 2023. Search downward: Minimal search-based Agree. *Glossa* 8:1–38.
- Keine, Stefan. 2019. Selective opacity. *Linguistic Inquiry* 50:13–62.
- Keine, Stefan. 2020. *Probes and Their Horizons*. Cambridge, MA: MIT Press.

- Kitahara, Hisatsugu. 1997. *Elementary Operations and Optimal Derivations*. Cambridge, MA: MIT Press.
- Ko, Heejeong. 2007. Asymmetries in scrambling and cyclic linearization. *Linguistic Inquiry* 38:49–83.
- Ko, Heejeong. 2011. Predication and edge effects. *Natural Language & Linguistic Theory* 29:725–778.
- Ko, Heejeong. 2014. *Edges in Syntax: Scrambling and Cyclic Linearization*, volume 50. Oxford: Oxford University Publishing.
- Kratzer, Angelika. 1996. Severing the external argument from its verb. In *Phrase Structure and the Lexicon*, ed. Johan Rooryck and Laurie Zaring, 109–137. Dordrecht: Kluwer.
- Krivochen, Diego Gabriel. 2023. The search for minimal search: A graph-theoretic approach. *Biolinguistics* 17:1–50.
- Kuno, Susumu. 1973. Constraints on internal clauses and sentential subjects. *Linguistic Inquiry* 4:363–385.
- Kuno, Susumu. 1981. The syntax of comparative clauses. In *Papers from the 17th Regional Meeting of the Chicago Linguistic Society*, ed. Roberta A. Hendrick, Carrie S. Masek, and Mary Frances Miller, 136–155. Chicago, IL: University of Chicago, Chicago Linguistic Society.
- Kuno, Susumu, and Jane J. Robinson. 1972. Multiple wh questions. *Linguistic Inquiry* 3:463–487.
- Lakoff, George, and John Robert Ross. 1966. Criterion for verb phrase constituency. In *Mathematics and Automatic Translation. NSF-17*, vol. II, ed. Anthony G Oettinger, 1–11.
- Landau, Idan. 2007. Constraints on partial VP-fronting. *Syntax* 10:127–164.
- Langacker, Ronald. 1969. On pronominalization and the chain of command. In *Modern Studies in English*, ed. David A. Reibel and Sanford A. Schane, 160–186. Englewood Cliffs, NJ: Prentice-Hall.
- Langendoen, D. Terrence, and Geoffrey K Pullum. 1977. Preposition stranding in English: A problem and a mystery. In *CLS Book of Squibs/Cumulative Index 1968-1977*, ed. Samuel E Fox, Woodford A Beach, and Shulamith Philosoph, 64–65. Chicago: Chicago Linguistic Society.
- Larson, Bradley. 2015. Minimal search as a restriction on Merge. *Lingua* 156:57–69.

- Larson, Richard K. 1988. On the double object construction. *Linguistic Inquiry* 19:335–391.
- Larson, Richard K. 1990. Double objects revisited: Reply to Jackendoff. *Linguistic Inquiry* 21:589–632.
- Larson, Richard K. 2014. *On Shell Structure*. New York: Routledge.
- Larson, Richard K. 2022. VP-preposing and constituency “paradox”. *Linguistic Inquiry* 1–59.
- Lasnik, Howard. 1976. Remarks on coreference. *Linguistic Analysis* 2:1–22.
- Lasnik, Howard, and Mamoru Saito. 1991. On the subject of infinitives. In *CLS 27: Papers from the 27th Regional Meeting of the Chicago Linguistic Society. Part 1: The General Session*, ed. Lise M. Dobrin, Lynn Nichols, and Rosa M. Rodriguez, 324–343. Chicago: Chicago Linguistic Society.
- Lebowski, Zach. 2021. CED effects in ascending and descending structures: Evidence from extraction asymmetries. Ms., The University of Chicago.
- Lechner, Winfried. 2003. Phrase structure paradoxes, movement and ellipsis. In *The Interfaces: Deriving and Interpreting Omitted Structures*, ed. Kerstin Schwabe and Susanne Winkler, 177–203. Amsterdam: John Benjamins.
- Lees, Robert B. 1960. *The grammar of English nominalizations*. The Hague: Mouton.
- Levin, Beth. 1993. *English Verb Classes and Alternations: A Preliminary Investigation*. Chicago, IL: The University of Chicago Press.
- Lohndal, Terje. 2012. Without specifiers: Phrase structure and events. Doctoral Dissertation, University of Maryland, College Park.
- May, Robert. 1985. *Logical Form: Its Structure and Derivation*. Cambridge, MA: MIT Press.
- McCawley, James D. 1998. *The Syntactic Phenomena of English*. Chicago: The University of Chicago Press, 2nd edition.
- McGinnis, Martha. 1998. Locality in A-movement. Doctoral Dissertation, Massachusetts Institute of Technology.
- McGinnis, Martha. 2001. Variation in the phase structure of applicatives. *Linguistic Variation Yearbook* 1:105–146.
- McInnerney, Andrew. 2022. The argument/adjunct distinction and the structure of prepositional phrases. Doctoral Dissertation, The University of Michigan.

- Merchant, Jason. 2013. Voice and ellipsis. *Linguistic Inquiry* 44:77–108.
- Merchant, Jason. 2014. Some definitions. Ms., The University of Chicago.
- Merchant, Jason. 2019. Roots don't select, categorial heads do: lexical-selection of PPs may vary by category. *The Linguistic Review* 36:325–341.
- Milway, Daniel. 2023. A formalization of Agree as a derivational operation. *Biolinguistics* 17:1–39.
- Mita, Ryohei. 2009. On tritransitive verbs. In *Germanic Languages and Linguistic Universals*, ed. John Ole Askedal, Ian Roberts, Tomonori Matsushita, and Hiroshi Hasegawa, 121–142. Amsterdam: John Benjamins.
- Moulton, Keir. 2015. CPs: Copies and compositionality. *Linguistic Inquiry* 46:305–342.
- Müller, Gereon. 1998. *Incomplete Category Fronting: A Derivational Approach to Remnant Movement in German*. Dordrecht: Kluwer.
- Müller, Gereon. 2011. *Constraints on Displacement: A phase-based approach*. Amsterdam: John Benjamins.
- Müller, Gereon. 2021. Constraints on grammatical dependencies. In *A Companion to Chomsky*, ed. Nicholas Allott, Terje Lohndal, and Georges Rey, 190–209. Hoboken, NJ: Wiley Blackwell.
- Newman, Elise. 2020. Facilitator effects in middles and more. *Glossa* 5:1–40.
- Overfelt, Jason. 2015. Rightward movement: A study in locality. Doctoral Dissertation, University of Massachusetts, Amherst.
- Pesetsky, David. 1995. *Zero Syntax: Experiencers and Cascades*. Cambridge, MA: MIT Press.
- Pesetsky, David. 2000. *Phrasal Movement and Its Kin*. Cambridge, MA: MIT Press.
- Phillips, Colin. 1996. Order and structure. Doctoral Dissertation, Massachusetts Institute of Technology.
- Phillips, Colin. 2003. Linear order and constituency. *Linguistic Inquiry* 34:37–90.
- Pollard, Carl, and Ivan A Sag. 1992. Anaphors in English and the scope of binding theory. *Linguistic Inquiry* 23:261–303.
- Postal, Paul M. 1986. *Studies of Passive Clauses*. Albany: State University of New York Press.
- Preminger, Omer. 2014. *Agreement and Its Failures*. Cambridge, MA: MIT Press.

- Preminger, Omer. 2019. What the PCC tells us about “abstract” agreement, head movement, and locality. *Glossa* 4:1–42.
- Pylkkänen, Liina. 2008. *Introducing Arguments*. Cambridge, MA: MIT Press.
- Rackowski, Andrea, and Lisa Travis. 2000. V-initial languages: X or XP movement and adverbial placement. In *The Syntax of Verb Initial Languages*, ed. Andrew Carnie and Eithne Guilfoyle, 117–141. Oxford: Oxford University Press.
- Rauber, Ross. 2019. (To me) it seems (to me) (like a mess) (to me) (like a mess). Ms., The University of Chicago.
- Reinhart, Tanya Miriam. 1976. The syntactic domain of anaphora. Doctoral Dissertation, MIT.
- Richards, Marc. 2019. Problems of ‘Problems of Projection’: Breaking a conceptual tie. *Catalan Journal of Linguistics* Special issue:139–152.
- Richards, Norvin. 2014. A-bar movement. In *The Routledge Handbook of Syntax*, ed. Andrew Carnie, Yosuke Sato, and Daniel Siddiqi, 167–191. New York: Routledge.
- van Riemsdijk, Henk. 1978. *A Case Study in Syntactic Markedness: The Binding Nature of Prepositional Phrases*. Lisse: The Peter de Ridder Press.
- Rizzi, Luigi. 1990. *Relativized Minimality*. Cambridge, MA: MIT Press.
- Rizzi, Luigi. 2013. Locality. *Lingua* 130:169–186.
- Roberts, Ian. 2019. *Parameter Hierarchies and Universal Grammar*. Oxford: Oxford University Press.
- Rosenbaum, Peter. 1967. *The Grammar of English Predicate Complement Constructions*. Cambridge, MA: MIT Press.
- Ross, John Robert. 1967. Constraints on variables in syntax. Doctoral Dissertation, MIT.
- Safir, Ken. 1987. The anti-c-command condition on parasitic gaps. *Linguistic Inquiry* 678–683.
- Saito, Mamoru. 1991. Extraposition and parasitic gaps. In *Interdisciplinary Approaches to Language: Essays in Honor of S.-Y.-Kuroda*, ed. Carol Georgopoulos and Roberta Ishihara, 467–486. Dordrecht: Springer.
- Saito, Mamoru, and Naoki Fukui. 1998. Order in phrase structure and movement. *Linguistic Inquiry* 29:439–474.
- Stowell, Timothy Angus. 1981. Origins of phrase structure. Doctoral Dissertation, Massachusetts Institute of Technology.

- Takahashi, Shoichi. 2004. Pseudogapping and cyclic linearization. In *NELS 34*, ed. Keir Moulton and Matthew Wolf, 571–585. Amherst, MA: University of Massachusetts, Graduate Linguistic Student Association.
- Taraldsen, Knut Tarald. 1981. The theoretical interpretation of a class of marked extractions. In *Theory of Markedness in Generative Grammar: Proceedings of the 1979 GLOW Conference*, ed. Adriana Belletti, Luciana Brandi, and Luigi Rizzi. Scuola Normale Superiore di Pisa.
- Ura, Hiroyuki. 1996. Multiple feature-checking: A theory of grammatical function splitting. Doctoral Dissertation, Massachusetts Institute of Technology.
- Zwart, Jan-Wouter. 2011. Structure and order: Asymmetric Merge. In *The Oxford Handbook of Linguistic Minimalism*, ed. Cedric Boeckx, 96–118. Oxford: Oxford University Press.
- Zyman, Erik. 2017. P’urhepecha hyperraising to object: An argument for purely altruistic movement. *Proceedings of the Linguistic Society of America* 2:1–15.
- Zyman, Erik. 2022. Proleptic PPs are arguments: consequences for the argument/adjunct distinction and for selectional switch. *The Linguistic Review* 39:129–158.
- Zyman, Erik. To appear. On the definition of Merge. *Syntax*.
- Zyman, Erik, and Nick Kalivoda. 2020. XP- and X^0 -movement in the Latin verb: Evidence from mirroring and anti-mirroring. *Glossa* 5:1–38.