

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

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Yale Syntax Reading Group

1. Intervention effects

Syntactic movement is subject to *intervention-based* locality:

- (1) In the structure:

$$X \dots [\dots Z \dots Y \dots]$$

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))

Superiority effects (Kuno and Robinson 1972; Chomsky 1973) instantiate intervention in $\bar{A}$ -movement:

- (2) Wh-subjects intervene for $\bar{A}$ -movement of wh-objects

- a. I was wondering [_{CP} who_[wh] C_[+wh] [_{TP} Joni claimed brought what_[wh]]]? 
- b. *I was wondering [_{CP} what_[wh] C_[+wh] [_{TP} Joni claimed who_[wh] brought]]? 

Normally, 'closeness' is defined in terms of structural prominence determined via asymmetric c-command:

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

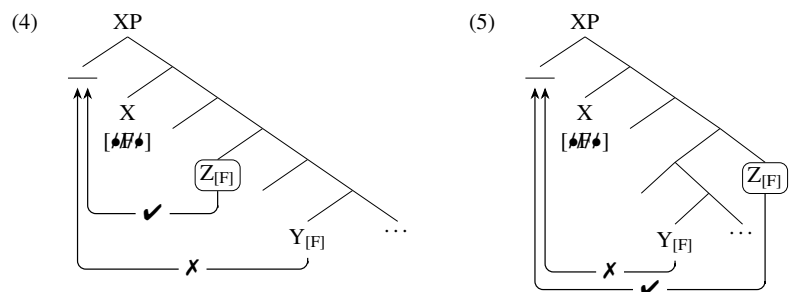
Given three syntactic objects X, Y, and Z, Z is closer to X than Y is iff:

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

(e.g. Relativized Minimality (Rizzi 1990) and the Minimal Link Condition (Chomsky 1995))

This predicts that intervention effects should be purely structural as in (4)–(5):

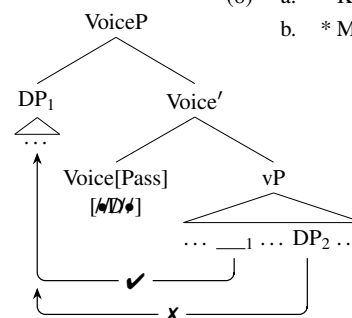
(N.B. ‘•’ features trigger external/internal Merge, following Heck and Müller (2007).)



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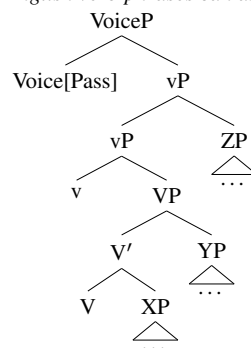
- **Discovery: precedence-based intervention exists**

- (6) **Precedence-based intervention in English passive A-movement** (section 2)
When just one constituent can undergo passive A-movement in English, it is invariably the leftmost accessible passivizable constituent within vP.
- (7) VoiceP (8) a. Krishna was [_{vP} depended [_{PP} on ____] [_{PP} for money]].
b. *Money was [_{vP} depended [_{PP} on Krishna] [_{PP} for ____]].



Left-to-right intervention cannot be derived from structural prominence: two lines of evidence show that left-to-right order within vP can correspond to an *ascending* structure like (9) (section 3):

- (9) *English verb phrases can ascend* (pace e.g. Larson 1988; Kayne 1994)



- ✓ *Do so*-replacement (building on Janke and Neeleman 2012)
- ✓ The anti-c-command condition on parasitic gap licensing
 - ↪ Supports a non-c-command-based account of binding (section 4; see esp. Bruening 2014).

Precedence-based intervention is derivable from procedural aspects of internal Merge-triggered search (section 6). I propose a novel search algorithm (see also Branan and Erlewine 2022; Chow 2022).

→ **Syntactic movement must be able to refer to linear precedence.**

The analysis predicts that precedence-based intervention should be observable with other movements, e.g. *wh*-movement (section 7).

2. Precedence-based intervention in English A-movement: the data

(10) Precedence-based intervention in English A-movement

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

2.1. Precedence-based intervention in verb phrases with multiple arguments

Left-to-right passive asymmetries in V-DP-{DP/CP}

In Standard English, the order of arguments is fixed and only the leftmost argument may passivize: (See Appendix C for an account of why direct objects can passivize in V-DP-DP in some languages.)

(11) V-DP-DP

- The bank denied [DP Mike] [DP a loan].
- * The bank denied [DP a loan] [DP Mike].
- [DP Mike] was denied ___ [DP a loan] by the bank.
- * [DP A loan] was denied [DP Mike] ___ by the bank.

(12) V-DP-CP_{that}

- The principal assured [DP Reuben] [CP that Judah was not in trouble].
- * The principal assured [CP that Judah was not in trouble] [DP Reuben].
- [DP Reuben] was assured ___ [CP that Judah was not in trouble] by the principal.
- * [CP That Judah was not in trouble] was assured [DP Reuben] ___ by the principal.

Left-to-right passive asymmetries in V-{DP/PP}-PP

(13) V-DP-PP

- They attributed [DP that idea] [PP to Joni].
- [DP That idea] was attributed ___ [PP to Joni] by them.
- * Joni was attributed [DP that idea] [PP to ___] by them.

(14) V-PP-PP

- The kids depended [PP on Krishna] [PP for money].
- Krishna was depended [PP on ___] [PP for money] by the kids.
- * Money was depended [PP on Krishna] [PP for ___] by the kids.

Unlike in V-DP-{DP/CP} frames, inversion of arguments is possible with V-{DP/PP}-PP w/ *extraposition*.

- They attributed ____i [PP to Joni] [DP every single idea that made the company money]_i.
- They depended ____i [PP for money] [PP on every funding source that was available]_i.

Yet, extraposition of an argument A to the right of an argument B fails to feed pseudopassivization out of B (see Postal 1986: 225–226; Pesetsky 1995: 275):

- * Joni_k was attributed ____i [PP to ____k] [DP every single idea that made the company money]_i.
- * Money_k was depended ____i [PP for ____k] [PP on every funding source that was available]_i.

↪ I propose that extraposition lands in a position above the probe on Voice[Pass] triggering passive movement; hence, passivization must feed extraposition.

(See Appendix A for similar intervention effects in tritransitive V-DP-PP-PP verb phrases.)

Left-to-right passive asymmetries in V-CP_{that}-PP (see Appendix B on V-PP-CP_{Control})

Either V-CP_{that}-PP or V-PP-CP_{that} order is possible (see Bruening 2018: 364; *pace* Emonds 1970: 97ff.; Stowell 1981: 161), though V-PP-CP_{that} is preferred under neutral prosody. Yet, **only CP_{that} can passivize**.

(19) V-CP_{that}-PP

- Joni signaled [CP that dinner was ready] [PP to the gorilla].
- Joni signaled [PP to the gorilla] [CP that dinner was ready].
- [CP That dinner was ready] was signaled ___ [PP to the gorilla] by Joni.
- * The gorilla was signaled {[PP to ___]} [CP that dinner was ready] {[PP to ___]} by Joni.

Importantly, when CP_{that} is omitted, pseudopassivization becomes possible (see also Postal 1986: 225):

(20) The gorilla was signaled [PP to ___] by Joni.

ANALYSIS: V-CP_{that}-PP order is underlying, V-PP-CP_{that} order is derived via extraposition of CP_{that} (see also Stowell 1981: 161; Pesetsky 1995: 273–275; Bruening 2018: 365).

↪ Extraposition does not feed pseudopassivization (see above), accounting for the asymmetry.

Excursus: it's not about PP (adjunct) islandhood

✗ Failed pseudopassivization as adjunct islandhood (*to be rejected*)

Pseudopassivization is impossible out of the rightmost PPs in (13)–(19) because those PPs are (adjunct) islands.

PROBLEM #1: They allow extraction w/out an intervening argument ((20)), hence aren't islands.

PROBLEM #2: They are transparent for *wh*-movement, hence aren't islands:

(21) Who did Joni signal [CP that dinner was ready] [PP to ___]?

PROBLEM #3: As shown below, pseudopassivization *is* possible out of certain (low) adjuncts.

PROBLEM #4: vP-pseudoclefting shows that these PPs are **arguments** (Hedberg and DeArmond 2009).

(22) For a constituent XP,

- if XP can immediately follow *do* in a vP-pseudocleft, then it is an adjunct.
- if XP cannot immediately follow *do* in a vP-pseudocleft (but must instead surface within the pseudoclefted vP), then it is an argument. (Zyman 2022: 135, (11))

(23) What the actors did [PP on that stage] was [vP perform]. ↪ PP is an adjunct.

(24) * What the actors did [PP on that stage] was [vP rely]. ↪ PP is an argument.

None of the PPs in (13)–(19) can immediately follow *do* ↪ these PPs are arguments per (22b).

(25) * What they did [PP to Joni] was [vP attribute [DP that idea]].

(26) a. * What the kids did [PP on Krishna] was [vP depend [PP for money]].

b. * What the kids did [PP for money] was [vP depend [PP on Krishna]].

(27) * What Joni did [PP to the judge] was [vP confess [CP that Matt had done it]].

(N.B. (26b) is acceptable under an irrelevant parse where the *for*-phrase is a purposive adjunct.)

2.2. Precedence-based intervention in combinations of internal arguments and clause-final adjuncts

- (28) V-DP_{Arg}-PP_{Adj}
- Every guest ate [DP a sandwich] [PP on this couch].
 - [DP A sandwich] was eaten ___ [PP on this couch] by every guest.
 - * This couch was eaten {[PP on ___]} [DP a sandwich] {[PP on ___]} by every guest.
- (29) V-PP_{Arg}-PP_{Adj}
- The students worked [PP on no project] [PP in this classroom].
 - No project was worked {[PP on ___]} [PP in this classroom] {[PP on ___]} by the students.
 - * No classroom was worked {[PP in ___]} [PP on this project] {[PP in ___]} by the students.
- (30) V-CP_{Arg}-PP_{Adj}
- Nobody has ever written [CP that the world is flat] [PP in this notebook] before.
 - [CP That the world is flat] has never been written ___ [PP in this notebook] by anybody before.
 - * This notebook has never been written {[PP in ___]} [CP that the world is flat] {[PP in ___]} by anybody before.

Importantly, if the internal argument is omitted, pseudopassivization out of the adjunct is fine:

- This couch was eaten [PP on ___] by every guest.
- No classroom was worked [PP in ___] by the students.
- This notebook was written [PP in ___] by the conspiracy theorist.

Therefore, the unacceptability of (28c), (29c), and (30c) must be due to intervention.

2.3. Interim summary

(34) Precedence-based intervention in English passivization

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

Excursus: it's not about V-P adjacency

- ✗ Pseudopassivization requires V-P adjacency (e.g. van Riemsdijk 1978: 218–223, Hornstein and Weinberg 1981: 85–6, Bresnan 1982: 54, Blight 2000, Drummond and Kush 2015: 430–2).

- (35) The movie was talked (*today) about ___. (Richards 2017: 313, (1a))

PROBLEM: pseudopassivization is possible across low (e.g. manner) adverbials (see also Stowell 1981: 449, Culicover and Jackendoff 2005: 208, Postal 2010: 201, and Findlay 2016: 258–9):

- This door has been leaned heavily [PP on ___] once too often. (Truswell 2008: 168)
- John's lecture was listened carefully/attentively [PP to ___] by his students. (Takami 1992: 99)

→ There is no V-P adjacency requirement on pseudopassivization.

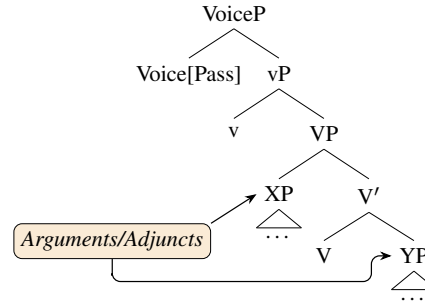
PROPOSAL: Temporal adverbials are generated higher → V-ADV-PP order with temporal adverbials ((35)) requires PP extraposition, but extraposition cannot feed (pseudo)passivization (see above).

3. English verb phrases can ascend

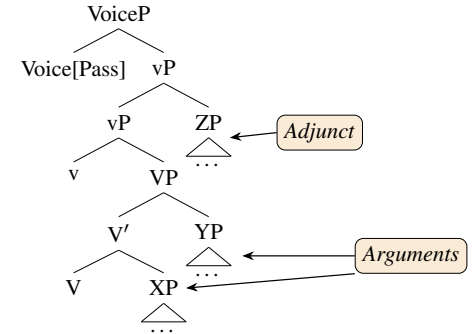
There are two ways to account for the precedence-based generalization in (34):

- ✗ If 'closeness' is determined via **structural prominence/asymmetric c-command** (e.g. Relativized Minimality, the Minimal Link Condition), then English verb phrases must only be *descending* ((38)).
- ✓ If 'closeness' is defined in terms of **linear precedence**, then English verb phrases may either be *descending* ((38)) or *ascending* ((39)).

(38) Descending verb phrase



(39) Ascending verb phrase



I provide **two arguments for ascending verb phrases** (see Appendix E for a third), contributing to a long line of research on English verb phrase structure (see Barss 1986; Larson 1988, 1990; Jackendoff 1990; Ernst 1994; Pesetsky 1995; Phillips 1996; Lechner 2003; Landau 2007; Janke and Neeleman 2012, a.o.).

English verb phrases can ascend: Evidence from *do so*-replacement

do so is a verb phrase anaphor which replaces a constituent of category V (Lakoff and Ross 1966; Fu et al. 2001; Houser 2010; Bruening 2019).

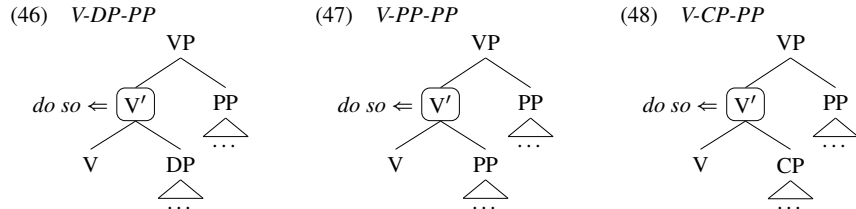
For many speakers (see Janke and Neeleman 2012), when a verb selects more than one internal argument, *do so* can replace V and its innermost argument, stranding other arguments, in the following frames:

- do so*-replacement in V-DP-PP
If he read_V [DP a sonnet] [PP to anyone famous], he did so [PP to Salman Rushdie]. (Janke and Neeleman 2012: 157, (14a))
- do so*-replacement in V-PP-PP
If they appealed_V [PP to Congress] [PP for anything], they did so [PP for aid].
- do so*-replacement in V-CP-PP
The judge concluded_V [CP that the defendant was guilty] [PP from the physical evidence], but the jury did so [PP from the oral arguments].

By contrast, *do so* cannot replace V and a non-adjacent argument, stranding V's linearly adjacent argument:

- * If he read_V [DP anything] [PP to Salman Rushdie], he did so [DP a beautiful sonnet].
- * If they appealed_V [PP to anyone] [PP for aid], they did so [PP to Congress].
- * The judge concluded_V [CP that the defendant was guilty] [PP from the physical evidence], but the jury did so [CP that she was innocent].

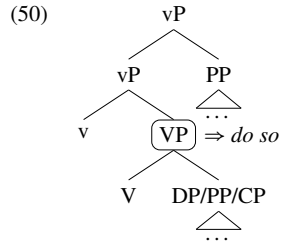
These data indicate that there must be a constituent of category V containing the verb and its linearly adjacent argument to the exclusion of other arguments—namely, V'. This is evidence for *ascending VPs*:



Similarly, *do so* can replace the verb and its argument(s), stranding rightward verb phrase adjuncts:

- (49) a. If she ate_V [DP the sandwich] [PP on any piece of furniture], she did so [PP on that couch].
 b. If the students worked_V [PP on their project] [PP in any classroom], they did so [PP in 12B].
 c. If he wrote_V [CP that the world is flat] [PP in any notebook], he did so [PP in that one right there].

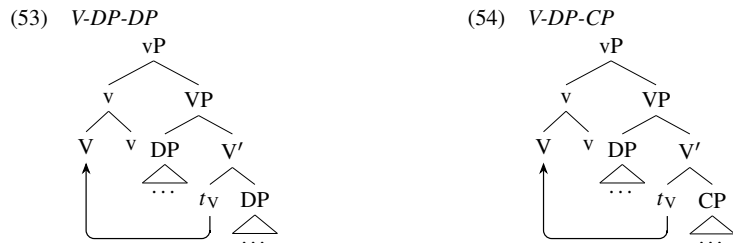
I assume for simplicity that these low adjuncts attach to vP on the right; *do so* can thus replace VP:



By contrast, *do so* cannot replace V and its linearly adjacent argument in V-DP-{DP/CP} frames.

- (51) *do so*-replacement in V-DP-DP
 *If he gave_V [DP Mary] [DP anything], he did so [DP a wool scarf]. (Janke and Neeleman 2012: 157)
 (52) *do so*-replacement in V-DP-CP
 *Matt promised_V [DP Joni] [CP that we'd bring plates], but Krishna did so [CP that we'd bring cups].

These VPs must therefore be *descending* (movement of V accounts for English word order, Larson 1988):



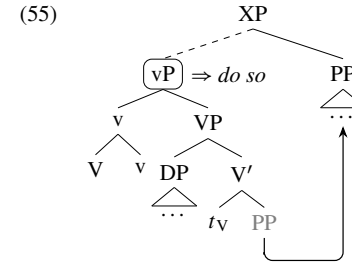
UPSHOT: *do so*-replacement reveals that verb phrases can *ascend*, contrary to the expectations of analyses where “leftmost = highest” (e.g. Larson 1988, 2022; Pesetsky 1995; Phillips 1996).

- ↪ Left-to-right intervention in passives cannot solely be derived from relative structural prominence.
The evidence favors precedence-based intervention over height-based intervention.

Excursus: no extraposition out of *do so*

✗ A descending VP analysis of (40)–(42) (to be rejected)

Verb phrases always *descend* and the reason that PP arguments can be stranded under *do so*-replacement is because PP can extrapose to the right.



PROBLEM: Extraposition and $\bar{A}$ -extraction are impossible out of *do so*.

- (56) ? John read _i carefully [DP almost all of Ecclesiastes]
 (*and Bill did so [DP the entirety of the Song of Solomon].
 (adapted from Janke and Neeleman 2012: 187, (126c))
 (57) I know who Joni SHOULD read a sonnet to, but I don't know who she SHOULDN'T (*do so).

UPSHOT: *do so*-replacement diagnoses base-generated VP constituency (pace McInnerney 2022).

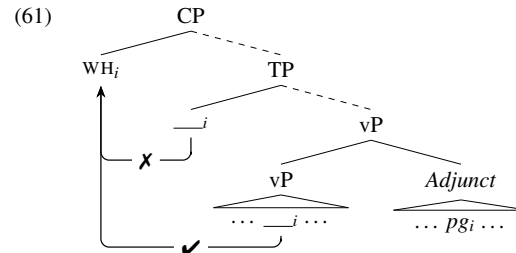
English verb phrases can ascend: the anti-c-command condition on parasitic gaps

A *parasitic gap* (*pg*) is a gap that is only grammatical in the presence of another gap created by *wh*-movement (= the ‘licensing gap’) (Taraldsen 1981; Chomsky 1982; Engdahl 1983).

- (58) a. Who_i did you offend _i [without even talking to *pg_i*]?
 b. * Who_i did you offend someone [without even talking to *pg_i*? (Arregi and Murphy 2022: 2)
 (59) **The anti-c-command condition on parasitic gaps**
 The licensing gap cannot c-command the parasitic gap.

- (60) * Who_i _i offended you [without you even talking to *pg_i*]?

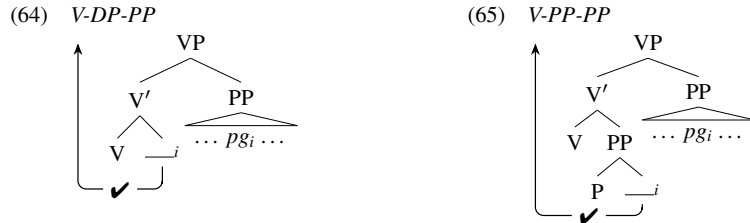
The contrast between (58a) and (60) is accounted for if verb phrase adjuncts adjoin to vP on the right (Nissenbaum 2000): a subject gap, but not a direct object gap, will c-command into the vP-level adjunct.



Adjuncts must be able to attach
 high on the right in vP
 ↪ adjuncts can **ascend**

Parasitic gaps can also be licensed in internal arguments. In ascending verb phrases with more than one internal argument, {extraction of/subextraction out of} one argument can license a *pg* in another argument:

- (62) *Parasitic gap licensing in V-DP-PP* (see also Arregi and Murphy 2022: 13, fn. 7)
 %_{[DP Which book]_i} did you _{[vP [_{v'} give _{___}]_i [_{PP} to anyone who you thought might like _{pg_i}]]?}
- (63) *Parasitic gap licensing in V-PP-PP* (see also Richards 2014: 183, (60b))
 Who_i did you _{[vP [_{v'} talk [_{PP} to _{___}]] [_{PP} about the reasons you voted for _{pg_i}]]?}



UPSHOT: the anti-c-command condition on *pg*-licensing ((59)) reveals that verb phrases can *ascend*.

- ↪ Left-to-right asymmetries in English passivization cannot be accounted for with (i) height-based intervention (determined via asymmetric c-command) and (ii) obligatorily descending verb phrases.
- ↪ Passivization asymmetries in ascending verb phrases require **precedence-based intervention**.

In section 6, I develop an analysis of precedence-based intervention. But first...

4. Against binding arguments for (radically) descending verb phrases

Despite the evidence from *do so* and parasitic gaps, binding/licensing tests ostensibly support *radically descending* verb phrase structure (Barss and Lasnik 1986; Larson 1988; Pesetsky 1995; Phillips 1996, a.m.o.).

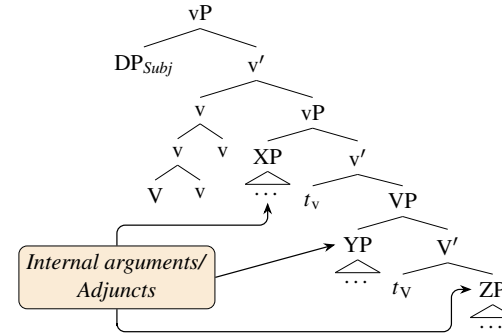
Binding/licensing go left-to-right in vP

In (66)–(69), the binder/licensor is in a PP argument while the bindee/licensee is in a PP adjunct to its right.

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

If the binder/licensor must c-command (ignoring PP nodes, see Pesetsky 1995: 173) the bindee/licensee, then *descending* structures would be necessary, contrary to what I have proposed:

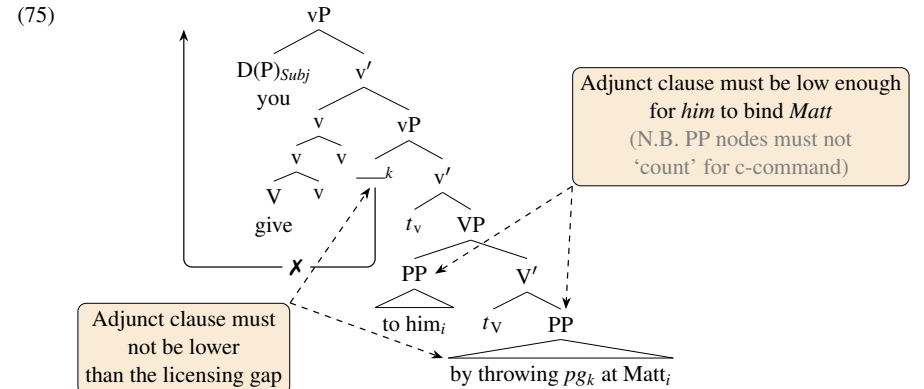
- (70) **A radically descending verb phrase (to be rejected)**



Parasitic gaps illustrate that the binding/licensing phenomena **do not require c-command**: direct object gaps license *pgs* in clause-final adjuncts simultaneous with rightward binding/licensing into those adjuncts.

- (71) *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}]?
- (72) *Parasitic gap licensing with simultaneous left-to-right reciprocal binding in vP*
- a. What_k did you _[vP give _{___}_k to Matt_i and Joni_j together with each other_{i+j}'s drawings of _{pg_k}]?
 - b. * What_k did you _[vP give _{___}_k to each other_{i+j} together with Matt_i and Joni_j's drawings of _{pg_k}]?
- (73) *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}]?
- (74) *Parasitic gap licensing with simultaneous left-to-right Condition C effects in vP*
- 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]?

These data are paradoxical if (i) binding requires c-command and (ii) *pg*-licensing requires anti-c-command:

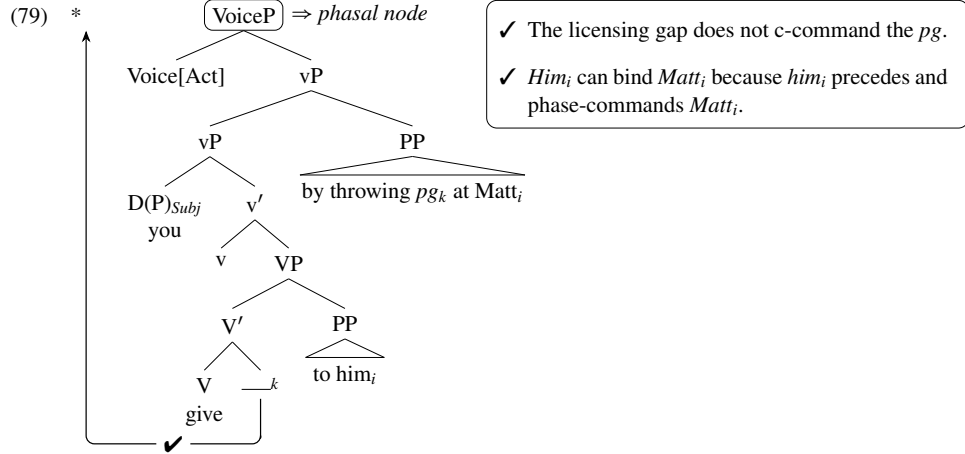


(See Appendix G for additional *pg* and binding data in tritransitive VPs and w/ extraposed CP arguments.)

A non-c-command-based account of binding is needed: precede-and-command

I therefore propose that binding/licensing are sensitive to *precedence* and a *coarser grained notion of command* (see also Langacker 1969, Jackendoff 1972, Lasnik 1976, and Neeleman and van de Koot 2022).

- (76) **Binding**
A binds B iff A and B are coindexed and A precedes and phase-commands B. (Bruening 2014: 344)
- (77) **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))
- (78) **Phasal nodes**
CP, VoiceP, DP



5. Interim summary

- §2. English passive A-movement exhibits left-to-right intervention effects with arguments and adjuncts.
- §3. English verb phrases can *ascend*, where “leftmost = lowest”. Left-to-right intervention cannot be exclusively attributed to the relative structural prominence of interveners.
- §4. The anti-command condition on parasitic gap licensing reveals that binding and licensing do not require c-command $\leadsto$ *precedence* plays a role in binding, too.

6. A search algorithm for internal Merge

Proposal

Precedence-based intervention is derivable from procedural aspects of internal Merge-triggered search.

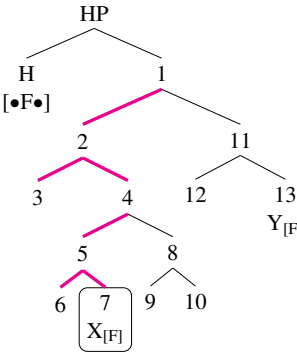
A derivational, probe-goal framework for internal Merge

- (Internal) Merge-triggering features (e.g. [$\bullet F \bullet$]) are *probes* which are lexically borne by heads.
 - Probes initiate a *search* for a *matching* goal in the c-command domain of the head bearing the probe.
- (80) **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 categorial feature of N. (modeled after Zyman To appear: 31, (42))
- Search proceeds node-by-node through the tree (save for opaque portions of structure, e.g. spellout domains) and halts once a matching goal is found; if no goal is found, the derivation crashes.

Search is depth-first, left-to-right (see also Appendix F)

- * *Depth-first*: evaluate daughters before sisters (Atlamaz 2019; Branan and Erlewine 2022; Chow 2022; Krivochen 2023).
- * *Left-to-right*: evaluate left daughters before right daughters. I assume that **sisters are linearly ordered for evaluation** (Branan and Erlewine 2022; Chow 2022).

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



1. Evaluate the starting node ‘1’.
2. If it doesn’t match [$\bullet F \bullet$], evaluate the left daughter of ‘1’.
3. If that node doesn’t match [$\bullet F \bullet$], evaluate that node’s left daughter.
- ...
- If a terminal node is reached without a match, backtrack to a node with an as-yet-unsearched (right) daughter, and continue from there.

* *Depth-first, left-to-right search predicts precedence-based intervention.* *

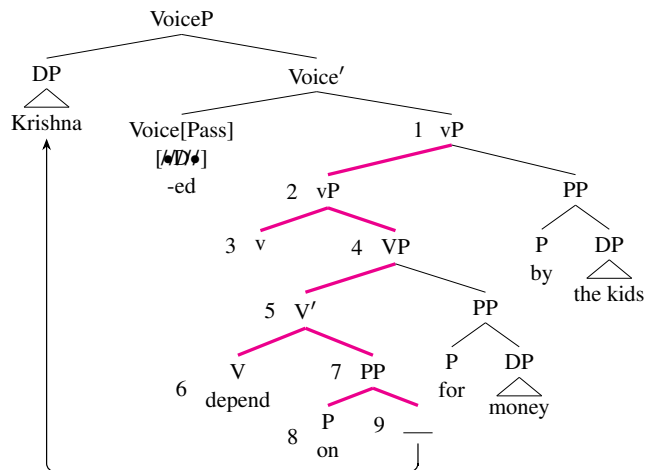
An analysis of passive A-movement

- Voice[Pass] bears [$\bullet D \bullet$], triggering A-movement of a DP into its Spec (see also Bruening 2011).

Depth-first, left-to-right search predicts precedence-based intervention in ascending (/descending) verb phrases.

- (82) a. Krishna was depended [_{PP} on ___] [_{PP} for money] by the kids.
b. * Money was depended [_{PP} on Krishna] [_{PP} for ___] by the kids.

(83)

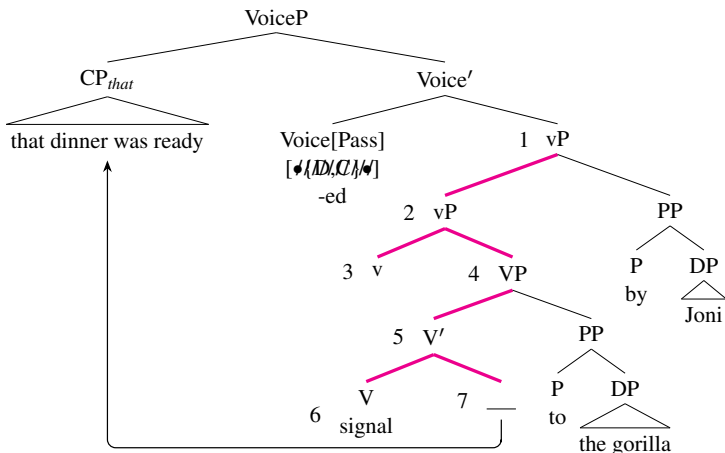


A WRINKLE: because CPs can passivize and intervene for passivization, the probe cannot simply be [$\bullet$ D $\bullet$].

→ PROPOSAL: Voice[Pass] bears a ‘disjunctive’ selectional feature which can be matched by either a DP or a CP → Voice[Pass] bears [$\bullet$ {D,C} $\bullet$].

- (84) a. [_{CP} That dinner was ready] was signaled __ [_{PP} to the gorilla] by Joni.
b. * The gorilla was signaled {[_{PP} to __]} [_{CP} that dinner was ready] {[_{PP} to __]} by Joni.

(85)



(See Appendix D for evidence that nominals lacking a D layer may be invisible to the passive probe.)

By contrast, these asymmetries are wholly unexpected under purely structural approaches to intervention.

Closeness is not defined in terms of asymmetric c-command

- If PPs count for c-command: none of the potentially passivizable DPs/CPs in (83) or (85) c-command the others, failing to predict intervention.
- If PPs don't count for c-command: we wrongly predict right-to-left intervention in ascending VPs.

Contra Relativized Minimality (Rizzi 1990), the Minimal Link Condition (Chomsky 1995: ch. 4), and Attract Closest (Pesetsky 2000: 15, (30)), among others.

Closeness is not determined via node counting/path measurement

Previous work has argued that ‘closeness’ can be calculated either (i) by counting the number of nodes/branches intervening between the probe and the goal (see Müller 1998: 130) or (ii) by counting the number of maximal projections intervening between the landing site and the goal (Hornstein 2009: 35ff.).

- All potentially passivizable DPs/CPs within the VPs of (83) and (85) are predicted to either be equidistant from Voice[Pass] or else the DP in the rightmost PP should qualify as ‘closer’ to Voice[Pass].
- DPs in vP-adjuncts are wrongly expected to intervene.

* **Precedence-based intervention exists, and it follows from depth-first, left-to-right search.** *

7. Precedence elsewhere in syntax?

Precedence in binding

Section 4 argued for a non-c-command-based theory of binding based on asymmetries between binding and parasitic gap licensing. A plausible alternative is that binding is sensitive to precedence.

Precedence-based intervention $\bar{A}$ -movement (i.e. in superiority effects)

Preliminary investigation also suggests that precedence-based intervention is observable in *wh*-questions (see also McInnerney 2022: 285, (147); Jackendoff 1990: 433, (25c–d); and Larson 2014: 317, (48d)):

- (86) a. Who_i were these cookies given [_{PP} to ___i] [_{PP} by who(m)]?
b. ?? 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]?)
- (87) a. Who_i did you give the cookies [_{PP} to __] [_{PP} on whose birthday]?
b. * Whose birthday_i did you give the cookies [_{PP} to who(m)] [_{PP} on ___i]?
(cf. Whose birthday_i did you give the cookies [_{PP} to Joni] [_{PP} on ___i]?)

Erik Zyman (*p.c.*) reports the following judgments which are predicted by precedence-based superiority:

- (88) 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 __]]?

(89) **An account of precedence-based intervention in *wh*-questions**

C_[+wh] bears [•wh•], and internal Merge-initiated search is depth-first, left-to-right.

UPSHOT: information about precedence must be available during syntactic structure building.

— **There's a precedent for precedence** —

There are independent arguments that precedence relations must be visible during the syntactic computation (e.g. Saito and Fukui 1998, Fukui 2001, Kayne 2011, 2022, Zwart 2011, Bruening 2018).

— **Why precedence?** —

If probing is defined *derivationally* (see Appendix F), then *some asymmetry* must be imposed on sisters.

→ C-command won't cut it, since sisters c-command each other.

Precedence is a plausible alternative for encoding asymmetry among sisters, arguably at Merge.

8. Conclusion

* English passive A-movement displays *precedence-based* (rather than *height-based*) intervention.

(90) **Precedence-based intervention in English passivization**

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

* Precedence-based intervention effects are derivable from procedural aspects of the search algorithm initiated by internal Merge-triggering probes.

→ Because my analysis ascribes no role to c-command/relative structural prominence among accessible goals, it is compatible with strong evidence for *ascending verb phrases* in English.

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A. Tritransitive VPs

Left-to-right passive asymmetries in tritransitive V-DP-PP-PP

- (91) a. [DP Divac] was traded ___ [PP to the Hornets] [PP for Bryant] by the Lakers.
 b. * The Hornets were traded [DP Divac] [PP to ___] [PP for Bryant] by the Lakers.
 c. * Bryant was traded [DP Divac] [PP to the Hornets] [PP for ___] by the Lakers.

vP pseudoclefting illustrates that these PPs are arguments:

- (92) a. What the Lakers did was [vP trade [DP Divac] [PP to the Hornets] [PP for Bryant]].
 b. * What the Lakers did [PP to the Hornets] was [vP trade [DP Divac] [PP for Bryant]].
 c. * What the Lakers did [PP for Bryant] was [vP trade [DP Divac] [PP to the Hornets]].

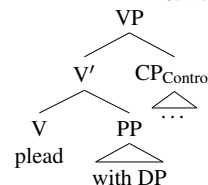
do so-replacement and parasitic gap licensing show that tritransitive verb phrases can ascend:

- (93) do so-replacement in [[[V-DP]-PP]-PP]
 a. If Matt traded_V [DP his watch] [PP to anyone] [PP for anything], he likely did so [PP to Joni] [PP for an iPad].
 b. If Matt traded_V [DP his watch] [PP to Joni] [PP for anything], he likely did so [PP for an iPad].
 c. * If Matt traded_V [DP anything] [PP to Joni] [PP for an iPad], he likely did so [DP his watch].
- (94) Parasitic gap licensing in [[[V-DP]-PP]-PP]
 a. What_i would you [vP [v' [v' trade ____i] [PP to anyone you know]] [PP for a replica of pg_i]]?
 b. What_i would you [vP [v' [v' trade ____i] [PP to anyone who really wants pg_i]] [PP for a replica of the Eiffel Tower_i]]?

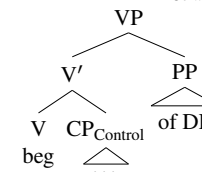
B. Two patterns of intervention with V-PP-CP_{Control} frames

- (95) Class 1 V-PP-CP_{Control} (also call/depend [PP on X] [CP to ...], appeal [PP to X] [CP to ...])
 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] ___.
- (96) Class 2 V-PP-CP_{Control} (also suggest [PP to X] [CP to ...])
 a. * The clerk was begged/asked/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/demanded ___ [PP of the clerk].

(97) Class 1 V-PP-CP_{Control}



(98) Class 2 V-PP-CP_{Control}



Supporting evidence from do so-replacement:

- (99) Class 1 verbs: V+CP_{Control} is not a constituent for do so-replacement
 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].
- (100) Class 2 verbs: V+CP_{Control} is a constituent for do so-replacement
 a. If Matt begged_V/asked_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].

C. Symmetric passivization

Direct objects can passivize over a seemingly intervening DP indirect object in double object constructions in many languages, including some dialects of (British) English (see Holmberg et al. 2019: 681):

(101) North-West British English dialects: V-DP-DP

- a. [DP My sister] was given the ball.
 b. % [DP The ball] was given my sister. (Haddican and Holmberg 2012: 192, (7))

I propose with Ura (1996: ch. 4) and McGinnis (1998) *et seq.* that the direct object optionally undergoes leftward movement over the goal DP to an outer specifier of VP/vP, still accessible to Voice[Pass].

- (102) % [DP The ball] was [vP given ___ my sister ___].

D. Advantage passives

In verb phrases with light idiomatic nominals, there appears to be a(n optional) lack of passive intervention:

- (103) a. Pepper was taken advantage of ___ by the record label.
 b. % Advantage was taken ___ of Pepper by the record label.
 (also pay attention to, make allowance for, set fire to, etc.)

Analysis: there are two structures for idiomatic nominals

- * In (103b), *advantage* is a full DP that can satisfy the probe on Voice[Pass].
- * In (103a), *advantage* is not a full DP (e.g. just NP), hence can't satisfy the probe on Voice[Pass].
 - When *advantage* doesn't intervene for pseudopassivization, it is immobile for other kinds of extraction (see Bresnan 1982: 61–62; Di Sciullo and Williams 1987: 55):

(104) * How much advantage₂ was Pepper₁ taken ____₂ of ____₁?

(105) cf.
How much advantage was taken of Pepper by the record label?

The structural account also explains why pseudopassives can skip over a non-specific/indefinite NP object (but not a definite DP object) in idiolects of English (Mills 2008) and in Swedish (Klingvall 2012: 61, (14)).

E. An additional argument for ascending verb phrases: VP-ellipsis

Prior work argues that VP-ellipsis also reveals *ascending* verb phrases (e.g. Pesetsky 1995; Phillips 1996):

(106) 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))

(107) 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))

CONFOUND: (106)–(107) could involve *pseudogapping*, where the stranded PP has moved out of the ellipsis site (Lechner 2003: 187ff.).

→ THE FIX: test *backward ellipsis*, since only VP-ellipsis can apply backwards (see Sag 1976: 83, n. 22, Johnson 1996: 83):

(108) a. Because John didn't ∅, Mary interviewed Gingrich.
b. * Because John did ∅ Clinton, Mary interviewed Gingrich. (Lasnik 1999: 202, (7)–(8))

DISCOVERY (based on a suggestion by Ad Neeleman): Backward VP-ellipsis can strand certain rightward arguments, revealing ascending verb phrases:

(109) a. *Backward VP-ellipsis in V-DP-PP*
Although he did [_{VP} <give [_{DP} a woolen scarf]> [_{PP} to Mary]], he refused to give a woolen scarf to his best friend. (Ad Neeleman, *pers. comm.*)
b. *Backward VP-ellipsis in V-PP-PP*
Although he does [_{VP} <depend [_{PP} on his parents]> [_{PP} for emotional support]], he doesn't depend on his parents for money.
c. *Backward VP-ellipsis in V-CP-PP*
Although he did [_{VP} <mention [_{CP} that he was upset]> [_{PP} to Mary]], he refused to mention that he was upset to his best friend.

F. The full search algorithm

- (110) **A depth-first, left-to-right search algorithm for Merge-based probing:**
- a. Let [**•F•**] 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 [**•F•**]?
 - 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 [**•F•**]?
 - If so, halt with the syntactic object of which L is the root as the goal.
 - Else, return to step (110b-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 (110b) using R as the new “N.” If there are no such nodes, halt with *no goal*.
 - c. QUERY: was a goal found?
 - i. If so, Merge(H^{max}, “goal”).
 - ii. Else, abort the derivation.

G. Additional parasitic gap evidence against purely c-command-based accounts of binding

Examples (71)–(74) showed that direct object gaps license *pgs* in clause-final adjuncts simultaneous with rightward binding/licensing into those same adjuncts.

Similar results obtain ...

- ... with clause-final PP arguments in tritransitive V-DP-PP-PP verb phrases:

- (111) *Parasitic gap licensing with simultaneous left-to-right variable binding in vP*
- a. What_k did you [_{VP} trade/sell _____k [_{PP} to every boy_i] [_{PP} for his_i cheap replica of pg_k]]?
 - b. * What_k did you [_{VP} trade/sell _____k [_{PP} to him_i] [_{PP} for every boy_i's cheap replica of pg_k]]?
- (112) *Parasitic gap licensing with simultaneous left-to-right reciprocal binding in vP*
- a. What_k did you [_{VP} trade/sell _____k [_{PP} to Eli_i and Al_j] [_{PP} for each other_{i+j}'s drawings of pg_k]]?
 - b. * What_k did you [_{VP} trade/sell _____k [_{PP} to each other_{i+j}] [_{PP} for Eli_i and Al_j's drawings of pg_k]]?
- (113) *Parasitic gap licensing with simultaneous left-to-right each ... the other licensing in vP*
- a. What_k did you [_{VP} trade/sell _____k [_{PP} to each contestant] [_{PP} for the other's replica of pg_k]]?
 - b. * What_k did you [_{VP} trade/sell _____k [_{PP} to the other] [_{PP} for each contestant's replica of pg_k]]?
- (114) *Parasitic gap licensing with simultaneous left-to-right NPI-licensing in vP*
- a. What_k would you [_{VP} trade/sell _____k [_{PP} to no customer] [_{PP} for anyone's replica of pg_k]]?
 - b. * What_k would you [_{VP} trade/sell _____k [_{PP} to any customer] [_{PP} for noone's replica of pg_k]]?
- (115) *Parasitic gap licensing with simultaneous left-to-right Condition C effects in vP*
- a. * What_k did you [_{VP} trade/sell _____k [_{PP} to him_i] [_{PP} for Matt_i's cheap replica of pg_k]]?
 - b. What_k did you [_{VP} trade/sell _____k [_{PP} to Matt_i] [_{PP} for his_i cheap replica of pg_k]]?

- ... with clause-final (extraposed) CP arguments in tritransitive V-DP-DP-CP verb phrases:

- (116) *Parasitic gap licensing with simultaneous left-to-right variable binding in VoiceP*
- Who_k did you [VoiceP [vP bet _____k an/some/each extremely expensive bottle of wine_i _____j] [CP that its_i gaudy label would be unappealing to pg_k]_j]?
 - * Who_k did you [VoiceP [vP bet _____k it_i _____j] [CP that an/some/each extremely expensive bottle of wine_i's gaudy label would be unappealing to pg_k]_j]?
- (117) *Parasitic gap licensing with simultaneous left-to-right each ... the other licensing in VoiceP*
- Who_k did you [VoiceP [vP bet _____k each bottle of wine _____j] [CP that the other's gaudy label would be unappealing to pg_k]_j]?
 - * Who_k did you [VoiceP [vP bet _____k the other _____j] [CP that each bottle of wine's gaudy label would be unappealing to pg_k]_j]?
- (118) *Parasitic gap licensing with simultaneous left-to-right Condition C effects in VoiceP*
- * Who_k did you [VoiceP [vP bet _____k the damned thing_i _____j] [CP that that extremely expensive bottle of wine_i's gaudy label would be unappealing to pg_k]_j]?
 - Who_k did you [VoiceP [vP bet _____k that extremely expensive bottle of wine_i _____j] [CP that the damned thing_i's gaudy label would be unappealing to pg_k]_j]?

- ... and with CP arguments (in V-DP-CP) extraposed to the right of PP adjuncts (judgments mine):

- (119) *Parasitic gap licensing with simultaneous left-to-right variable binding in VoiceP*
- Who_k did you [VoiceP [vP persuade _____k _____j [PP on each college campus_i]] [CP that you were going to meet up with pg_k in its_i library]_j]?
 - * Who_k did you [VoiceP [vP persuade _____k _____j [PP on it_i]] [CP that you were going to meet up with pg_k in each college campus_i's library]_j]?
- (120) *Parasitic gap licensing with simultaneous left-to-right each ... the other licensing in VoiceP*
- Who_k did you [VoiceP [vP persuade _____k _____j [PP in each coffee shop]] [CP that the other would appeal to pg_k more]_j]?
 - * Who_k did you [VoiceP [vP persuade _____k _____j [PP in the other]] [CP that each coffee shop would appeal to pg_k more]_j]?
- (121) *Parasitic gap licensing with simultaneous left-to-right NPI-licensing in VoiceP*
- Who_k did you [VoiceP [vP persuade _____k _____j [PP on no occasion]] [CP that you were going to meet up with pg_k in any_i library]_j]?
 - * Who_k did you [VoiceP [vP persuade _____k _____j [PP on any occasion]] [CP that you were going to meet up with pg_k in no_i library]_j]?
- (122) *Parasitic gap licensing with simultaneous left-to-right Condition C effects in VoiceP*
- * Who_k did you [VoiceP [vP persuade _____k _____j [PP on that day_i]] [CP that you were going to meet up with pg_k after Friday_i's lecture]_j]?
 - Who_k did you [VoiceP [vP persuade _____k _____j [PP on Friday_i]] [CP that you were going to meet up with pg_k after that day_i's lecture]_j]?

Thus, the anti-c-command condition on parasitic gap licensing consistently points to a non-c-command-based account of the relevant binding/licensing facts.